Collaborative Terminology Tooling & Data Management (CTT & DM)

Tooling and Server Development

Requirements Specification Document

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# Introduction

VA and the Department of Defense (DoD) have failed to meet the goals of interoperability, standardization, and computability as mandated by Congress in the [National Defens](http://www.gpo.gov/fdsys/pkg/CPRT-113HPRT86280/pdf/CPRT-113HPRT86280.pdf)e [Authorization Act (NDAA) for Fiscal Year (FY) 2014](http://www.gpo.gov/fdsys/pkg/CPRT-113HPRT86280/pdf/CPRT-113HPRT86280.pdf), the [Omnibus Spending Bill of 2014](http://docs.house.gov/billsthisweek/20140113/CPRT-113-HPRT-RU00-h3547-hamdt2samdt_xml.pdf), and [House of Representatives (HR) 4486 Military Construction and VA Spending Bill](http://rules.house.gov/bill/113/hr-4486).

At this time, VA does not have an approved and resourced terminology plan that can be successful. Interoperability mandates from Congress and the Office of Management and Budget (OMB) can be met with proper planning and investment. As a result, the quality and timeliness of VA Health and Benefits Services can be transformed by up-to-date, computable clinical data, coded with national standards, to and from DoD, Veterans Benefit Administration (VBA), and Veterans Health Administration (VHA) staff at the point of service.

Enterprise Terminology Service (ETS)

Knowledge Based Systems (KBS) and Standards and Terminology Services (STS) are working to establish a collaborative Enterprise Terminology Service (ETS) that bridges clinical and technical domains in order to address both the Congressional and Executive mandates for interoperability, standardization, computability, and meaningful use. The ETS will consist of two primary components operating in tandem.

Clinical Terminology Service (CTS)

First, a robust Clinical Terminology Service (CTS) is necessary to establish and continually improve the VA’s ability to collect and accurately and fully represent healthcare data in the medical record. The CTS will address internal VHA terminology consultation and business ownership needs. These needs have grown tremendously because of the new demands from the Veterans Health Information Systems Technology Architecture (VistA) Evolution, Connected Health, and Compensation and Pension (C&P) and the shift of responsibilities back to VHA from the Interagency Program Office (IPO).

Technical Terminology Service (TTS)

Secondly, a robust Technical Terminology Service (TTS) is necessary to publish standard terminologies and to ensure their complete integration with VA Health Information Technology (HIT) systems and applications. The TTS will address internal Office of Information and Technology (OI&T) technical needs, including terminology publication and distribution, as well as technical consultation for accessing terminology resources, for example, Service Oriented Architecture (SOA) integration.

Collectively, the ETS is foundational to establishing and maintaining robust interoperability with VA partners, such as DoD and VBA, and addressing longstanding Congressional concerns. Specific business objectives that necessitate stating these requirements include:

1. The safety and life-critical nature of the health data VA encodes and processes. Mistakes in the semantic encoding and/or processing of this health data result in morbidity and mortality to the Veterans we serve.
2. Health data must be ubiquitously standardized to deliver the full promises of HIT systems, including the ability to compare the processes, and quality, of care among national and International health providing organizations. Achieving this ubiquitous standardization requires participation in collaborative and open-source development efforts. We have a variety of existing relationships, and contemplated relationships, that center around particular open-source projects, such as the International Health Terminology Standards Development Organization (IHTSDO) Open Tooling Framework, and the IHTSDO workbench that is currently utilized by the IHTSDO, Denmark, Sweden, the United States National Library of Medicine, Kaiser Permanente, and some internal VA projects. In cases where contributions to, or extension of, these shared projects is a business requirement, we will specify requirements for specific development languages, libraries, developer operations automation frameworks, and database technologies.

## Purpose

The purpose of this document is to describe the business and informatics architecture needs of Collaborative Terminology Tooling & Data Management (CTT & DM) Tooling and Server Development. This document provides a foundation for establishing baseline and identifies the capabilities and functionalities in support of CTT & DM Tooling and Server Development.

## Scope

The scope of the RSD includes new CTT and DM Tooling and Server Development functionalities as well as enhancements to existing functionalities.

## References

* [Department of Veterans Affairs Handbook](http://www1.DNS   /vapubs/viewPublication.asp?Pub_ID=50&FType=2) 6500
* Collaborative Terminology Tooling & Data Management (CTT & DM) Tooling and Server Development BRD
* CTTDM Jazz
* [http://vista.med.va.gov/nsrd/Tab\_GeneralInfoView.asp?RequestID=20100](http://vista.med.DNS   /nsrd/Tab_GeneralInfoView.asp?RequestID=20100904)904
* [http://www.gpo.gov/fdsys/pkg/CPRT-113HPRT86280/pdf/CPRT-113HPR](http://www.gpo.gov/fdsys/pkg/CPRT-113HPRT86280/pdf/CPRT-113HPRT86280.pdf)T86280.pdf
* Consolidated Appropriations Act, 2014 ([http://docs.house.gov/billsthisweek/20140113/CPRT-113-HPRT-RU00-h3547](http://docs.house.gov/billsthisweek/20140113/CPRT-113-HPRT-RU00-h3547-hamdt2samdt_xml.pdf)- [hamdt2samdt\_xml.pdf](http://docs.house.gov/billsthisweek/20140113/CPRT-113-HPRT-RU00-h3547-hamdt2samdt_xml.pdf))
* [http://rules.house.gov/bill/113/hr-](http://rules.house.gov/bill/113/hr-4486)4486
* Standard GUI Compliance
* [http://www.oracle.com/technetwork/java/javase/overview-137531.htm](http://www.oracle.com/technetwork/java/javase/overview-137531.html)l
* [http://www.ihtsdo.org/fileadmin/user\_upload/Docs\_01/Publications/SNOMED\_CT\_Dia](http://www.ihtsdo.org/fileadmin/user_upload/Docs_01/Publications/SNOMED_CT_Diagramming_Guideline.pdf)g [ramming\_Guideline.pd](http://www.ihtsdo.org/fileadmin/user_upload/Docs_01/Publications/SNOMED_CT_Diagramming_Guideline.pdf)f

# Overall Description

The following sections will cover specifications for accessibility, business rules, design constraints, disaster recovery, documentation, functionality, user interface, performance, quality attributes, reliability, scope integration, security, system features, and usability.

## Accessibility Specifications

The accessibility specifications are to be in compliance with relevant guidelines and regulations set forth by Section 508 of the Rehabilitation Act of 1973. Accessibility testing will be done to included compliance with:

* [Americans with Disabilities Act of](http://en.wikipedia.org/wiki/Americans_with_Disabilities_Act_of_1990) 1990
* [Section 508 Amendment to the Rehabilitation Act of](http://en.wikipedia.org/wiki/Section_508_Amendment_to_the_Rehabilitation_Act_of_1973) 1973
* [Web Accessibility Initiative](http://en.wikipedia.org/wiki/Web_Accessibility_Initiative) (WAI) of the [World Wide Web Consortium](http://en.wikipedia.org/wiki/World_Wide_Web_Consortium) (W3C)
* [http://www.Secti](http://www.section508.gov/)on508.gov

## Business Rules Specification

If the system has to change the release process, it has to modify the POM file and project sources, and then check those changes into the project’s version control system and then request a project release.

## Design Constraints Specification

* Must run on LINUX box and be able to run in concert with existing system.
* The default platform for all software development beneath the presentation layer development 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 in 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. Scaled Vector Graphics (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 (<http://dev.w3.org/csswg/css-images-4/>) 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 ([https://jersey.java.net](https://jersey.java.net/)) is the default framework for implementing web services.
* The Workflow Management Service shall publish workflow processes as Maven artifacts.
* The Artifact Server shall have a complete history of all 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 rich client tools will support scripting using the Oracle Nashorn JavaScript libraries.
* High-performance stand-alone terminology editing environment, deployed as a [Ja](http://www.oracle.com/technetwork/java/javase/overview-137531.html)va
* [WebStart rich internet application](http://www.oracle.com/technetwork/java/javase/overview-137531.html) 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.

## Disaster Recovery Specification

* The disaster recovery plan must have an accurate call list.
* The disaster recovery should be test and retested to ensure accuracy.
* The members who are responsible should be knowledgeable of their defined role.
* The disaster recovery plan should contain easy to follow steps and directions to reach recovery.
* The disaster recovery plan should be kept up-to-date.
* The disaster recovery plan should have a list of vendor contacts and policies.
* The disaster recovery plan should cover all essential and critical infrastructures.

## Documentation Specifications

System and user documentation for the CTT & DM Tooling and Server Development documentation should include:

* Standard operating procedures;
* Change Management Process;
* User manual for software;
* Documentation for network setup;
* Maintenance agreements/documentation;
* Implementation Guide.

## Functional Specifications

### Functionality and Services

The Project Information System and Management Environment (PRISME) is the underlying software piece that brings all the components together under a development framework to support the following features.

Table : Functionality and Services

| Functionality / Services | Description |
| --- | --- |
| Terminology Server | Provide programmatic access to terminology components. The system should also support the integration of all other terminology sources as required to standardize vocabularies for data sharing with the Department of Defense. |
| Workflow Management & Rules Engine | Support the business life cycle from authoring through execution to monitoring and management – utilizing Drools & jBPM Integration (API).  Workflow Management Service deployed on a Java EE 8/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. |
| Component Request Service | The Component Request Service will enable users to request new components for various applications. |

#### Project Information System and Management Environment

CTT & DM Tooling and Server Development shall provide Project Information System and Management Environment (PRISME) for use by Developers and Managers to administer the development environment by creating an Integrated Development Environment (IDE). Additional PRISME capabilities were also implemented in Release 1.

Table : Project Information System and Management Environment Requirements

| BRD ID | Requirements |
| --- | --- |
| ETS-F-2 | ETS-R-5: The system SHALL show a dashboard displaying the following information:   * List of PRISME projects * Summary statistics of the projects * Links showing any detailed information of the projects (including build metrics) * Tracker for each project * Artifacts deployed for each project * Version control system for each project’s sources and generated website |
| ETS-F-3 | ETS-R-6: The system SHALL use declarative specifications of a project’s build, deployment, Release, reporting, and documentation within a version-controlled Project Object Model (POM) file. Work Item# 305358  ETS-R-7: The POM file SHALL contain the Uniform Resource Locator (URL) locations of the version control system which hosts the project’s POM file as well as any configuration files, data files, and source files and shall also specify the project’s dependencies, the developers involved and the roles they play, the defect tracking system, the continuous integration system, the organizations participating in the project, and the licenses associated with artifacts generated by the project. |

#### Workflow Management Service

PRISME will provide a workflow management service that is based on the **Business Process Model and Notation (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)](http://jbpm.jboss.org/) is an open-source (Apache 2) prototypical example of such a workflow management service.

Table : Workflow Management Service

| BRD ID | Requirements |
| --- | --- |
| ETS-F-9 | ETS-R-109: The system SHALL provide a Workflow management service that can create, load, and execute rules, and able to coordinate workflows between ETS client applications. |
| ETS-F-10 | ETS-R-110: The system SHALL provide workflow management service engine which must run embedded within the default Java 8 Standard Edition (Java 8 SE) application platform. |
| ETS-F-11 | ETS-R-111: The Workflow Management Service SHALL run as a web service deployed on a Java EE 8 SE server. |
| ETS-F-12 | ETS-R-112: The Workflow Management Service SHALL provide access to workflow services through a Representational State Transfer (REST) Application Program Interface (API) |
| ETS-F-14 | ETS-R-119: The Workflow Management Service SHALL have the ability to create a task.  ETS-R-121: The Workflow Management Service SHALL have the ability to execute/complete a task. |
| ETS-F-20 | ETS-R-133: The Workflow Management Service SHALL publish workflow processes as Maven artifacts on the Artifact Repository Service. |

#### Identity and Access Management Service

Additional identity and access management service capabilities were also implemented in Release 1.

Table : Identity and Access Management Service Requirements

| BRD ID | Requirements | |
| --- | --- | --- |
| ETS-F-22 | ETS-R-135: The system SHALL provide a single-sign-on capability so that users only have to log on once and all role-based access control is managed from this single-sign-on. | |
| ETS-F-23 | ETS-R-12: The Identity and Access Management service SHALL support publication of a terminology system that consists of users and their roles, so that terminology development environments can use those concepts to identify editing actions of users, and to determine roles assigned to individual users.  ETS-R-13: The system SHALL allow the user to be assigned to a concept and a role. |
| ETS-F-26 | ETS-R-14: The system SHALL allow stratification of user’s assigned role (e.g., modeler, quality assurance, reviewer, and mentor).  ETS-R-15: The system SHALL allow access to particular user functions and work flows may be granted or denied based on user role. |

#### Artifact Repository Service

PRISME will provide an artifact repository service. [Artifactory](http://www.jfrog.com/home/v_artifactory_opensource_overview) [Apache Archiva](http://archiva.apache.org/index.cgi) and [Sonotype Nexus](http://www.sonatype.org/nexus/) are prototypical examples of artifact repository services.

Table : Artifact Repository Requirements

| BRD ID | Requirements | |
| --- | --- | --- |
| ETS-F-30 | ETS-R-19: The Artifact Repository Service SHALL classify artifacts with a type that describes the format of a project artifact. An example type, such as “RF2” would indicate that the artifact contained terminology content represented as Systematized Nomenclature of Medicine (SNOMED) Release Format 2 files. The classifier can optionally be used to describe different variations of a file Release such as "Delta" or "Full" |

#### Version Control Service

PRISME shall provide a version control service. A prototypical example of this version control service would be [Git](http://Git-scm.com) or [Apache Subversion](http://subversion.apache.org). Git is used by [OSEHRA](http://www.osehra.org/page/osehra-code-repository) and synergism and/or integration with OSEHRA is worth considering.

Additional version control service capabilities were also implemented in Release 1.

Table : Version Control Service Requirements

| BRD ID | Requirements |
| --- | --- |
| ETS-F-41 | ETS-R-139: The Version Control Service SHALL allow single-sign-on and role-based access control via the Identity and Access Management Service (ETS-F-22 above). |

#### Project Creation Application

The project creation application will guide the selection of options necessary to create a project POM and to create the necessary infrastructure components (version control repository, continuous integration server setup, web site deployment location, issue trackers) and to select the proper project options. The goal of the project creation application is to enable technical users to create projects more efficiently and to also enable non-technical project managers to be able to set up their own projects with guidance from the application. Additional project creation application capabilities will also be implemented in Release 2.

Table : Project Creation Application Requirements

| BRD ID | Requirements |
| --- | --- |
| ETS-F-59 | ETS-R-37: The Project Creation Application SHALL automate the creation and initialization of the Version Control Service repository for a project, and check in initial project sources into the Version Control Service. |
| ETS-F-60 | ETS-R-38: The Project Creation Application SHALL automatically configure the Continuous Integration Service to check out the project from the Version Control Service, build the project, and then deploy the project to the Artifact Repository Service. |
| ETS-F-61 | ETS-R-39: The Project Creation Application SHALL allow a project administrator to select filtered project dependencies (such as a version of SNOMED or LOINC) from a list of dependencies of the proper classification (java library, terminology content, etc.) obtained from searching the PRISME Artifact Repository Service in real time. |

### Content Management Capabilities

Content management capabilities are discrete functions that may be aggregated together to form an application. For example, a comprehensive editing environment would have all the content management capabilities available within a single environment. A web application may only use selected content management capabilities to efficiently serve the needs of a single user community with minimal setup and training.

#### Taxonomy Viewing

Additional taxonomy viewer capabilities were also implemented in Release 1.

Table : Taxonomy Viewing Requirements

| BRD ID | Requirements |
| --- | --- |
| ETS-F-74 | ETS-R-154: The taxonomy viewer SHALL display the definition status of each concept (active, inactive) and Attribute section (fully defined or primitive). This can be accomplished through the use of icons. The incorporation of a “focused taxonomy browser” (a view limited to one concept and only its immediate subtypes and super types) would be especially helpful. |
| ETS-F-69 | ETS-R-44: The taxonomy viewer SHALL support custom shapes and colors based on different terminology characteristics and colors may display what path or module a component is part of. |
| ETS-F-71 | ETS-R-47: The taxonomy viewer SHALL be configurable to display an appropriate icon based on membership of a concept in a reference set. |

#### Query Capabilities

Additional query capabilities were also implemented in Release 1.

Table : Query Capabilities Requirements

| BRD ID | Requirements |
| --- | --- |
| ETS-F-80 | ETS-R-49: The user SHALL be able to construct standard queries using a graphical interface that supports type-ahead completion for selecting concepts for use in the query specification. |
| ETS-F-83 | ETS-R-164: The system SHALL have access to comprehensive ad-hoc searching capabilities.  ETS-R-166: The system SHALL be able to search by fully specified name or other description, by active/inactive status, by any of a concept's properties or relationships.  ETS-R-168: The system SHALL allow the user to have a preference option on how they want to search in the taxonomy view. |

#### Description Logic

Additional description logic capabilities were also implemented in Release 1.

Table : Description Logic Requirements

| BRD ID | Requirements |
| --- | --- |
| ETS-F-171 | ETS-R-56: The system SHALL provide classifier functionality for the SOLOR Terminologies (SNOMED CT, LOINC, and RxNorm). |

#### Mapping Capabilities

Additional mapping capabilities were also implemented in Release 1.

Table : Mapping Capabilities Requirements

| BRD ID | Requirements |
| --- | --- |
| ETS-F-163 | ETS-R-59: The system SHALL support mapping between and among terms and knowledge artifacts. |
| ETS-F-164 | ETS-R-60: The system SHALL support users in creating, maintaining, updating and versioning mappings between and among terms and knowledge artifacts |
| ETS-F-188 | ETS-R-61: The system SHALL support mapping to multiple standardized terminologies, including SNOMED CT, LOINC, and RxNorm and the ability to designate mappings as “exact,” “narrower than,” or “broader than.” |
| ETS-F-189 | ETS-R-62: The system SHALL have a dedicated terminology mapping interface allowing users to visualize both the source and the target standardized terminologies (codes and terms) in the same panel. |
| ETS-F-215 | ETS-R-63: The system SHALL allow authors to define the metadata for a map set/value set. Metadata shall include the following:   * Map set name * Map set identifier * Source terminology version * Terminology version * Purpose of the map set * Map set equivalence identifier * Map type that defines if the map is from a standards development organization map, government recognized map or a proprietary/customized map * Map set status * Reason for change |
| ETS-F-180 | ETS-R-251: The system SHALL provide the ability to create a new map set. |
| ETS-F-191 | ETS-R-189: The system SHALL support mapping workflow integration, including assignment of users and roles to mapping tasks, support approval/rejection status or conflict adjudication, the ability of users respond to or add comments, etc. |
| ETS-F-216 | ETS-R-190: The system SHALL allow authors to store guidelines or rules (heuristics) that govern the map and its creation and use. |
| ETS-F-178 | ETS-R-252: The system SHALL have the ability to edit existing Map Sets |
| ETS-F-178 | ETS-R-287: The system SHALL display the Map Sets in the Terminology Editor with the following data points:   * VUID * Preferred Name * Description * Source Code System * Source Version * Target Code System * Target Version * VHAT Version * Workflow State * Map Entry Changes * Status * Last Updated * Action |

#### Workflow

Table : Workflow Requirements

| BRD ID | Requirements |
| --- | --- |
| ETS-F-128 | ETS-R-200: The system SHALL provide the ability to define a workflow that can be modified easily to adapt to changes in VA business requirements. |
| ETS-F-155 | ETS-R-204: The system SHALL build the workflow algorithm which can add users based on authoring permissions (i.e., modeler, reviewer, approver, etc.).  ETS-R-205: The system SHALL provide workflow that supports approval, rejection, approval for publication status, and workflow comments.  ETS-R-206: The system SHALL display workflow comments and changes.  ETS-R-207: The system SHALL build a Workflow that can be either user-based or role-based depending on need. |
| ETS-F-157 | ETS-R-209: The system SHALL display a message “This concept is authored already” during the event when more than one author models the same concept. |
| ETS-F-174 | ETS-R-211: The system SHALL display all workflow history for a concept in a given release period. |

#### Concept Management

Additional concept management capabilities were also implemented in Release 1 as well as Backlog work.

Table : Concept Management Requirements

| BRD ID | Requirements |
| --- | --- |
| ETS-F-159 | ETS-R-64: The system SHALL allow the modeler to create new concepts within the SOLOR terminology (Deferred editorial policy)  ETS-R-100: The New concepts SHALL be created through a semi-automated process (which includes functionality such as pre-populating preferred terms) |
| ETS-F-193 | ETS-R-65: The system SHALL allow the modeler to edit existing concepts e.g., addition or retirement of new descriptions, relationships, etc.)(Deferred editorial policy) |
| ETS-F-194 | ETS-R-66: The system SHALL allow the user to create child concept. The ability to create a new concept as a child of another.  ETS-R-103: The system SHALL allow the user to clone terminology from another terminology. |
| ETS-F-160 | ETS-R-218: The system SHALL allow the modeler to retire concepts manually (Deferred Editorial Policy). |
| ETS-F-161 | ETS-R-220: The system SHALL allow the modeler to see a given concept’s history (all previous versions of the concept) in an easily viewable format. |
| ETS-F-162 | ETS-R-223: The system SHALL have a means of indicating the origin of concepts, Refsets, and other content (i.e., the capability to distinguish which content is created by the KBS terminology authoring team and which content has been created outside of KBS and by whom, STAMP Details). |
| ETS-F-195 | ETS-R-224: The system SHALL provide graphical user interface components which enhance and simplify editing processes such as:   * Configurable panels for editing concepts * Viewing the taxonomy * Mapping development, etc. * Navigable history of codes/concepts visited * Ability to copy/paste identifiers and descriptions (via mouse or keyboard shortcuts) * Straight-forward, clearly delineated buttons/controls for editing, creating/retiring content, etc. |

#### Server Requirements

Additional server capabilities were also implemented in Release 1.

Table : Server Requirements

| BRD ID | Requirements |
| --- | --- |
| ETS-F-197 | ETS-R-225: The system SHALL have the ability to import incremental SNOMED CT Releases. |
| ETS-F-201 | ETS-R-226: The system SHALL have the ability to integrate with a workflow service. |
| ETS-F-207 | ETS-R-229: The system SHALL have the ability to interoperate with OSEHRA ISAAC. |

### End User Applications

#### Terminology Web Application Environment

Table : Terminology Web Application Environment Requirements

| BRD ID | Requirements |
| --- | --- |
| ETS-F-142 | ETS-R-74: Web Application Environment SHALL be configurable to provide selected content management capabilities. |

### Inputs into System

#### Terminology Releases from Standards Development Organizations (SDO)

Additional Terminology Releases from Standards Development Organizations (SDO) capabilities were also implemented in Release 1 as well as Backlog work.

Table : Terminology Releases from SDO Requirements

| BRD ID | Requirements |
| --- | --- |
| ETS-F-208 | ETS-R-77: The system SHALL incorporate additional extensions into the taxonomy (e.g., the US Extension). |
| ETS-F-182 | ETS-R-232: The terminology tooling shall have the ability to import VHAT content into VHA Terminology (via existing XML specifications). |
| ETS-F-208 | ETS-R-78: The system SHALL provide the ability so that a concept can be searched using Lucene. |

#### Terminology Releases from Knowledge Sharing Partners

Table : Terminology Releases from Knowledge Sharing Partners Requirements

| BRD ID | Requirements |
| --- | --- |
| ETS-F-148 | ETS-R-97: The system SHALL be able to accept, process, integrate, and version electronic Releases from terminology knowledge sharing partners (VETS/VHAT Map Sets). |

### Outputs from System

#### Outputs from the System

Additional Outputs from the System capabilities are currently planned as Backlog work as well.

Table : Outputs from the System Requirements

| BRD ID | Requirements |
| --- | --- |
| ETS-F-178 | ETS-R-240: The system SHALL support a mechanism for integrating data from the Terminology Tooling (from both IHTSDO Workbench and OSEHRA ISAAC) with existing (current) VA systems. |
| ETS-F-179 | ETS-R-243: The system SHALL provide the ability to search in VHAT by (not limited):   * Designation Name * Property Name * Property Value * Relationship Name * Relationship Value * VUID * Version * Domains |

### VETS Platform

#### Terminology Browser

Table : Terminology Browser Requirements

| BRD ID | Requirements |
| --- | --- |
| ETS-F-178 | ETS-R-257: The system SHALL provide a browser that end user may use to view VHA Terms |

#### SDO Imports

Table : SDO Imports Requirements

| BRD ID | Requirements |
| --- | --- |
| ETS-F-180 | ETS-R-261: The System SHALL have the ability to import content from SDO providers:   * LOINC * RxNorm * SNOMED CT |

#### Terminology Editor (TED)

Table : Terminology Editor (TED) Requirements

| BRD ID | Requirements |
| --- | --- |
| ETS-F-178 | ETS-R-288: The system SHALL have the ability to edit existing VETS items. |
| ETS-F-178 | ETS-R-263: The system SHALL have the ability to view/edit the following subsets for Allergy domain and not limited to:   * Legacy Allergy Reactants * Legacy Allergy Reactions * Reactants * Reactions |
| ETS-F-178 | ETS-R-264: The system SHALL have the ability to view/edit the following subsets for Immunizations domain and not limited to:   * Imm Admin Routes * Imm Body Sites * Imm Contraindications * Imm Info Sources * Imm Manufacturers * Imm Procedures * Imm Refusal Reasons * Imm VIS * Legacy Imm Procedures * Legacy Skin Tests * Skin Tests |
| ETS-F-178 | ETS-R-265: The system SHALL have the ability to view/edit the following subsets for National Drug File and not limited to:   * Drug Classes * Drug Ingredients * Drug Products * Generic Drugs |
| ETS-F-178 | ETS-R-266: The system SHALL have the ability to view/edit the following subsets for Orders domain and not limited to:   * Nature of Order * Order Status |
| ETS-F-178 | ETS-R-267: The system SHALL have the ability to view/edit the following subsets for Pharmacy domain and not limited to:   * Medication Routes |
| ETS-F-178 | ETS-R-268: The system SHALL have the ability to view/edit the following subsets for TIU domain and not limited to:   * TIU Doc Type * TIU Role * TIU SMD * TIU Service * TIU Setting * TIU Status * TIU Titles |
| ETS-F-178 | ETS-R-269: The system SHALL have the ability to view/edit the following subsets for Value set and not limited to:   * Allergy Types * Genders * Marital Statuses * Medication Types * Problem Statuses * Medication Statuses |
| ETS-F-178 | ETS-R-270: The system SHALL have the ability to Service SHALL have the ability to view/edit the following subsets for Vitals domain and not limited to:   * Vital Categories * Vital Qualifiers * Vital Types |

## Graphical User Interface (GUI) Specifications

### General GUI Compliance

The ETS and STS Tooling and Server Development shall provide general graphical user interface compliance. Some general GUI compliance including the following specifications:

* A well-defined on-screen indication of the current focus will be provided.
* The on-screen indication moves among interactive interface elements as the input focus changes.
* Focus will be programmatically exposed so that assistive technology can track focus and focus changes.
* Identity, operation, and state of the user interface element, will be available to support assistive technology.
* An image that represents a program element, the information conveyed by the image must also be available in text.
* Textual information will be provided through operating system functions for displaying text.
* Minimum information that will be made available is text content, text input caret location, and text attributes.
* Applications will not override user-selected contrast and color selections and other individual display attributes.
* When electronic forms are used, the form will allow people using assistive technology, to access the information, field elements, and functionality required, for completion and submission of the form, including all directions and cues.

### GUI Compliance Specific to Compliance Training

The ETS and STS Tooling and Server Development shall provide graphical user interface compliance specific to Terminology Tooling. This specific compliance includes the following specifications:

* Project Information System and Management Environment (PRISME), the Artifact Repository Service will enable users to search the repository via a Graphical User Interface (GUI) for artifacts by checksum, group id, artifact id, classifier, version, license, and by full text search of selected project content, minimally including the project POM file.
* Content management capabilities, re-query capabilities, the user shall be able to construct standard queries using a graphical interface that supports drag and drop of concept into the query specification, as well as type-ahead completion for selecting concepts for use in the query specification. The user shall be able to enter words or fragments in any order to retrieve all appropriate results.
* Content management capabilities, re-use of existing components, the system will allow the modeler to select components of an existing model to be re-used in the creation of a new model. Methods of selection and re-use should be highly useable and easily understood, for example, using graphical elements.
* Terminology tooling shall provide capabilities for users to add and edit QA rules, in a graphical manner, using domain specific languages where appropriate.
* Terminology tooling shall provide graphical user interface components that enhance and simplify editing processes, such as:
* Configurable panels for editing concepts.
* Viewing the taxonomy, refset/mapping development, etc.
* A navigable history of codes/concepts visited.
* The ability to copy/paste identifiers and descriptions, via mouse or keyboard shortcuts.
* Straight-forward, clearly delineated buttons/controls for editing, creating/retiring content etc.

## Multi-divisional Specifications

A robust Technical Terminology Service (TTS) is necessary to publish standard terminologies and to ensure their complete integration with VA Health Information Technology (HIT) systems and applications. Service will utilize a J2EE Platform running on a non-Windows dependent OS.

* The TTS will address internal Office of Information and Technology (OI&T) technical needs, including terminology publication and distribution as well as technical consultation for accessing terminology resources, e.g., Service Oriented Architecture (SOA) integration.
* Establishing and maintaining robust interoperability with VA partners, such as DoD and
* VBA.
* Health data must be ubiquitously standardized, including the ability to compare the processes, and quality of care among national and international health providing organizations.
* Must be able to share data with organizations such as the International Health Terminology Standards Development Organization (IHTSDO) Open Tooling Framework, and the IHTSDO workbench that is currently utilized by the IHTSDO, Denmark, Sweden, the United States National Library of Medicine, Kaiser Permanente, and some internal VA projects.
* The rich client tools will support scripting using the Oracle Nashorn JavaScript libraries.
* The terminology tooling shall provide classifier functionality for the SOLOR Terminologies (SNOMED CT, LOINC, and RxNorm), VA Extension content, post- coordinated expressions, and LEGO content.
* The terminology tooling must also be able to support the workflow integration of terminology authors external to the KBS team, and potentially external to the VA.
* The terminology tooling should also support workflow for exporting content to VA partners and for submitting content requests to the United States SNOMED CT Content Request System (USCRS).

## Performance Specifications

* The system shall remain responsive at all times, with no more than 2 second lags between user action, and system response to action.
* 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.
* Refset environments must support Refset computation of a 150,000 member set, and computation of parent Refsets in less than 10 seconds.

**Performance Specifications Requirements**

If this is a system modification, how many users does the current system support?

* The current system supports 8-10 users (STS and KBS staff).

How many users will the new system (or system modification) support?

* 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.

What is the predicted annual growth in the number of system users?

* Annual growth is expected to average 10-15%. Initially, growth may be as high as 20% (specifically related to VistA Evolution and Connected Health initiatives). However, it is expected to plateau.

## Quality Attributes Specification

The following types of testing will be done to ensure the quality of the ETS and STS Tooling and Server Development application:

* [Graphical user interface](http://en.wikipedia.org/wiki/Graphical_user_interface_testing) testing
* Unit testing
* [Usability](http://en.wikipedia.org/wiki/Usability_testing) testing
* [Software performance testi](http://en.wikipedia.org/wiki/Software_performance_testing)ng
* [Compatibility](http://en.wikipedia.org/wiki/Compatibility_testing) testing
* [Load testi](http://en.wikipedia.org/wiki/Load_testing)ng
* [Volume testi](http://en.wikipedia.org/wiki/Volume_testing)ng
* [Stress testi](http://en.wikipedia.org/wiki/Stress_testing)ng
* [Security testin](http://en.wikipedia.org/wiki/Security_testing)g
* [Smoke testi](http://en.wikipedia.org/wiki/Smoke_testing_(software))ng
* [Ad hoc](http://en.wikipedia.org/wiki/Ad_hoc_testing) testing
* [Regressi](http://en.wikipedia.org/wiki/Regression_testing)on testing
* [Installation testin](http://en.wikipedia.org/wiki/Installation_testing)g
* [Maintenance testi](http://en.wikipedia.org/wiki/Maintenance_testing)ng
* [Recovery testing](http://en.wikipedia.org/wiki/Recovery_testing) and failover testing.
* [Accessibility](http://en.wikipedia.org/wiki/Computer_accessibility) testing, including compliance with:
* [Section 508 Amendment to the Rehabilitation Ac](http://en.wikipedia.org/wiki/Section_508_Amendment_to_the_Rehabilitation_Act_of_1973)t of 1973

## Reliability Specifications

1. 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. Build (system implementation) shall be scheduled during off peak hours or in conjunction with relevant maintenance schedules.
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. The business owner should provide specific requirements for establishing system maintenance windows when planned service disruptions can occur in support of periodic maintenance.

## Scope Integration

The following sections provide ETS and STS Tooling and Server Development known interfaces and related projects or work efforts.

### Known Interfaces

Known interfaces included, but are not limited to:

* VHA Enterprise Terminology Services (VETS) (includes New Term Rapid Turnaround
* (NTRT)
* Connected Health/Mobile Applications
* Corporate Data Warehouse (CDW)
* Registries
* TDS

Table : Known Interfaces

| Name of Application | Description of current application | Interface Type | Existing Functionality | Deliverables |
| --- | --- | --- | --- | --- |
| VHA Enterprise Terminology Services (VETS) (includes New Term Rapid Turnaround (NTRT) | Suite of products that deliver standardized terminology content for use across the VA enterprise; including VistA and Clinical /Health Data Repository (CHDR). | Automated | Yes, but not to enterprise requirement’s level | Rapid and accurate issuance of terms, updates of existing terms, and deployment of solutions over a browser to multiple applications. |
| Connected Health/Mobile Applications | Provides mobile access to VA healthcare information | Automated | Limited; applications are being developed | Data would be shared, as needed. |
| Corporate Data Warehouse (CDW) | National data repository that pulls from several VHA clinical and administrative systems, primary VistA. | Automated | Yes | Data would be shared, as needed. |
| Registries | Supports the maintenance of local and national registries for clinical and resource tracking of care for patients with certain clinical conditions. | Automated | Yes | Data would be shared, as needed |

### Related Projects or Work Efforts

The following are related projects or work efforts:

* [NSR #20120905 Mobile Applications](http://vista.med.DNS   /nsrd/Tab_GeneralInfoView.asp?RequestID=20120905)   
  The Mobile Development project is focused on the development of simple and complex applications and treats these applications as functions being released to the App Store. This project manages the development of mobile applications and plans for cyclic release of applications over the course of 4, 6 month increments.
* [**NSR #20130905 VistA Evolution (VE)**](http://vista.med.DNS   /nsrd/Tab_GeneralInfoView.asp?RequestID=20130905)The VistA-4 Project will be the first project in the VistA Evolution Program. VistA-4 will focus on syntactic, semantic, and process interoperability, care coordination, the integration of ancillary services, and meaningful use. VistA-4 will rely upon infrastructure components, data models, and services that support an open, modular, extensible EHR platform allowing VA to provide high-quality solutions at increased speed and decreased cost. The resulting system will be flexible and agile – accommodating new technology advances and achieving optimal results more efficiently.
* [**NSR #20140509 VA/DoD Data Standardization**](http://vista.med.DNS   /nsrd/Tab_GeneralInfoView.asp?RequestID=20140509)VA is collaborating with the DoD and the IPO to improve the interoperability of data contained in the VA and DoD health care systems. Data standardization is the key. As part of the improvement process, this request will provide the framework for expectations related to sharing standardized clinical data between VA and its health care deliver partners (namely DoD).
* [**NSR #20080407 Standard Computable Data in Documents**](http://vista.med.DNS   /nsrd/Tab_GeneralInfoView.asp?RequestID=20080407)This request seeks to standardize objects in documents so that they are computable and available for all document types.
* [**NSR #20110408 Certification of VistA for Meaningful Use**](http://vista.med.DNS   /nsrd/Tab_GeneralInfoView.asp?RequestID=20110408)This NSR seeks to bring VistA into compliance with the Stage 1 Meaningful Use of EHR Technology certification criteria, enabling VA to meet its commitment to the Meaningful Use objectives. The Health Information Technology for Economic and Clinical Health (HITECH) Act, enacted as part of the American Recovery and Reinvestment Act (ARRA) of 2009, was signed into law on February 17, 2009, to promote the adoption and meaningful use of certified health information technology. In July of 2010, CMS announced a final rule to implement provisions of ARRA that include criteria for achieving meaningful use of health information technology. This final rule defined meaningful use adoption criteria in stages of adoption. In an effort to further codify the relationship between the aforementioned legislation, OMB issued a memorandum on September 17, 2010, requiring that selected federal agencies, including VA, achieve five HIT Principle Processes by the end of FY12.

## Security Specifications

The VA requires that any enhancement to the ETS and STS Tooling and Server Development application should address standards, procedures, and technical aspects of the solution required to achieve Certification and Accreditation of the system. These should address controls listed in the FIPS PUB 200 Minimum Security Requirements for Federal Information and Information Systems. Additional security specifications include compliance with:

* Standards and regulatory requirements published in VA Handbook and Directive 6500: [Veterans Affairs Directives > VA Handbook and Directive](http://www1.DNS   /vapubs/viewPublication.asp?Pub_ID=50&FType=2) 6500
* FIPS PUB 140-2, Security Requirements for Cryptographic Modules, and for all voice and data traffic encryption: [Computer Security Division > Publications > Federa](http://csrc.nist.gov/publications/fips/fips140-2/fips1402.pdf)l [Information Processing Standards > FIPS PUB 140-2](http://csrc.nist.gov/publications/fips/fips140-2/fips1402.pdf).

In consideration of patient safety considerations, data protection measures such as backup intervals and/or redundancy shall be consistent with systems categorized as critical.

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 medium.

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. )

Additional Security Specifications capabilities were also implemented in Release 1 as well as capabilities planned for Backlog work.

Table : Role and Privilege Requirements

| Requirements |
| --- |
| The system SHALL allow users be assigned to multiple system roles. |
| The system shall allow users to be assigned concepts. |
| The system SHALL allow the following kind of user roles:   * Read-Only * Editor * Reviewer * Approver * Administrator |
| The system SHALL allow Read-Only to perform the following:   * View terminology, concepts, refsets; * Search terminology, refsets, concepts; * Track the current stage in workflow. |
| The system SHALL allow Editor to perform the following:   * Search terminology, refsets, concepts; * Edit, add, retire terminology, refsets, concepts; * Send changes to reviewer; * Add comments; * Track the current stage in workflow. |
| The system SHALL allow Reviewer to perform the following:   * Search terminology, refsets, concepts; * Add comments; * Track the current stage in workflow; * Send changes to approver. |
| The system SHALL allow the Approver to perform the following:   * Search terminology, refsets, concepts; * Track the current stage in workflow; * Approve new terminology, concepts, refsets that is submitted for approval; * Approve modified terminology, concepts, refsets that is submitted for approval; * Reject new terminology, concepts, refsets; * Reject edited terminology, concepts, refsets; * Add comments to a rejected task; * Update request status; |
| The system SHALL allow the Administrator to perform the following:   * Search terminology, refsets, concepts; * Run standard reports; * Track the current stage in workflow; * Manage workflow (track and modify the current stage in workflow); * Monitor and run standardized reports; |
| The system SHALL allow the Administrator to perform the following:   * Create new users; * Modify user roles; * Assign user roles; * Deploy KOMET Configurations to AITC servers; * Manage System; * View System reports; * View Status reports; * Import Terminology Content; * Export Terminology Content; * Create KOMET Configurations. |

## System Features

The following table provides a quick summary of all of the components and outlines the functionality/services for each server. The Project Information System and Management Environment (PRISME) is the underlying software piece that brings all the components together under a development framework to support the following features.

Table : System Features Requirements

| Functionality / Services | Description |
| --- | --- |
| Terminology Server | Provide programmatic access to terminology components. The system should also support the integration of all other terminology sources as required to standardize vocabularies for data sharing with the Department of Defense. Host terminology from the following systems: |
| Workflow Management & Rules Engine | Support the business life cycle from authoring through execution to monitoring and management – utilizing Drools & jBPM Integration (API).  Workflow Management Service deployed on a Java EE 8/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. |
| Component Request Service | The Component Request Service will enable users to request new components for various applications. |
| TDS | Pushes approved data to STS via XML and for select datasets, pushed to VistA via HL7 messages |

## Usability Specifications

Usability is defined as the “extent to which a system, product, or service can be used by specified users to achieve specified goals with effectiveness, efficiency, and satisfaction in a specified context of use” (International Organization for Standardization [ISO] 9241:210).[[1]](#footnote-1) For clinical systems, organizations such as the Office of the National Coordinator (ONC) through its regulation - 170.314(g) (3): Safety Enhanced Design certification program[[2]](#footnote-2) and its Health IT Policy Committee[[3]](#footnote-3); as well as the Institute of Medicine (IOM) through its November 2011 report titled ‘‘Health IT and Patient Safety: Building Safe Systems for Better Care,’’[[4]](#footnote-4) call for a focus on improved usability outcomes in conjunction with improved safety, risk management, and safety culture. A UCD process is a framework aimed at optimizing the usability of a system, product, or service, while at the same time including human factors activities focused on areas impacting patient safety.

### User Centered Design (UCD) Process

UCD standards provide alternative frameworks for integrating UCD into the design and development of software systems. Just as software projects can call for similar but slightly different design and/or development approaches to assure a successful system, projects can also call for similar but slightly different UCD processes. Characteristics that might result in one UCD process being used over another UCD process include requirements defining the rigor with which UCD activities must be carried out or the specificity required for traceability from UCD activities to impact on the product.

Aspects of the ISO 9241:210 (Ergonomics of human-system interaction - Human-Centered Design for Interactive Systems) and National Institute of Standards and Technology (NIST) 7741 (Guide to the Processes Approach for Improving the Usability of Electronic Health Records)[[5]](#footnote-5) UCD standards are the foundation for the process described in this document. For regulatory purposes, for example ONC's 170.314(g) (3): Safety Enhanced Design certification, both of these standards as well as other standards are acceptable.

The ISO 9241-210 (Human- Centered Design for Interactive Systems) describes four primary activities that are to be carried out in iterative fashion until defined usability objectives are obtained. The National Institute of Standards and Technology Interagency Report (NISTIR) 7741 (NIST Guide to the Processes Approach for Improving the Usability of Electronic Health Records [EHR]) describes activities to be carried out during the development of EHR applications. This standard focuses on methods relating to UCD and usability testing.

### Content Management Capabilities

Content Management capabilities and integration of those capabilities into applications will be done according to the principles of User Centered Design as defined in ISO 9241:210 (Ergonomics of human-system interaction - Human-Centered Design for Interactive Systems) and NIST 7741 (Guide to the Processes Approach for Improving the Usability of Electronic Health Records).[[6]](#footnote-6)

Design of Content Management capabilities and integration of those capabilities will meet ONC's 170.314(g) (3): Safety Enhanced Design certification standards.

# Purchased Components

* JIRA

# Estimation

See Contractor Project Management Plan document for details.

# Approval Signatures

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Alan Arnold, Integrated Project Team (IPT) Chair and Program Manager

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Steven Brown, M.D., Business Sponsor

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Appendix A: Non Functional Requirements

Operational Environment Requirements

N/A

Documentation Requirements

* Provide the level of documentation required to support the system and maintain operations and continuity.
* Documentation shall represent minimal programmatic and lifecycle operations support documentation artifacts as defined by VA standards in ProPath and as required by the VA Enterprise System Engineering Lifecycle and Release Management office for sustained operations, maintenance, and support (http://DNS eie.DNS /lifecycle/default.aspx) prior to approval by any VA change control board and release into production.
* Administrator’s and User Manual

Implementation Requirements

The Implementation of ETS/STS is divided into three releases.

1. The implementation of Release 1 must be complete by 25-05-2016.
2. The implementation of Release 2 must be complete by 26-09-2016.
3. The implementation of Release 3 must be complete by 31-03-2017.

Data Protection/Back-up/Archive Requirements

N/A

Levels for Disaster Recovery

N/A

Data Quality/Assurance Requirements

A monitoring process shall be provided to ensure that data is accurate and up-to-date and provides accurate alerts for malfunctions while minimizing false alarms.

Conceptual Integrity

The artifact server will compute and maintain checksum files for each artifact that is published, and when artifacts are pulled, the checksums are validated before to ensure the integrity of the file.

Availability

1. 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. Build (system implementation) shall be scheduled during off peak hours or in conjunction with relevant maintenance schedules.
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. The business owner should provide specific requirements for establishing system maintenance windows when planned service disruptions can occur in support of periodic maintenance.

Interoperability

1. Systems must be heterogeneous and agnostic for operating systems and code bases.
2. Provide the ability to securely transfer large files (of 4-8 gigabyte) from an external source to VA systems.
3. Provide access to the system over a remote access solution.

Manageability

N/A

Reliability

See Availability section

Supportability

N/A

Appendix B: Other Requirements

The following non-functional requirements should be reviewed and assessed while developing the requirements for the project.

Work Flow Requirements

Create New/Modify existing Concept Request

**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 marks the request to “Edit-In-Progress” and makes the edits.
3. The request is marked as “Ready for review”.
4. The request is routed to the “Ready for review” Queue.
5. The request resides in the “Ready for review” 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 “Ready for Review” Queue.
2. The Reviewer reviews the request that is marked “Ready for Review,”
3. The reviewer reviews the modification to one or more concepts made by the editor

The reviewer marks the rejected concepts as “Ready for Re-Edit” with comment and sends back the request to the “Ready for Re-Edit” Queue.

1. The Concept Reviewer approves the modification
2. The reviewer marks the approved concepts as "Ready for Approval"
3. The approved request is in the "Ready for Approval" queue.

**C. Approve the Request**

User Type: Approver

1. The workflow state associated with this request is marked as “Ready to Approval.”
2. The request resides in the “Ready to Approval” 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 and marks the concepts as "Ready for SQA."
5. The Approver rejects the modification to one or more concepts and marks the request with “Ready for Re-Edit” with comment and sends back the request to the “Ready for Re-Edit” Queue.
6. The requests are removed from the “Ready to Approval” Queue.
7. The approved changes are published and system updated accordingly.

**D. Cancel the Request**

User Type: Any Role

1. The workflow state associated with this request is marked as "Cancel Requested."
2. The request resides in the "Cancel Requested" Queue.
3. The requests are canceled.

Note: This figure represents workflow requirement steps listed above.

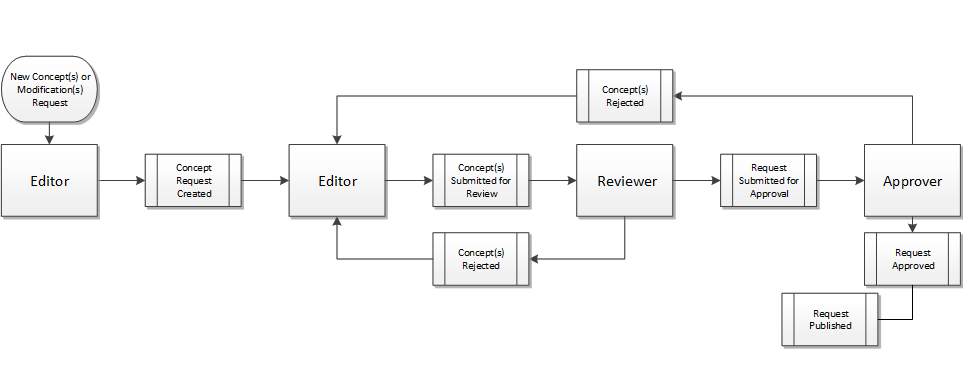


Figure 1. Work Flow Requirements

**Additional Steps:**

Publishing - Need criteria for determining if Concept published is being pushed to all or a selected group such as VistA which is currently managed separately as NTRT deployments.

Scheduled Updates - STS Analysts format data from various sites (ICD-10, GEM, LOINC etc.) on a regular basis for import via the VETS suite of tools.

1. ISO 9241:210 (2010). Ergonomics of human-system interaction - Human-centered design for interactive systems. [↑](#footnote-ref-1)
2. [Ergonomics of human-system interaction](http://www.healthit.gov/policy-researchers-implementers/2014-edition-final-test-method)  [↑](#footnote-ref-2)
3. Health Information Technology: Standards, Implementation Specifications, and Certification Criteria for Electronic Health Record Technology, 2014 Edition; Revisions to the Permanent Certification Program for Health Information Technology, Final Rule. [↑](#footnote-ref-3)
4. IOM. 2012. Health IT and Patient Safety: Building Safer Systems for Better Care. Washington, DC: The National Academies Press. [↑](#footnote-ref-4)
5. NIST 7741 (2010). Guide to the Processes Approach for Improving the Usability of Electronic Health Records. [↑](#footnote-ref-5)
6. NIST 7741 (2010). Guide to the Processes Approach for Improving the Usability of Electronic Health Records. [↑](#footnote-ref-6)