**Department of Veterans Affairs (VA)**

**Home Telehealth Reporting Enhancements (HTRE) Phase 2**

**Integrated Home Telehealth Application (IHTA) Build 1**

**System Design Document (SDD)**



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**1. Introduction**

The Integrated Home Telehealth Application (IHTA) is a Web-based portal sponsored by the Veterans Health Administration (VHA) Office of Telehealth Services (OTS). IHTA was first architected and developed under the Home Telehealth Infrastructure Enhancement (DNS ) project. The development of IHTA has continued under the subsequent Home Telehealth Capability Enhancement (HTCE) project, and the current Home Telehealth Reporting Enhancements (HTRE) Phase 2 project. In all phases of the project IHTA has worked with the Sustainment side of the HT Product Development organization to support OTS business requirements.

The HTRE Phase 2 acronym designates the Veteran Focused Integration Process (VIP) project and its numbering follows the VIP Build convention. IHTA releases have been numbered consecutively since the first release in 2010. IHTA R9.0 will be released under Build 1.

IHTA is designed to provide a flexible, maintainable, and resilient platform for Home Telehealth (HT) business functions. Each business function supported by IHTA is constructed as an application module of IHTA. IHTA modules include: Manage QIRs, HT Reports, Administration, and My Profile. User access to IHTA is granted upon successful authentication against the existing Department of Veterans Affairs (VA) Enterprise Lightweight Directory Access Protocol (LDAP). Access to each IHTA module is restricted by user roles and permissions granted during the user registration process. Details on each module are provided below:

• **Manage QIRs**: This module allows the Care Coordination/Home Telehealth (CCHT) staff to electronically submit, process, track, and print Quality Improvement Reports that document quality and patient safety issues related to HT devices. This functionality replaces the legacy VA Reporting and Processing Medical Materiel Complaints/ Quality Improvement Report form (VA Form 0729).

• **HT Reports**: Allows users to retrieve aggregate HT Patient survey and census activity data from the HT local data store (in the future, Health Data Repository (HDR) to produce and export various management-level reports.

• **Administration**: Provides IHTA administrators with the ability to approve or reject registrations and assign roles to users. This module also allows administrators to manage and schedule batch jobs (i.e., Weekly Vendor Compliance Report E-mail, Purge Completed Reports, Vendor Response Due Date).

• **My Profile**: Allows the user to view his/her system information and roles assigned.

In the future, the HTRE Phase 2 project will also design and coordinate the creation of the following new functionalities:

• Interface Home Telehealth contracted vendor servers and VistA imaging in support of collecting and storing wound care images.

• Interface MyHealth eVet (MHV) Blue Button and HDR to provide veteran patients

access to their HT patient survey and health measurements data using MHV Blue Button.

**1.1. Scope**

HTRE Phase 2 will enhance the existing IHTA HT Reports module that supports the integration of patient data collected at home with VA and VistA systems. The software framework, hardware architecture, interfaces, and tools that support IHTA applications and HT data will not be altered.

HTRE Phase 2 has three items as its main deliverables:

1. Continue enhancements to the application that supports clinical reporting and outcomes

(Census, Survey, VHA Support Service Center (VSSC) feed).

2. Work with the VA development team for Health Data Repository (HDR) to move data into the HDR as the permanent VA System of Record.

3. Continue enhancements to the Integrated Home Telehealth Application (IHTA) web portal, to include patient survey and census reporting, Quality Improvement Report tracking, and the HT Report Module. The Contractor shall also provide Tier 3 sustainment support for the above applications.

Any mention in this document of Home Telehealth processes outside of the scope of the HTRE Phase 2 project are for context purposes of the application and describing the data handling environment within which the HTRE Phase 2 objectives will be developed.

HTRE Phase 2 Requirements are located in the Business Requirements Document (BRD):

**Includes**

**Table 1: Scope Inclusions**

• Provide Home Telehealth Reporting Census data requirements in support of transition to the Health Data Repository

• Provide Home Telehealth Reporting Survey data requirements in support of transition to the Health Data Repository

• Tweak CNS Upload Performance

• IHTA Application support software must pass Fortify scan/requirements

• IHTA Application support software must be TRM Compliant

• IHTA Application must achieve Section 508 conformance

**Excludes**

N/A

**Table 2: Scope Exclusion**

**1.2. User Profiles**

Intended users of IHTA include National, Veterans Integrated Service Network (VISN) and Facility Administrators, Care Coordinators, PSAs, Program Office Managers, Vendors (Manage QIRs), and HT Contract Office staff (Manage QIRs).

**2. Background**

**2.1. Overview of the System**

The HTRE Phase 2 project is the continuation and enhancements to the HTCE project. The HTCE project developed an architectural hardware platform and software design to handle several HT business objectives. The Integrated Home Telehealth Application (IHTA) is the product for achieving these objectives.

IHTA serves as an access point for HT business users to monitor HT service of the veteran patients. Depending on the HT business user’s role, the IHTA provides the user a broad or restricted scope of veteran patients’ information that the user is responsible for or has visibility to.

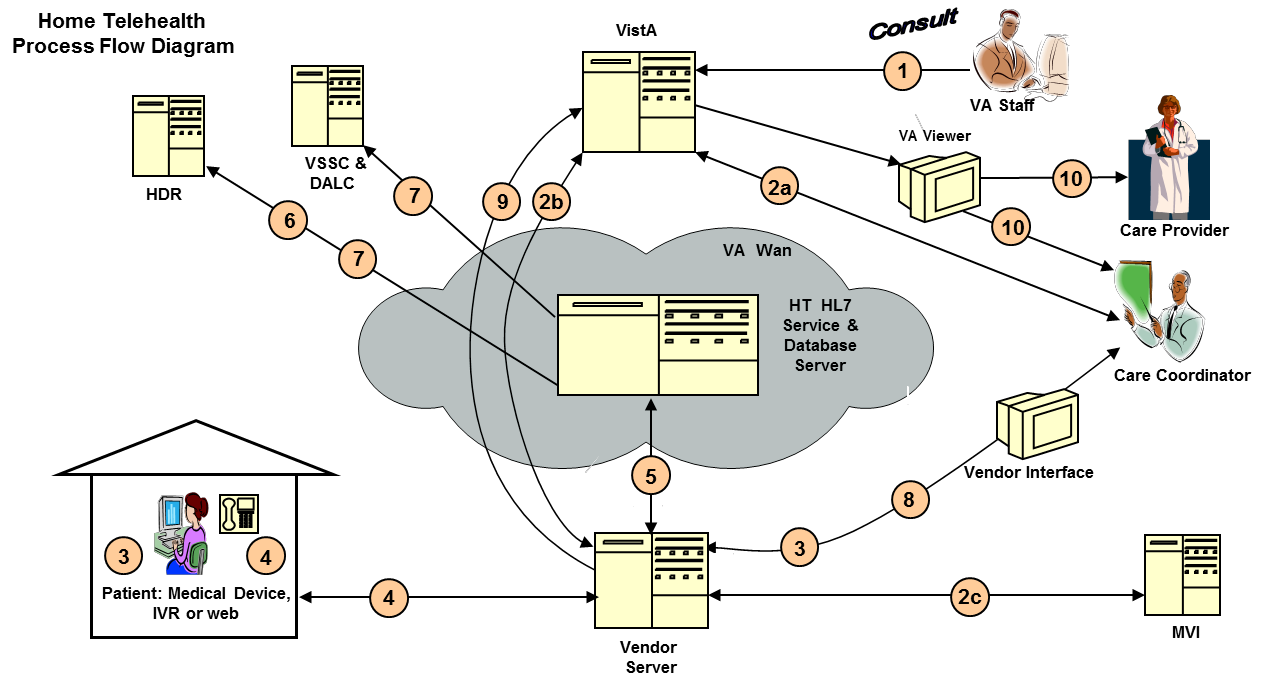
The HTRE Phase 2 project will complete the HT business needs, as well as develop new functionality.

**2.2. Overview of the Business Process**

Figure 1 illustrates the business process of HT. HT serves as the branch of Veterans Health Administrative (VHA) to provide home-based medical service and monitoring of the veteran patient. Through the use of vendor supplied medical devices, interactive voice response (IVR) units or web based applications, HT can collect medical information from the veteran patient on a daily basis and use it to monitor their health.

Table 3 describes the process IDs.

**Figure 1: Home Telehealth Process Flow Diagram**



**Table 3: Business Process IDs**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Business Process ID** | **Business Process Name** | **Type** | **Owner** | **Description** |
| 1 | HT Consult | Existing | VA Staff | VA staff requests patient be considered for HT enrollment by sending VistA consult. |
| 2 | HT veteran patient registration | Existing | VA Staff – HT Care Coordinator  & HT Vendor | Care Coordinator (a) completes the VistA consult action in VistA PIMS which generates (b) an HL7 patient registration message to the vendor server. The vendor server adds the patient to the server database and (c) subscribes to MVI for identity updates on the patient. |
| 3 | HT veteran patient registration | Existing | VA Staff – HT Care Coordinator | Using the Vendor interface the Care Coordinator (CC) links the device with the patient record and arranges to have device installed in the patient’s home. CC configures the device collection parameters and identifies DMP programs the patient will participate in. |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Business Process ID** | **Business Process Name** | **Type** | **Owner** | **Description** |
| 4 | Survey submission | Existing | HT Vendor | The patient uses the in-home medical device, IVR or web browser to capture vital signs and respond to survey questions. All data is transmitted to the vendor server normally once per day. |
| 5 | Survey & Census reports | Modernized | HT | On a real time basis the vendor server sends vital sign data and survey response information via HL7 messaging to the HT HL7 service The information is stored in the HT database and forms the basis for the online survey reports. On a weekly basis the vendor server submits to HT HL7 service, census reports of all captured patient communication to the vendor server. The census report information is stored in the HT database and forms the basis for the online census activity reports and data extracts. |
| 6 | HDR  transfer | Existing | HT | Once validated and accepted by the HT HL7 service, The vendor supplied vital sign data, survey and DMP response information is sent to the Health Data Repository (HDR). HDR is the system of record for HT. |
| 7 | VSSC extract & DALC extract | Existing | HT | On a weekly basis the HT staff creates two data extracts of the most recent census data report. One file is  provided to VHA Support Service Center (VSSC) and the other to Denver Acquisition & Logistics Center (DALC). |
| 8 |  | Existing | VA Staff – HT Care Coordinator | Using the Vendor interface, Care Coordinators can monitor patient supplied information. |
| 9 | Vendor progress notes | Existing | HT Vendor | Vendor server sends draft 28 day Progress Note(s) to facility VistA server using the vendor servers interface to VistA |
| 10 |  | Existing | VA Staff | Care Provider and Care Coordinator review Home Telehealth and VistA information using VistA Web. |

**2.3. Overview of the Significant Requirements**

This section provides an overview of significant requirements for the HTRE Phase 2 project. Customer-approved user stories will be stored on the HTRE TSPR:

**2.3.1. Overview of Significant Functional Requirements**

The Functional Requirements for HTRE Phase 2 will be elaborated in the user stories. Each user story will be a stand-alone document that will be reviewed and approved by the customer. Customer-approved user stories will be stored on the HTRE SharePoint.

HTRE Phase 2 follows the Agile Software Development methodology and detailed functional requirements are developed and approved within a build. Table 4 describes the user story for Build 1 as well as previous HTRE release user stories.

**Table 4: Functional Requirements**

|  |  |
| --- | --- |
| **ID** | **Requirement** |
| OWNR  15.6 | Provide the ability to continue development and maintenance of the automated Quality Improvement Reporting (QIR) process. |

**2.3.2. Overview of Functional Workload / Performance**

**Requirements**

Table 5 describes the Operational Environment requirements for Build 1.

**Table 5: Operational Environment Requirements**

|  |  |
| --- | --- |
| **ID** | **Requirement** |
| 391896 | Critical business performance parameters shall be identified (e.g., transaction speed, response time for screen display/refresh, data retrieval, etc.) in a manner that data capture can occur to support metric reporting and support the OI&T performance dashboard display. If no such performance metrics are required or provided there will be no program specific Service Level Agreements (SLA) created, nor shall there be any active/real time monitoring through OI&T Performance Dashboard to provide the business owners any performance metrics. |

**2.3.2.1. IHTA Capacity**

Total number of current users supported:

• 200 Care coordination nurses and program office staff. Maximum number of users to be supported in end state:

• 4000 Care coordination nurses and program office staff (Telehealth Services would expect this to support one care coordinator for each 100 patients).

Predicted annual growth in the number of system users:

• Support one care coordinator for each 100 patients e.g. for 123,000 patients 1,230 care coordinator accounts will be needed.

**2.3.2.2. IHTA Performance**

• Home Page to download in less than 5 seconds

• Login response times within 4 seconds

• Support 5-10 concurrent users under normal conditions

• Request to access an external link should take less than 3 seconds

• Searches on QIR will take less than 3 seconds

• Creating the initial shells of a QIR will take less than 2 seconds

• Exporting a list of QIRs will take less than 3 seconds

• Generating HT aggregate reports takes a maximum of 1 minute.

**2.3.3. Overview of Operational Requirements**

Table 6 describes the operational requirements for the HTRE Phase 2 Build 1.

**Table 6: Overview of the Operational Requirements**

|  |  |
| --- | --- |
| **ID** | **Requirement** |
| NEED/ARCH  509816 | The COOP strategy will be modified where necessary to accommodate  HT report resolution. |
| Usability | HTRE version of HT Reports will provide performance metrics equal to or better than currently existing HT reports deployed using .Net technology. |
| Usability | HDR-HTH data service solutions will provide performance metrics that support the performance of HT Reports. |
| 429606 | Maintenance, including maintenance of externally developed software incorporated into this application(s), shall be scheduled during off peak hours or in conjunction with relevant maintenance schedules. |

|  |  |
| --- | --- |
| **ID** | **Requirement** |
| 390684 | 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. |
| 390673 | Provide a real-time monitoring solution to report agreed/identified critical system performance parameters. |

**2.3.4. Overview of the Technical Requirements**

**Table 7: Overview of the Technical Requirements**

|  |  |
| --- | --- |
| **ID** | **Requirement** |
| N/A |  |

**2.3.5. Overview of the Security or Privacy Requirements**

Table 8 describes the security and privacy requirements for the HTRE Phase 2 Build 1.

**Table 8: Security or Privacy Requirements**

|  |  |
| --- | --- |
| **ID** | **Requirement** |
| ENTR25 | All VA security requirements will be adhered to. Based on Federal Information Processing Standard (FIPS) 199 and NIST SP 800-60, recommended Security Categorization is High.  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. |
| ENTR10 | 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. |
| ENTR95 | All Section 508 requirements will be adhered to. Compliance with Section 508 will be determined by fully meeting the applicable requirements as set forth in the VHA Section 508 checklists (1194.21,  1194.22, 1194.24, 1194.31 and 1194.41) located at: http://www.ehealth.va.gov/508/resources\_508.html or as otherwise specified. Checkpoints will be established to ensure that accessibility is incorporated from the earliest possible design or acquisition phase and successfully implemented throughout the project. |
| ENTR7 | All executive order requirements will be adhered to. |
| ENTR8 | All Enterprise Identity Management requirements will be adhered to. These requirements are applicable to any application that adds, updates, or performs lookups on persons. |

|  |  |
| --- | --- |
| **ID** | **Requirement** |
| ENTR103 | Application/services shall reference the Standard Data Services (SDS) as the authoritative source to access non-clinical reference terminology. |
| ENTR104 | Application/Services shall use the VA Enterprise Terminology Services (VETS) as the authoritative source to access clinical reference terminology. |
| ENTR105 | Applications recording the assessments and care delivered in response to an Emergency Department visit shall conform to standards defined by the VHA-endorsed version of C 28 – Health Information Technology Standards Panel (HITSP) Emergency Care  Summary Document Using Integrating the Healthcare Enterprise (IHE) Emergency Department Encounter Summary (EDES) Component. |
| ENTR106 | Applications exchanging data summarizing a patient’s medical status shall conform to standards defined by the VHA-endorsed version of C  32 – HITSP Summary Documents Using HL7 Continuity of Care  Document (CCD) Component. |

**2.3.6. Overview of System Criticality and High Availability**

**Requirements**

IHTA production environment is designed to ensure the continued operation of identified business critical systems in the event of a hardware or software failure or natural disaster. Specific goals are:

• To be operational at the Secondary Facility within 12 (twelve) hours of a standby invocation.

• To operate at the Secondary Facility for up to 7 (seven) days.

• To reinstate IHTA within the maximum working standby period.

• To minimize the disruption to IHTA*.*

These objectives are achieved through the use of hardware clustering, database mirroring, and deployment at two geographically dispersed data centers. The hardware clusters are fronted by load balancing servers capable of distributing web traffic and recovering from application server failure. The IHTA architecture and configuration, to date, have provided the HT business office a satisfactory level of service.

HTRE Phase 2 will not alter or require additional changes to the system availability or disaster recovery already in place for IHTA.

**2.3.6.1. Availability**

IHTA server and user support is only required during business hours. The application has redundant servers in two geographically dispersed VA data centers at Martinsburg, WV and Hines, IL. Operation can be switched to the alternate site within 4 hours and is tested quarterly. This architecture will reduce downtime due to system failure or maintenance. The solution is deemed downtime tolerant and requires 99% minimum service availability during business hours (less than one hour per week, assuming a 60 hour business week of 7 am until 7 pm eastern

time), and is guaranteed by the hosting facility. After a disaster, the hosting facility guarantees an

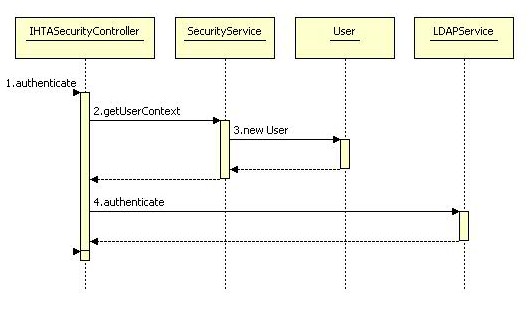
RTO of 15 days and an RPO of 24 hours via restore of the last known good backup.

**2.3.7. Single Sign-On Requirement**

IHTA uniquely identifies and authenticates VA users using the VA Enterprise LDAP. VA users are those who can access the VA network with a valid VA network ID and those whose credentials are stored in LDAP. Figure 2 depicts the VA authentication process.

Two Factor Authentication is required to be implemented in IHTA and the HTRE Phase 2 project is planning the implementation for Build 2 in April 2017.

**Figure 2: VA User Authentication Process Flow**



**2.3.8. Requirement for Use of Enterprise Portals**

At the current time, IHTA is designed, implemented, and deployed as a portlet on its own dedicated portal server. If the business requirements call for IHTA to be deployed as part of another portal system, IHTA can be packaged as a portlet and deployed onto the designated portal server.

**2.3.9. Special Device Requirements**

This section is not applicable to IHTA as special devices will not be used.

**3. Conceptual Design**

This section of the SDD provides details about the conceptual application design, data design, and infrastructure design.

**3.1. Conceptual Application Design**

This section provides the conceptual design of the application that is being produced by this project.

**3.1.1. Application Context**

The current design of IHTA includes that ability to authenticate a VA user using an interface to a VA Lightweight Directory Access Protocol (LDAP); use the Health Data Repository (HDR) as the designated system of record (SOR); and maintain an interface to the Home Telehealth database in support of HT data collected from vendor servers that has yet to be permanently established in the HDR.

**Figure 3: ‘As-Is’ IHTA Application Context**

**Health Data**

**Repository (HDR)**

**LDAP**

**IHTA**

**Administration User Profile**

**Inventory**

**Tracker/QIR**

**HT Reports**

**Vendor**

**Servers**

**Home Telehealth Database**



Per Figure 4, removal of user access to Inventory Tracker module and Inventory Tracker functionality objective of the HTRE Phase 2 project will require a design change to the IHTA application. The design change will be in the form of making Manage QIRs, a subcomponent of Inventory Tracker, a main functional user option of IHTA in place of Inventory Tracker. The change will be cosmetic as the software already handles QIR functionality when user selection occurs. All user access to Inventory Tracker is controlled by IHTA role and permission settings so the appropriate steps will be taken to migrate user’s access from Inventory Tracker functionality.

**Figure 4: ‘To-Be’ IHTA Application Context**

**(1) Health Data Repository (HDR)**

**(2) LDAP**

**IHTA**

**Administration User Profile**

**QIR**

**HT Reports**

**(4) Vendor Servers**

**(3) Home Telehealth Database**



The following tables describe the information in the Application Context Diagram (Figure 4). Note that the system for which this design applies is represented by a single object (typically in the center of the diagram). Therefore, it is not referred to in the following tables.

**Table 9: Objects in the Application Context Diagram**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **ID** | **Name** | **Description** | **Interface**  **Name** | **Interface**  **System** |
| HDR | Health Data  Repository | Health Data Repository (HDR) is the future system of record (SOR) for Home Telehealth (HT) collected data. | HDR data service | N/A |
| LDAP | Lightweight Directory Access Protocol | LDAP allows IHTA to authenticate and to authorize VA user access to IHTA portlets and services. | LDAP | N/A |
| HT Database | HT Database | HT database is the current system of record (SOR) for Home Telehealth (HT) collected data and supports all HT applications. | HT Database | N/A |
| Vendor  Servers | Vendor  Servers | Providers of HT data collected from home based veteran patients. | Vendor  Servers | N/A |

**Table 10: Interfaces External to OI&T**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **ID** | **Name** | **Related**  **Object** | **Input**  **Messages** | **Output**  **Messages** | **External**  **Party** |
| LDAP | Lightweight Directory Access Protocol | IHTA | IHTA User authentication | Yes or No response to users authorization to proceed | N/A |
| Vendor  Servers | Vendor  Servers | Vendor  Servers | HL7 formatted veteran patient census or survey information | HL7 formatted message success or failure  acknowledgment | N/A |

**Table 11: Interfaces Internal to OI&T**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **ID** | **Name** | **Related**  **Object** | **Input Messages** | **Output Messages** | **External**  **Party** |
| HT Database | HT Database | Vendor  Servers | Patient Surveys  Census Activity | Message success or failure acknowledgements. | Vendors |

**Table 12: External Shared Data Stores**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **ID** | **Name** | **Data Stored** | **Owner** | **Access** |
| HDR | Health Data Repository | Future source of Patient Census and  Survey data | HDR | Read |

**3.1.2. High-Level Application Design**

**3.1.2.1. Inventory Tracker**

The removal of Inventory Tracker functionality from the IHTA application will change the application design. HTRE will remove the menu structure dedicated to all Inventory Tracker functionality except for the management of QIRs (see subsequent sections). The IHTA application code will be modified to remove Inventory Tracker specific functionality and the database will be altered to archive and remove Inventory Tracker specific data. All user permissions specific to Inventory Tracker will be inactivated.

**3.1.2.2. Manage QIRs**

The high level application design for promoting QIR functionality from a sub component of Inventory Tracker to a main IHTA module will change the application design. HTRE Phase 2 will enhance IHTA application menu structure to make Manage QIRs a main menu option for users who have QIR roles and permissions and the need to create or respond to QIR activities.

**Figure 4: Manage QIR - High-Level Application Design**



**Care Provider**

**HT Report Request**

IHTA

Service

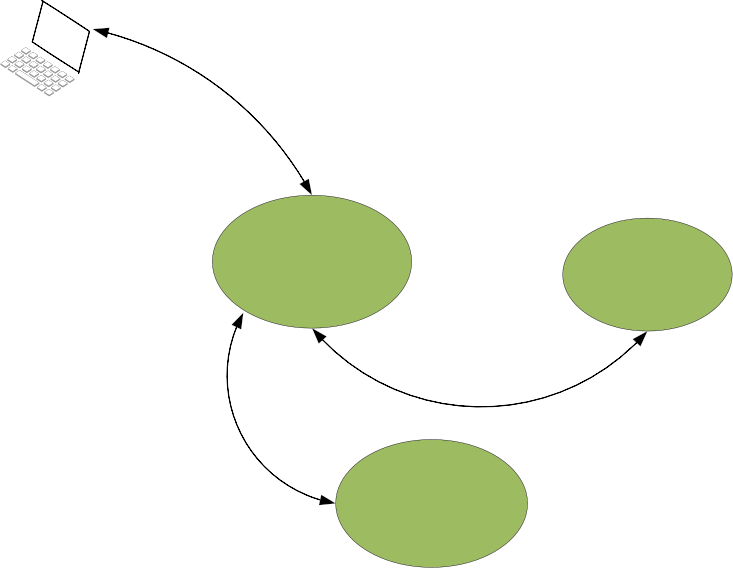
**LDAP**

Administration

User Profile

QIR

**HT Server**



The Objects / Components in the following table are to be Built or Modified.

**Table 13: Objects in the High Level Application Design**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **ID** | **Name** | **Description** | **Service / Legacy Code** | **External Interface Name** | **External**  **Interface ID** | **Internal Interface Name** | **Internal**  **Interface ID** | **SDP Sections**  **1&2** |
| Manage  QIRs | Inventory  Tracker | IHTA module for tracking Home Telehealth medical devices |  |  |  |  |  |  |
| QIR | QIR | IHTA module for Managing Quality Improvement Reports |  |  |  |  |  |  |

**Table 14: Internal Data Stores**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **ID** | **Name** | **Data Stored** | **Steward** | **Access** |
| HT Server | HT  database | Inventory Tracker & QIR | HT | Read |

**3.1.2.3. HT Access Through My Health eVet**

In a future enhancement the HTRE Phase 2 team will design and coordinate the ability for a veteran patient to access their HT data using the existing My Health eVet web based interface. The HTRE Phase 2 team will work with MHV My Health eVet product development team to create the veteran patient interface and coordinate the development between MHV My Health eVet product development and HDR product development groups to create the appropriate data services for securely identifying the veteran patient data.

A complete solution to developing a successful Blue Button interface to access HDR based HT

patient information will involve the following interacting components:

• A single sign-on MHV Blue Button user interface for the benefit of the veteran patient from which they can retrieve their HT information.

• Strong authentication of the veteran patient to make sure that they are accessing their own data and no one else’s. It is expected that the MHV Blue Button application will handle the major authentication of the veteran patient and interact with HDR based HT data services to make sure that the patients data is correctly identified using the appropriate veteran identifying traits.

• A properly structure messaging interface between MHV/Blue Button and HDR to exchange veteran patient data request and results.

**3.1.2.4. Wound Care**

In a future enhancement the following figure demonstrates the handling of wound images starting with a consult request and ending with the approved wound image stored in VistA Imaging for access and review by the medical staff supporting the veteran patient.

**Figure 5: Wound Care Imaging - Concept**



**Care Provider Image Consult Request**



**Care Coordinator Image Verification**

**Care Provider**

**Image Review**

**Veteran: Wound Image Created**

**Vendor Server**

**VistA Imaging**

**Care Coordinator**

**Image Review**

Start Finish

The HTRE Phase 2 team will coordinate the development between HT contracted vendors and VistA Imaging product development group to create a standard process for transferring and storing wound care images from the vendor servers to VistA Imaging.

A complete solution to transferring digitally generated wound images from vendors to VistA Imaging involves several interacting components:

• The ability of the vendor to conform to VistA Imaging’s DIACOM standards.

• An interface for the Care Coordinators verification of wound images.

• Proper messaging infrastructure that can support secure transfer of DIACOM

encapsulated images for acknowledged delivery to the proper VistA facility.

• Secure handling of all patient data from the vendor server through delivery to VistA Imaging.

**3.1.3. Application Locations**

All IHTA production application and system components are currently housed at two different data centers, Martinsburg and Hines. Architectural strategy supporting COOP and disaster recovery directives dictates that one of these sites be active at all times.

**Table 15: Application Locations**

|  |  |  |  |
| --- | --- | --- | --- |
| **Application**  **Component** | **Description** | **Location at Which**  **Component is Run** | **Type** |
| Manage QIRs | Medical Device tracking and Quality Improvement Reports | Martinsburg & Hines  (DR site) | All |

**Table 16: Application Users**

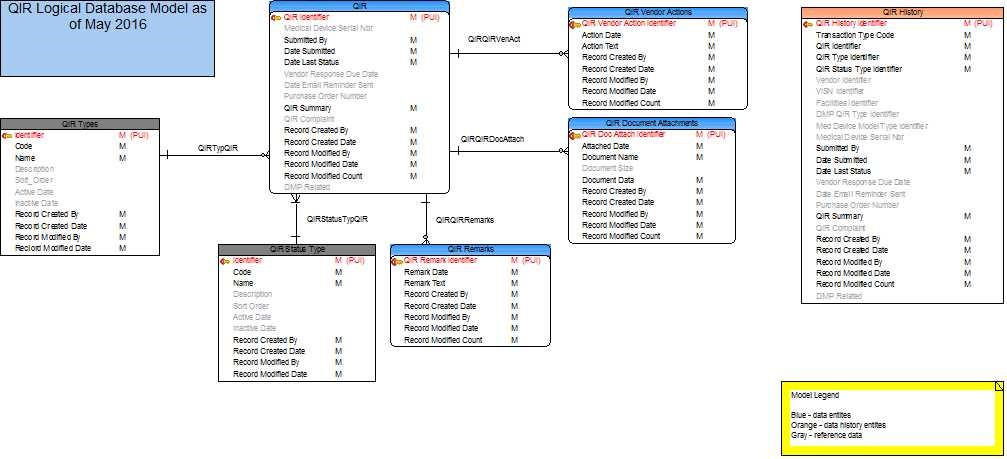
|  |  |  |
| --- | --- | --- |
| **Application Component** | **Location** | **User** |
| Manage QIRs | All | National, Veterans Integrated Service Network (VISN) and Facility Administrators, Care Coordinators, PSAs, Program Office Managers |

**3.2. Conceptual Data Design**

**3.2.1. Project Conceptual Data Model**

HTRE Phase 2 Build 1 release will modify IHTA by promoting QIR from a sub module of Inventory Tracker to a main module. The data structure that supports QIR was architected to stand on its own with no dependencies on other portions of the HT database. The QIR data structure will not require modification in support of making QIR a main IHTA module.

**Figure 6: QIR Conceptual Data Model**



**3.2.2. Database Information**

Table 17 identifies the database that will be interfaced with as part of this effort.

**Table 17: Database Inventory**

|  |  |  |  |
| --- | --- | --- | --- |
| **Database Name** | **Description** | **Type** | **Steward** |
| Home Telehealth | QIR data storage | IHTA - QIR module | Home Telehealth |

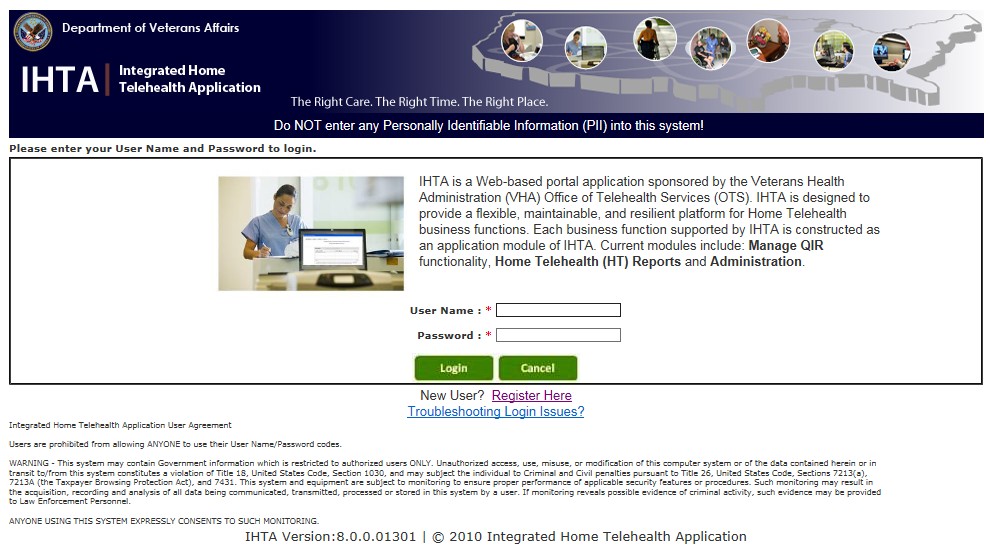
**3.2.3. User Interface Data Mapping**

This section describes and defines the user interface screens in the product.

**3.2.3.1. IHTA - User Login Screen**

Figure 7 shows the IHTA User Login screen and Table 18 describes the elements on the screen.

**Figure 7: IHTA - User Login Screen**



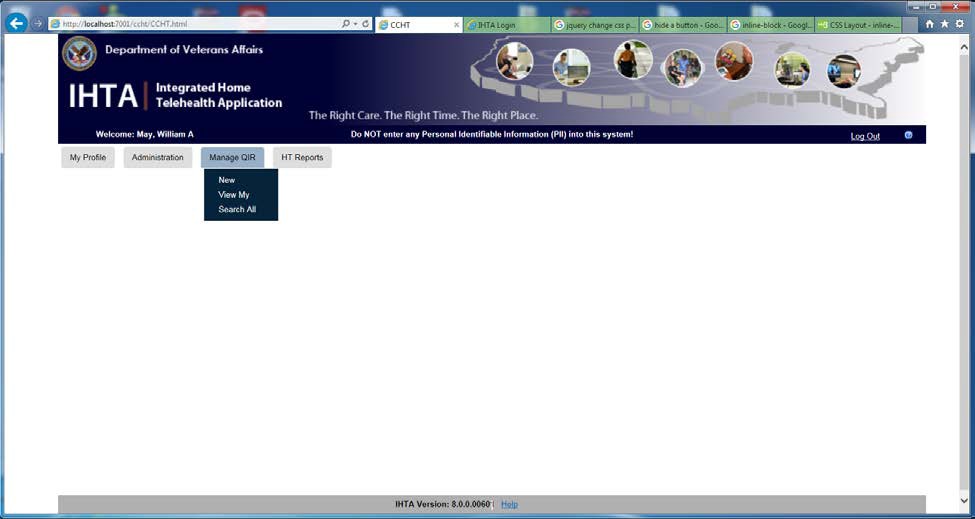
**Table 18: IHTA - User Login Screen Description**

|  |  |  |  |
| --- | --- | --- | --- |
| **Graphical User**  **Interface (GUI) Field** | **Table (Database Table that field connects to)** | **Field (Field in Table that the GUI field connects to)** | **Comments** |
| User login identifier | Application User | User Name | The user assigned as a  VA net identifier. |
| Password | NA | NA | The password is LDAP stored and controlled. IHTA does not maintain the password for any users. |

**3.2.3.2. IHTA - Application Component Selection Screen**

Figure 8 shows the IHTA Application Component Selection screen and Table 19 describes the elements on the screen.

**Figure 8: IHTA - Application Component Selection Screen**



**Table 19: IHTA - Application Component Selection 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** |
| Manage QIRs drop down menu | NA | NA | Manage QIRs > New, Manage QIRs > View My and Manage QIRs > Search All |

**3.2.3.3. Unmapped Data Element**

This section is not applicable to the HTRE Phase 2 project.

**3.3. Conceptual Infrastructure Design**

**3.3.1. System Criticality and High Availability**

IHTA employs load-balancing techniques across a Web server and application server clusters. A cluster consists of multiple server instances running simultaneously and working together to provide increased scalability and reliability. A cluster appears to clients as a single instance. Server instances in a cluster can run on the same machine or be located on different machines. A failure of one server instance in a cluster will not impact the cluster’s operation. Instead, requests to the failed server instance are automatically failed over to the remaining server instances in a cluster for processing. The database server is non-clustered, providing a single access point in support of IHTA application data needs. Figure 10 depicts the IHTA Web server cluster, application server cluster, and database server.

IHTA will employ a standard deployment model, which has one active deployment at the production site and an inactive deployment at the secondary site. Load balancing and fail-over are implemented in the Web server and application server clusters where requests to a cluster will be distributed equally to all instances in a cluster. Failure to an instance in a cluster will not

impact operation of the remaining instances in a cluster. In the event of catastrophic failure at the primary site, incoming requests to the primary site will be failed over to the secondary site, and the application will be activated manually to process incoming requests.

HT’s database servers are configured to work as a mirrored pair with a primary active database mirroring all database structure and data changes to the inactive secondary database. Future enhancement will be to implement a database cluster across the production and DR sites so that the application and database will automatically activate in the event of failure at the primary site.

**3.3.1.1. Disaster Recovery**

A Disaster Recovery plan is designed in the event of a disaster affecting the HTRE Phase 2 project’s IHTA. IHTA is deployed to Production at the Martinsburg Capitol Region Readiness Center (CRRC) and the Hines Information Technology Center (HITC), as stated above. At any given time, one of these sites will be the Primary IHTA Production site, and one will be the Secondary site. IHTA is designed with redundant servers and services in order to provide one level of fault tolerance within the data center. Failures within the data center, such as the loss of a hard drive, power supply, or a network interface card, are assumed to be covered by the Standard Operating Procedures (SOP) established by the data center’s local operations staff.

The following objectives have been established for the plan:

• Maximize the effectiveness of DR operations through an established plan that consists of the following phases:

• ***Notification/Activation*** - Detect and assess damage and activate the plan

• ***Recovery*** - Restore temporary IT operations and recover damage done to the original system

• ***Reconstitution*** - Restore IT system processing capabilities to normal operations.

• Identify the activities, resources, and procedures needed to carry out IHTA processing requirements during prolonged interruptions to normal operations.

• Assign responsibilities to designated VA personnel and provide guidance for recovering

IHTA after prolonged periods of interruption to normal operations.

• Ensure coordination with other VA staff who will participate in the DR planning strategies. Ensure coordination with external points-of-contact (POC) who will participate in the DR planning strategies.

**3.3.2. Special Technology**

This section is not applicable to the HTRE Phase 2 project.

**3.3.3. Technology Locations**

All IHTA hardware and software are in place at the indicated locations and fully operational.

**Table 20: Technology Location Details for Production 1**

|  |  |  |
| --- | --- | --- |
| **Technology Component**  **Production 1** | **Location** | **Usage** |
| Workstations | NA |  |
| Special Hardware (Load  Balancers) | Martinsburg | Distribute user load across IHTA web servers. |
| Interface Processors (Web  Servers) | Martinsburg | User interface. |
| Legacy Mainframe | NA |  |
| Legacy Application Server | Martinsburg | Application processing; data request and handling. |
| Legacy Databases | Martinsburg | HT data storage |
| Other |  |  |

**Table 21: Technology Location Details for Production 2**

|  |  |  |
| --- | --- | --- |
| **Technology Component**  **Production 2** | **Location** | **Usage** |
| Workstations | NA |  |
| Special Hardware (Load  Balancers) | Hines | Distribute user load across IHTA web servers. |
| Interface Processors (Web  Servers) | Hines | User interface. |
| Legacy Mainframe | NA |  |
| Legacy Application Server | Hines | Application processing; data request and handling. |
| Legacy Databases | Hines | HT data storage |
| Other |  |  |

**Table 22: Technology Component Certification, Education, and Testing**

|  |  |  |
| --- | --- | --- |
| **Technology Component**  **Certification; Education; Testing** | **Location** | **Usage** |
| Workstations | NA |  |
| Special Hardware (Load  Balancers) | Hines | Distribute user load across IHTA web servers. |
| Interface Processors (Web  Servers) | Hines | User interface. |
| Legacy Mainframe | NA |  |
| Legacy Application Server | Hines | Application processing; data request and handling. |
| Legacy Databases | Hines | HT data storage |
| Other | N/A |  |

**Table 23: Technology Component Development**

|  |  |  |
| --- | --- | --- |
| **Technology Component**  **Development** | **Location** | **Usage** |
| Workstations | NA |  |
| Special Hardware (Load  Balancers) | Hines | Distribute user load across IHTA web servers. |
| Interface Processors (Web  Servers) | Hines | User interface. |
| Legacy Mainframe | NA |  |
| Legacy Application Server | Hines | Application processing; data request and handling. |
| Legacy Databases | Hines | HT data storage |
| Other | N/A |  |

**3.3.4. Conceptual Infrastructure Diagram**

**3.3.4.1. Location of Environments and External Interfaces**

**Figure 9: IHTA Development and SQA at Hines Data Center**



**Web/Application Server**

**Release DEV Maintenance DEV**

**Application Server**

**Web/Application Servers**

**Release SQA Cluster**

**Maintenance SQA Cluster**

**Application Server Cluster**

**Release DEV Database**

**Hines**

**SQL Mirror**

**Maintenance DEV Database Release SQA Database**

**Maintenance SQA Database**

**Database**

**Server**

**Database**

**Server**

**Database**

**Server**

**DEV Environments**

**SQA Environments**

IHTA development architecture is active and will be used by HTRE Phase 2 for product development.

**3.3.4.2. Conceptual Production String Diagram**

IHTA production architecture is active and in use. See Section 4 of this document.

**4. System Architecture**

The architectural goal of IHTA is to provide a flexible, maintainable, and resilient platform for HT business functions. Each business function that leverages IHTA is constructed as an application module of IHTA and shares the same set of IHTA infrastructure and business services that can be leveraged to interface with other enterprise systems. At the core of IHTA is an integrated internet and intranet application that provides business functionality needed by OTS. IHTA is accessible through a Web portal. Current portlets (modules) of IHTA include the following: Administration, QIR, and HT Reports. Any future IHTA functionality developed by HTRE Phase 2 will follow the same architectural approach. Access to each IHTA module is restricted by user roles and permissions granted during the registration process.

To ensure that the IHTA architecture adheres to Product Development (PD) architectural standards, the IHTA architecture is based on the Clinical Information Support System (CISS) architecture, which has been certified as meeting the relevant PD standards. The IHTA architecture contains the key constructs discussed in the subsequent sections.

**4.1. Hardware Architecture**

IHTA employs load-balancing techniques across a Web server cluster, an application server cluster, and a database server. A cluster consists of multiple server instances running simultaneously and working together to provide increased scalability and reliability. A cluster appears to clients as a single instance. Server instances in a cluster can run on the same machine or be located on different machines. A failure of one server instance in a cluster will not impact the cluster’s operation. Instead, requests to the failed server instance are automatically failed over to the remaining server instances in a cluster for processing. Figure 10 depicts the IHTA Web server cluster, application server cluster, and database servers.

IHTA employs a standard deployment model, which has one active deployment at the production site and an inactive deployment at the secondary site. Load balancing and fail-over are implemented in the Web server and application server clusters where requests to a cluster will be distributed equally to all instances in a cluster. Failure to an instance in a cluster will not impact operation of the remaining instances in a cluster. In the event of catastrophic failure at the

primary site, incoming requests to the primary site will be failed over to the secondary site, and the application will be activated manually to process incoming requests. Future enhancement will be to implement a database cluster across the production and DR sites so that the

application, deployed at the secondary site, will be automatically activated in the event of failure at the primary site.

**Figure 10: IHTA Hardware Architecture**



`

**Web Users**

**Intranet connection**

**External Systems**

**Primary**

**Load balancers**

**Fail-over**

**Backup**

**Load balancers**

**Primary Web/Application Server Cluster**

**Backup Web/Application Server Cluster**

**Web/Application Web/Application**

**Primary Site**

**Web/Application**

**Web/Application**

**Server 1**

**Server 2**

**Server 1**

**Server 2**

**SQL Mirror**

**Database**

**Secondary Site**

**Server**

**Database**

**Server**

The IHTA architecture implements a standard, standby DR deployment in which near-real-time data replication across the primary and secondary sites are ensured. Although IHTA is deployed to both the primary and secondary sites, IHTA deployment is only activated at the secondary site when there is catastrophic failure of IHTA at the primary site. In the event of catastrophic failure, incoming requests to the primary site’s load balancers will be failed over to back-up load balancers at the secondary site. The primary site’s main data store is synchronized with the secondary site’s back-up data store through database mirroring to ensure near, real-time data replication.

**4.2. Software Architecture**

Figure 11 presents the software interfaces for IHTA’s component architecture.

IHTA is implemented as a Web-based “Integrated Portal” and is implemented in Java using both standard and enterprise features. At the current time, IHTA is designed, implemented, and deployed as a portlet on its own dedicated portal server. If the business requirements call for IHTA to be integrated into other portal systems, IHTA can be packaged as a portlet and deployed onto the portal server.

**Figure 11: IHTA Technology Stack**

**Apache HTTPS Web Server**

**Weblogic Application Server – Weblogic Portal Server**

**IHTA Portal**

**Spring Portal**

**Portal / Portlet**

**Spring Portlet**

**External**

**Service**

**Presentation tier**

**CISS Framework**

**Spring**

**Web**

**Flex**

**JSP**

**JSTL**

**HTML**

**Actionscript**

**Javascript**

**Service**

**Business Service tier**

**Spring Framework**

**Persistent tier**

**Spring BlazeDS**

**Spring**

**JMS**

**Hibernate**

**JDBC**

**Java Persistent API (JPA)**

**Java Enterprise Edition (JEE)**

**SAAJ**

**JAXB**

**JAX-RPC**

**JAX-WS**

**JSF**

**JSP**

**EJB**

**JavaMail**

**JTA**

**JCA**

**JAAS**

**JMX**

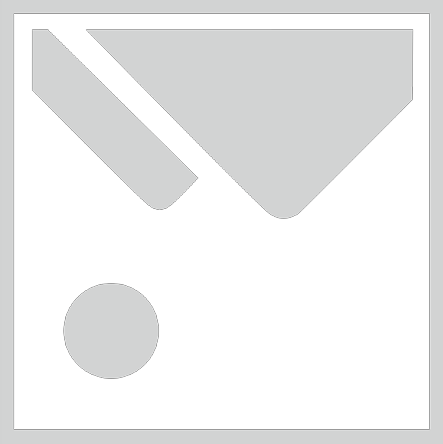
**Java Standard Edition (JSE)**

**Microsoft SQL Server**

While the Apache Web Server will be used to process HTTPS requests for static content, such as on-line HTML files, the WebLogic Server Apache Plug-In is installed and configured on the Apache Web Server to forward requests for dynamic content to a cluster of WebLogic Portal Server instances. The Apache Web Server Plug-In operates as an Apache Web Server’s dynamic shared module loaded at start-up time to process requests to IHTA. The configuration of the WebLogic Server Apache Plug-In involves editing the Apache httpd.conf file to instruct the Apache Web Server to load the WebLogic Portal Server Library for the plug-in as an apache module, to specify application requests that should be handled by the module, to define URL rewrite rules for IHTA URLs, and to define the port and address of the WebLogic Portal Server Cluster and Admin Server.

The IHTA architecture is configured for HTTPS communication between the load balancer and the WebLogic/Application clustered servers to ensure that HTTPS encrypted traffic is the only form of communication to and from the IHTA application.

**Figure 12: HTTPS IHTA Architecture**



The Oracle WebLogic Portal Server is used as the application platform suite (APS) for developing, integrating, and deploying IHTA’s applications, portals, and Websites. The Oracle WebLogic Portal Server bundled with the WebLogic Application Server provides services through JEE components. These components include Enterprise Java Beans (EJB), Java Server Pages (JSP), Java Naming and Directory Interface (JNDI), Java Messaging Services (JMS), Java Authentication and Authorization Services (JAAS), and other enterprise services. Taken

together, these WebLogic Application Server services enable personalization, real-time business activity monitoring, business intelligence, identity management, and wireless deployment.

The database management software, Microsoft SQL Server 2012, is configured on a dedicated server. Data storage is defined to the local drives. IHTA will be configured to access the database server using the Java Database Connectivity (JDBC) thin driver for Microsoft SQA Server to perform data retrieval and manipulation. The IHTA application controls all interaction between the application modules and the HT database through a dedicated and secure IHTA application login. Direct individual user interaction directly with the database is not allowed through the application.

**4.3. Network Architecture**

Figure 13 illustrates a sample design of the network architecture that is used for IHTA product development and production environments. Network connection between database servers, application servers, and Web servers to the VA local area network (LAN) is facilitated through a HP NC382i Dual Port Multifunction Gigabit Server Adapter installed on each server.

**Figure 13: IHTA Network Architecture**



**Physical Application Architecture Production Environment**

`

**Web Users**

**VA Wide Area Network (WAN)**

**VA Firewall**

**VA LAN**

**Load**

**Balancer**

**Server Cluster Load Balancing**

**Microsoft Enterprise SQL Server**

**Web/Application**

**Server 1**

**Web/Application**

**Server 2**

**4.4. Service Oriented Architecture / ESS**

When deemed necessary, and based on business requirements, IHTA can expose its own business services to the VA Enterprise as Service Oriented Architecture (SOA) services. These services will be implemented using industry standard technology as either 1) a remote procedure call using Stateless Session Enterprise Java Beans (EJB) or 2) a Web service implemented in the Representational State Transfer (REST) style. As of right now, there is no call for IHTA to develop SOA based services.

**4.5. Enterprise Architecture**

IHTA enterprise architecture adheres to the VA Technical Reference Model (TRM) Standards.

**Table 24: Enterprise Architecture**

|  |  |
| --- | --- |
| **Item** | **Description** |
| Dependencies  (hardware): | Martinsburg CRRC:  Application Servers:  Web Servers:  HITC:  Application Servers:  Web Servers: |
| Platform and OS: | **Web and Application Servers OS: Red Hat Enterprise Linux OS**  **\*v5.11**  **DB Servers OS: Windows Enterprise v2008 R2**  **\*Java 7 Platform, Standard Edition**  **\***J2EE  JDBC – Oracle V12.1.0.2.0  **\***Hibernate-commons-annotations 3.1.0.GA  **\***Hibernate-core 3.3.2.GA  **\***Hibernate-validator 4.3.0.Final  **\***Hibernate-entitymanager-3.4.0.GA  **\***Hibernate-annotations-3.4.0.GA  **\***Spring 3.0.0.RELEASE  **\***Quartz 1.7.1  \*Tiles 2.2.2.2  \*Programs will be upgraded in increments, starting with Java v8 and Red Hat v7 as top priorities, in the next release temporary set for 11/30/16. The transition to upgrade all other programs may take six months or longer to implement and will be outlined in future Sprints Plans. |
| Dependencies  (software): | Apache Web Server V2.2.3;  Oracle WebLogic Portal Server v10.3.6  **Microsoft SQL Server 2012** |

**5. Data Design**

This section outlines the design of the database management system (DBMS) and non-DBMS

files associated with the system.

**5.1. DBMS Files**

The main HT data repository is the HT Census Survey database. The database is hosted by Microsoft SQL Server 2012 with all database files maintained on local storage to the database server. The HTRE Phase 2 project will not introduce additional database storage requirements.

The HT Census Survey database supports all IHTA application components and third party WebLogic application. The information collected by these components is stored in the HT database but logically separated by designated schemas. WebLogic database objects are stored in a separate dedicated database.

Table 25 outlines the schemas defined in the HT database and the IHTA application components supported by the schema.

**Table 25: HT Database Schema Description**

|  |  |
| --- | --- |
| **Schema** | **Description** |
| dbo | Default database schema. Contains the Patient Census, and Survey database objects. |
| ht | Contains the HT user interface, user management and user reports database objects. |
| inf | Contains database objects in support of the third party tools Quartz and Spring framework database objects. |
| qir | Supports QIR database objects. |

The transaction source for the HT database comes from the following:

• Patient Census reports occur weekly, typically on Sunday, via HL7 messaging. Currently three vendors are required to submit census reports (3 transactions representing 94000 patient transactions per week)

• Patient Surveys occur daily via HL7 messaging from all six vendors. (8000 transactions per week)

• HT passes successfully accepted Patient Census and Survey data from HT database to

HDR via HL7 messaging (102000 transactions per week)

• QIR creation and follow-up response (average 12 transactions per week)

• HT online Patient Census and Survey reporting (estimated 24 transactions per week)

• HT Patient Census activity extracts (estimated 855000 transactions per week)

• The remaining IHTA application components account for an estimated 14 transactions per week.

On a weekly basis, the application components and support processing generate 1059050 transactions a week or on average 2 transactions per second. Of the total number of transactions it is estimated that 10% of them involve data creation or update activities while the rest are read transactions.

The HT database including the transaction log file currently occupy 70 gigabytes of space. The HTRE Phase 2 project will not add to the transaction rate as it replaces transactions used for the existing HT online reports and will not add to the overall HT storage because all its database activities will be read request.

**5.2. Non-DBMS Files**

Existing non-DBMS files are extract files produced from HT data on a weekly basis for VHA VSSC and DALC. These flat files contain Patient census activity data in a delimited format. The HTRE Phase 2 project will not impact the production of these flat files in any way.

**5.3. Data View**

The data view of the HT logical model will be presented in its entirety. Since the layout of the model is difficult to follow, the HT logical database model will also be presented broken out by IHTA application components that the HTRE Phase 2 project will interface with to complete HT reports.

**Figure 14: HT Logical Database Model**

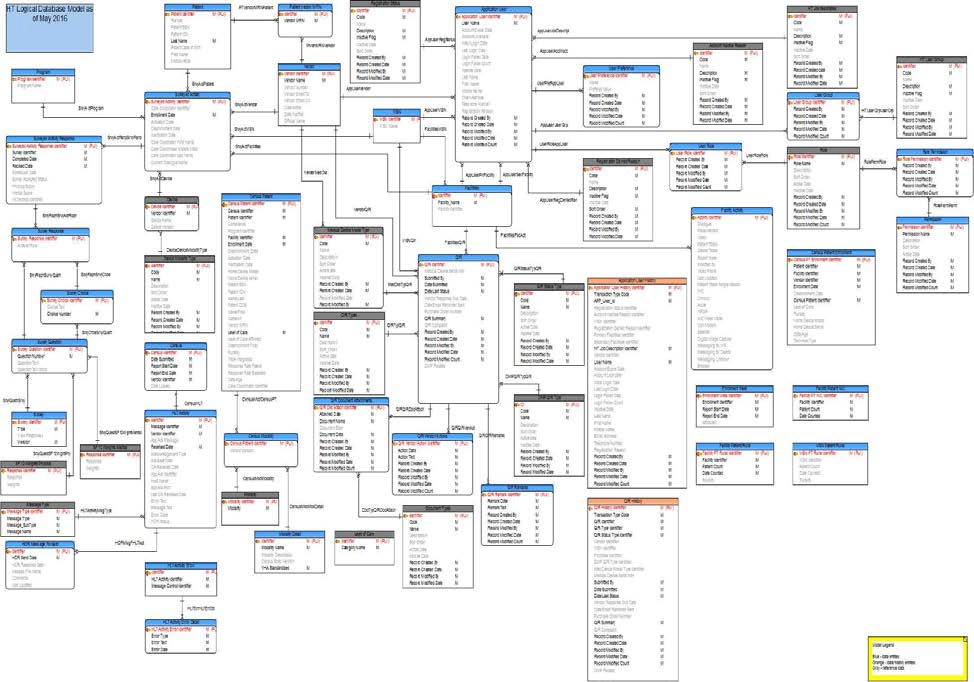


Figure 15: IHTA Administration and User Profile Logical Database Model



IHTA Administration & User Profile Logl eal

Database Model as of October, 2014

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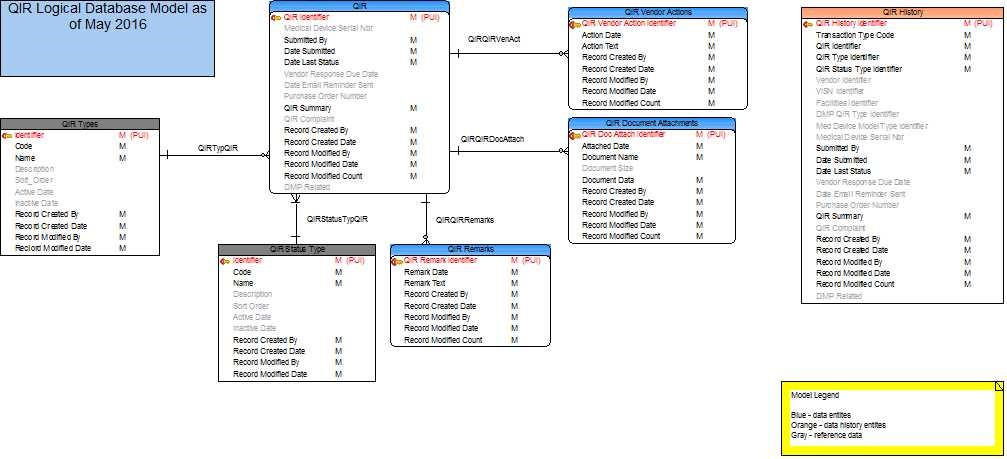
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orange • data history entities gray· reference data

**Figure 16: IHTA QIR Logical Database Model**



**6. Detailed Design**

The HTRE Build 1 project contains modifications to the menu structure now include the Manage

QIRs, menu, replacing the Inventory Tracker menu

In addition, this release addresses the mitigation of long standing Section 508 compliance issues. In order to facilitate Section 508 compliance the entire IHTA application will be revised by replacing the Flex/Flash presentation layer with HTML. The resulting detail design from

HTRE’s Phase 2 coordination of the design and development of the veteran patient access to HT information via MHV/Blue Button will be documented in the SDD of both MHV and HDR product development teams. If the final design of this interaction involves the IHTA software product, appropriate documentation will be included in this SDD document.

The resulting detail design from HTRE’s Phase 2 coordination of the design and development of the interface for transferring wound care images from HT vendors to VistA Imaging will be documented once this phase of the project is started and planned.

**6.1. Hardware Detailed Design**

The functional objectives of the HTRE Phase 2 project, as described above, will not require any hardware modifications to the existing IHTA hardware architecture. Taking additional Manage QIRs functionality and HTML changes into consideration, the current computing, memory, and storage capacity of the IHTA application and database servers in combination with the expected use rate by the HT user community does not require an increase in any computer resources.

**6.2. Software Detailed Design**

Renaming Inventory Tracker module to Manage QIRs will result in modifications to the main menu option and submenus selections of New, View My, and Search All.

**6.2.1. Conceptual Design**

This section of the SDD provides details about the conceptual application design and interface structures.

**6.2.1.1. Product Perspective**

This section of the SDD provides details about the components associated with the QIR module.

**Figure 17: IHTA - QIR**

**(1) Health Data Repository (HDR)**

**(2) LDAP**

**IHTA**

**Administration User Profile**

**QIR**

**HT Reports**

**(4) Vendor Servers**

**(3) Home Telehealth Database**



As shown in the figure above, QIR Reports is an application module as part of the IHTA product. Any QIR user that expects to interact with QIR must be a registered and known user to IHTA.

**6.2.1.1.1. User Interfaces**

The IHTA user interface is described in section 3.2.3 - User Interface Data Mapping of this document. The HTRE Phase 2 development of Manage QIRs includes the functionality to generate, view, and search Quality Improvement Reports (QIR) for quality and patient safety issues related to Home Telehealth devices. HTRE Phase 2 development of Manage QIRs module will depend on existing IHTA hardware interfaces and will not require additional pathways of computer resource interaction.

**6.2.1.1.2. Software Interfaces**

HTRE Phase 2 development of Manage QIRs module will depend on existing IHTA software interfaces and will not introduce alternative software routes.

**6.2.1.2. Product Features**

The Integrated Home Telehealth Application (IHTA) is a Web-based system, providing a flexible, maintainable, and resilient platform for Home Telehealth (HT) business functions. IHTA is sponsored by the Veterans Health Administration (VHA) Office of Telehealth Services (OTS) and is designed to provide a flexible, maintainable, and resilient platform for Home Telehealth business functions. Each business function supported by IHTA is constructed as an application module of IHTA. Current IHTA modules include: Manage Quality Improvement (QIR) functionality, HT Reports, Administration, and My Profile. IHTA access will be granted upon successful authentication against the existing Department of Veterans Affairs (VA) Enterprise Lightweight Directory Access Protocol (LDAP).

**6.2.1.3. User Characteristics**

Intended users of IHTA include National, Veterans Integrated Service Network (VISN) and Facility Administrators, Care Coordinators, PSAs, Program Office Managers, Vendors (Manage QIRs), and HT Contract Office staff (Manage QIRs Specific Requirements).

**6.2.1.4. Dependencies and Constraints**

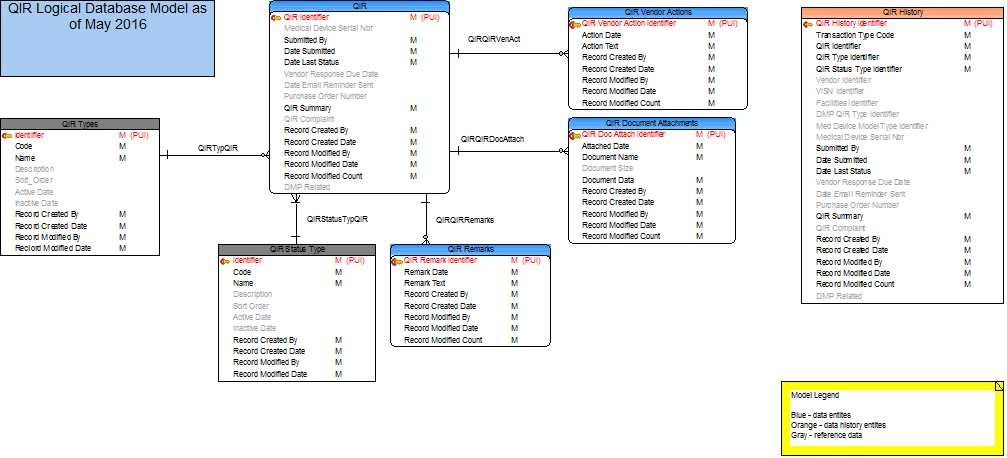
This section is not applicable for IHTA.

**6.2.2. Specific Requirements**

**6.2.2.1. Database Repository**

Figure 18 is the logical model of the HT database that is specific to Manage QIRs and the source of data for Manage QIRs functionality that will be re-configured by the HTRE Phase 2 project team. The database repository for Manage QIRs will not change or be altered due to the changes in user accessibility to the functionality. Manage QIRs functionality and the data it collects or reports on will remain the same as it has been.

**Figure 18: IHTA – Manage QIRs**



The Manage QIRs functionality will not require any entity, attribute, constraint, or indexing changes to the existing HT database.

**6.2.2.2. System Features**

Under the HTRE Phase 2 Agile SDM, the system features and functional requirements for each module of IHTA will be documented using user stories. Customer-approved user stories will be stored on the HTRE TSPR.

**6.2.2.3. Design Element Tables**

This section is not applicable for IHTA.

**6.3. Network Detailed Design**

This section is not applicable for IHTA.

**6.4. Security and Privacy**

**6.4.1. Security**

All computer systems and sub-systems of the HTRE Phase 2 project must incorporate adequate safeguards for the security of information processed by them. Before a system or sub-system becomes operational, it must undergo a security Certification and Accreditation (C&A) process that results in an Authority to Operate (ATO) or Interim Authority to Operate (IATO). According to Office of Management and Budget (OMB) and the Clinger-Cohen Act of 1996, security must be a consideration throughout the System Development Lifecycle (SDLC). This section describes the security specifications that must be included in the development of IHTA. This section will be used as a starting point for security planning.

• **Access Control** (National Institute of Standards and Technology [NIST] SP 800-53**1**).

Access control for IHTA is provided agency-wide by OTS. Local, regional, and national IHTA administrators will determine and maintain access controls at the system level for IHTA. This control is managed at the VA level.

• **Authorization**. IHTA enforces assigned authorizations for controlling access to the system in accordance with applicable policy. For VA users, IHTA uses the existing VHA Enterprise Lightweight Directory Access Protocol (LDAP) domain for authentication storage. For non-VA users, IHTA will utilize the IHTA database tables to store authorization information, such as credentials and successful and failed logon attempts. The administrative IHTA screens are provided for administrative users to assign authorizations to IHTA users with different roles and permissions.

• **Registration**. The IHTA registration screens capture a user’s VA network ID to store it in the IHTA database table.

• **Registration Approval**. The registration approval process for IHTA is performed by its administrator or a system administrator. The screens of the registration approval process capture and store IHTA database information about user roles, groups, and permissions related to specific application modules of IHTA.

• **Identification and Authentication** (NIST SP 800-53). IHTA uniquely identifies and authenticates VA users using the VA Enterprise LDAP.

HTRE Phase 2 will use the formal, documented policies, and procedures (i.e., VA Directive and Handbook 6500, Security Accreditation Package and Security Management and Reporting Tool [SMART] database) provided by Office of Cyber and Information Security (OCIS) that govern the security requirements set forth by NIST and VA, and must ensure their effective implementation. Please refer to the Home Telehealth SMART Inventory Checklist.

1 National Institute of Standards and Technology Special Publication 800-53 Revision 2, Recommended Security Controls for

Federal Information Systems, December 2007.

**6.4.2. Privacy**

Modification of QIR to a main menu user option does not include the use of PII or PHI information. QIR can be classified as operational providing the Telehealth business office with field monitoring of vendor supplied medical devices behavior and performance metrics.

The future collecting and storing of wound care images between Home Telehealth contracted vendor servers and VistA imaging will involve the use of PII to perform proper patient identification when integrating patient’s images into VistA image. It is expected that the interface between the vendor server and VistA Imaging will conform to the user credentialing and data encryption requirements as specified by VA security directives and required by the VistA imaging interface specifications. The detailed privacy specifics of the interface will be detailed once the final design is agreed upon by all stakeholders.

The future interface between MHV Blue Button and HDR will require that the Blue Button user provide enough PII data to properly identify themselves. It is expected that the interface between the MHV Blue Button and HDR will conform to the user credentialing and data encryption requirements as specified by VA security directives and required by the MHV Blue Button software interface. The detailed privacy specifics of the service interface will be detailed once

the final design is agreed upon by all stakeholders.

**6.5. Service Oriented Architecture / ESS Detailed Design**

When deemed necessary, and based on business requirements, IHTA can expose its own business services to the VA Enterprise as Service Oriented Architecture (SOA) services. These services will be implemented using industry standard technology as either 1) a remote procedure call using Stateless Session Enterprise Java Beans (EJB) or 2) a Web service implemented in the Representational State Transfer (REST) style. As of right now, there is no call for IHTA to develop SOA based services.

**7. External System Interface Design**

This section is not applicable for IHTA.

**8. Human-Machine Interface**

**8.1. 508 Compliance Waiver**

A 508 Waiver Request was submitted on 2/2/2016 for the Home Telehealth Reporting Enhancement (HTRE) project R2.0 of the Integrated Home Telehealth Application (IHTA) R7. IHTA was audited in May 2015, and after extensive discussion with the 508 team it was determined several issues with the use of Flex. In order to remediate, the entire IHTA application is revised by replacing the Flex/Flash presentation layer with HTML.

IHTA Build 1 is currently undergoing Section 508 audit to confirm that the remaining two issues from the 11/15/2016 have been remediated.

**9. Attachment A – Approval Signatures**

REVIEW DATE: December 12, 2016

SCRIBE: Celeste Perkins

Signed:

Ellen Hans, Integrated Project Team (IPT) Chair & IT Program Manager Date

Catherine Buck, Business Sponsor Date

David Komraus, HTRE Phase 2 Project Manager Date

**A. Additional Information**

**A.1. Identification of Technology and Standards**

IHTA R9.0 will be released under HTRE Phase 2 Build 1.

**A.2. Constraining Policies, Directives and Procedures**

IHTA complies with the following standards:

• Section 508 Compliance Standards from the Electronic and Information Technology

Accessibility Standards Final Rule (Federal Register 21 December 2000, 36 CFR Part

1194)2

• Code Conventions for the JavaTM Programming Language3

• Java 7 Platform, Standard Edition 4

• Any messaging implemented to support IHTA will comply with applicable sections of the Health Level 7 (HL7) standard5

**A.3. Requirements Traceability Matrix**

The attached RTM contains the traceability between the business requirements from the BRD

and the user story requirements being developed for the IHTA application.

**A.4. Packaging and Installation**

This section is not applicable to the HTRE Phase 2 project.

**A.5. Design Metrics**

This section is not applicable to the HTRE Phase 2 project.

2 Electronic and Information Technology Accessibility Standards (Section 508). Accessed at: [http://www.access- board.gov/guidelines-and-standards/communications-and-it/about-the-section-508-standards/section-508-standards](http://www.access-board.gov/guidelines-and-standards/communications-and-it/about-the-section-508-standards/section-508-standards)

3 Code Conventions for the Java™ Programming Language. Accessed at:

<http://java.sun.com/docs/codeconv/html/CodeConvTOC.doc.html>

4 Java 8 Platform, Standard Edition. Accessed at: <http://docs.oracle.com/javase/8/>

5 Health Level 7 (HL7) Standards Website. Accessed at: <http://www.hl7.com/>xcv