##### 

Perceptive Reach:

Integrated Reach Database System

(IRDS)

Interface Design Specification



Department of Veterans Affairs

November 2014

Version 0.2

Revision History

|  |  |  |  |
| --- | --- | --- | --- |
| Date | Version | Description | Author |
| 11/26/2014 | 0.2 | Added dashboard content | Robert Snelling, Andal Fequiere, Paul Bradley |
| 11/07/2014 | 0.1 | Added initial database content | Bill Balshem |
| 04/25/2012 | 0.0 | First Draft | Paul Bradley |
|  |  |  |  |

Table of Contents

1. Introduction 4

1.1. Scope 4

1.2. Assumptions 4

1.3. References 4

1.4. Acronyms 5

1.5. System Identification 6

2. Interface Definition & Requirements 6

2.1. System Overview 8

2.2. Interface Overview 8

2.2.1. External Data Sources 9

2.2.2. External Interfaces 10

2.3. Data Transfer 10

2.3.1. SQL Server Integration Services (SSIS) 10

2.3.2. Remote Procedure Calls (RPC) 11

2.4. Communications Methods 11

2.4.1. IRDS Surveillance Dashboard 11

2.5. Performance Requirements 12

2.6. Security 12

3. Interface Verification 12

3.1. Data Source Imports 12

3.1.1. Batch Imports 13

Approval Signatures 14

# Introduction

VA is seeking to expand suicide prevention to include upstream approaches, designed to reduce initiation or escalation of a risk factor. Upstream suicide interventions target individuals or groups who exhibit biological, psychological, or social risk factors that are more prominent among high-risk groups than among the larger population. Understanding the unique needs of our nation’s Veterans and the military culture as it relates to stigma and mental health is important for early intervention. The goal of the Integrated Reach Database System (IRDS) innovation is to promote the general health of the Veteran population and effectively intervene in issues before they escalate in crisis.

The IRDS solution innovates the current process of risk data collection, analysis, and use in effective intervention strategy. The solution will harness the power of large and diverse data stores to aggregate, analyze and identify risk onset as well as reveal previously unidentified at-risk individuals and populations as a holistic and integrated approach.

The IRDS innovation will serve to bolster the three major components of VHA’s Strategic Plan for Suicide Prevention: surveillance, risk and protective factors, and prevention interventions. The IRDS innovation will target antecedent events specific to Veteran populations prior to the onset of risk to mitigate the development of risk.

## Scope

The IRDS Interface Design Specification document describes the relationship between IRDS and each of the external systems connected to it in terms of data items, protocols, and timing of events.

This Interface Design Specification will describe what data will be transferred between the IRDS and its input sources and output destinations such as:

* Input: Suicide Data Repository (SDR)
* Input: Veterans Benefits Administration Data
* Input: Corporate Data Warehouse (CDW)
* Input: VistA Data
* Output: VA Suicide Prevention Coordinators
* Output: Rutgers UHBC Outreach and Intervention Coordinators & Clinicians
* Output VA Suicide Prevention stakeholders

This document should be read in conjunction with the IRSD System Design Document (SDD).

## Assumptions

TBD

## References

The following IRDS documents may be referenced in tandem with the information recorded here:

* Project Management Plan (PMP)
* System Design Document (SDD)

## Acronyms

Table : Acronyms

| Acronym | Term |
| --- | --- |
| Army STARRS | Army Study to Assess Risk and Resilience in Service members |
| BIRLS | Beneficiary Identification Records Locator System |
| CD | Compact Disk |
| CDC | Center for Disease Control |
| DoD | Department of Defense |
| ETL | Extract, Transform, Load |
| GB | Gigabyte |
| ICD | International Classification of Diseases |
| IM/IT | Information Management/Information Technology |
| IRDS | Integrated Reach Database System |
| IT | Information and Technology |
| NDI | National Death Index |
| OIT | Office of Information and Technology |
| OMHS | Office of Mental Health Services |
| PMP | Project Management Plan |
| RSD | Requirements Specification Document |
| RTM | Requirements Traceability Matrix |
| SAS | Statistical Analysis System |
| SDCD | State Death Certificate Data |
| SDR | Suicide Data Repository |
| SFTP | Secure File Transfer Protocol |
| SMITREC | Serious Mental Illness Treatment Resource and Evaluation Center |
| SPAN | Suicide Prevention Applications Network |
| SQL | Structured Query Language |
| SSIS | SQL Server Integration Services |
| SSN | Social Security Number |
| TB | Terabyte |
| UI | User Interface |
| VA | Department of Veterans Affairs |
| VCL | Veterans Crisis Line |
| VHA | Veterans Health Administration |
| VSSC | VHA Support Service Center |

## System Identification

Identify the system and software which apply to the SDD, including: identification number(s), title(s), abbreviation(s), version number(s), and release number(s). Identify all standards (e.g., American National Standards Institute [ANSI], International Organization for Standardization [ISO], Institute of Electrical and Electronics Engineers [IEEE], etc.).

# Interface Definition & Requirements

This section details interfaces external to systems. External systems are systems that are not within the scope of the system under development, regardless of whether the other systems are managed by the vendor or its client.

Provide sufficient detail about the interface requirements for the development team to format, transmit, and/or receive data across the interface.

Include the following information (as appropriate):

* Data format requirements; if data must be reformatted before it is transmitted or after incoming data is received. Describe the tools and/or methods for the reformat process.
* Specifications for hand-shaking protocols between systems; content and format of hand-shake messages, timing for exchanging these messages, and errors handling.
* Format(s) for reports exchanged between the systems.
* Graphical representation of the connectivity between systems, showing the direction of data flow.
* Query and response descriptions.
* Describe the individual data elements that the interfacing entity(s) will provide, store, send, access, and receive, such as:
* Names/identifiers
  + Data Element Name
  + Data Format/Length
  + Data Type
  + Definition
  + Non-Technical Name
  + Non-Technical Synonyms
  + Specifications
  + Synonyms
* Range or enumeration of possible values (e.g., 0-99)
* Accuracy and precision (number of significant digits)
* Priority, timing, frequency, sequencing, and other constraints
* Security and privacy constraints
* Sources (setting/sending entities) and recipients (using/receiving entities).

Describe the data element assemblies (records, messages, files etc.) that the interfacing entity(s) will provide, store, and send, such as:

* Names/identifiers
  + Technical Name, e.g., data structure name
  + Non-technical Names, e.g. synonyms
* Data elements
* Medium/structure of data elements/assemblies
* Visual characteristics (e.g. layouts, fonts, icons etc.)
* Relationships among assemblies
* Security and privacy constraints
* Sources and recipients.

Describe the communication methods that the interfacing entity(s) will use for the interface, such as:

* Communication links, bands, frequencies, and media
* Message formatting
* Flow control (e.g. sequence numbering)
* Data transfer rate
* Routing
* Transmission services
* Safety
* Security and privacy considerations.

Describe characteristics of the protocols that the interfacing entity(s) will use for the interface, such as:

* Priority/layer of the protocol
* Packeting
* Legality checks, error control
* Recovery procedures
* Synchronization
* Status, identification, and other reporting features.

Where appropriate describe other characteristics, such as physical compatibility of the interfacing entity(s) (dimensions, tolerances, loads, voltages, plug compatibility, etc.)

## System Overview

The Perceptive Reach development and field pilot proposes to combine technology, outreach and clinical support to realize a clinically based data-driven early intervention and treatment solution aimed at suicide prevention. IRDS is a solution for analyzing multiple and integrated data sets with cutting-edge data analytic techniques and visualizations to identify at-risk individuals and populations and provide proactive and secure notifications of these results to Veteran support services. The Perceptive Reach project proposes to expand the capabilities of the Suicide Data Repository to include new interfaces to clinical data sources, integrated data analytics capabilities, a surveillance dashboard, and secure messaging.



Figure : IRDS System Overview

## Interface Overview

The primary ingress interfaces will use SQL Server Integration Services (SSIS) to retrieve data from the designated data sources such as the SDR. The SSIS package will be configured to pull data from the designated data source at a specified interval (daily/weekly/monthly/annually).

The primary egress interface will be the Direct Messaging interface used to notify VA Suicide Prevention Coordinators (SPC) and Rutgers Outreach and Intervention coordinators and clinicians. The IRDS will leverage the VLER Direct messaging service utilizing a RESTful interface to transmit message content. Another interface utilized by VA Staff and SPCs will be the IRDS Surveillance Dashboard which will provide browser based visualizations of critical data to identify Veterans at high risk for suicide.

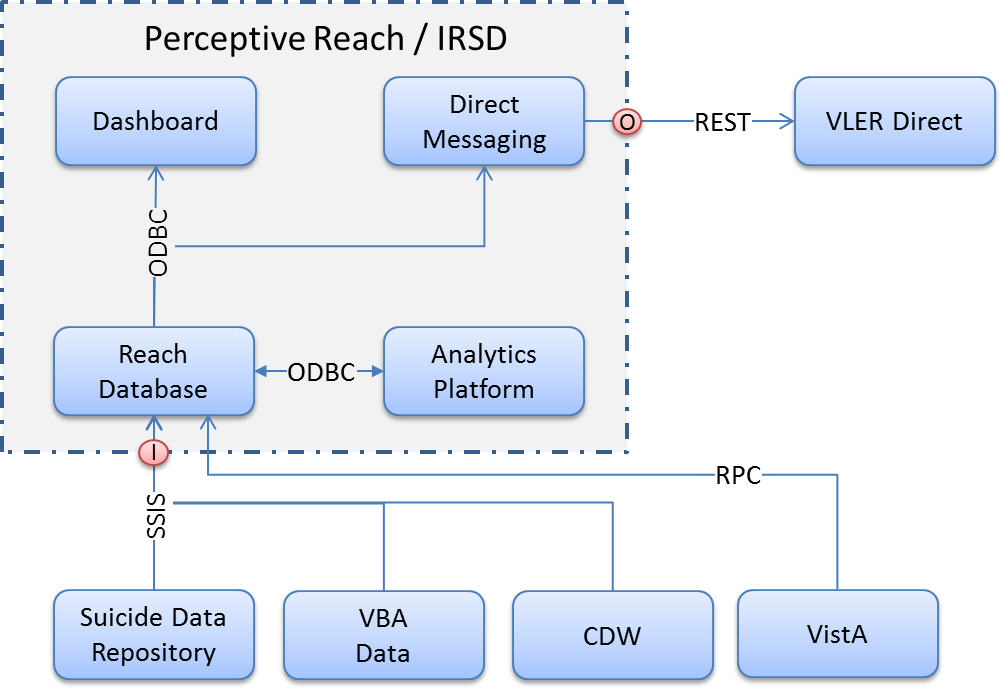


Figure : IRDS Interface Overview

### External Data Sources

The external data sources to be imported into Reach database of the IRDS have been identified as:

1. VA Suicide Data Repository (SDR) - The SDR contains VA and DoD suicide and mortality data. The data store is Microsoft SQL Server. Periodically data is imported into the system from

* Mortality search results from the National Death Index (NDI)
* State Death Certificate Data (SDCD)
* Veterans Crisis Line (VCL)
* Suicide Prevention Applications Network (SPAN)
* VA Beneficiary Identification Records Locator Subsystem (BIRLS) Death File

1. Corporate Data Warehouse (CDW) - CDW warehouses VHA and VBA data is SQL Server format. It is assumed that VHA and VBA data will be imported into the IRDS Reach database. The plan is to connect to the CDW servers via a SQL connection and directly pull the data into the IRDS system.
2. Veterans Health Information Systems and Technology Architecture (VistA) - It is assumed that some VHA data will be retrieved directly from the VA Vista system. VistA uses an M data platform. VistA data will be imported into the IRDS Reach data base using custom and/or currently existing RPC calls.
3. Non VA data sources - The VA has expressed an interest in importing and analyzing data that is external to VA data sources. Some of the sources being considered are LexisNexis and PACER. The PwC requirements team is currently reviewing possibilities with the VA.

### External Interfaces

The external interfaces resulting from the IRDS solution have been identified as:

1. The IRDS Surveillance Dashboard will provide a browser based user interface featuring representations of the analyzed consolidated data sources. These are processed and organized into visualizations which will assist SPCs and other VA personnel in their duties.
   * This dashboard will reflect data updated on a daily basis and may include charts, tables, maps, animations, other graphics and visual technology.
   * The dashboard will have configurable features based on user roles as defined by the stakeholders. This will provide for distinct views to meet each role’s business needs.



1. VLER Direct Messaging
2. SDR SSIS Interface
3. CDW SSIS Interface
4. VistA RPC Interface

## Data Transfer

### SQL Server Integration Services (SSIS)

SSIS will be the primary tool for importing external data sources into the IRDS Reach database

For a specific data import, an SSIS package will be developed to

1. Make a connection to the source (SQL table, text file, other)
2. Import the data into a staging area
3. Make the appropriate data transformations (cleaning, standardization)
4. Load the transformed data into the appropriate Reach data store tables

The execution of SSIS packages (.dtsx files) can be automated by scheduling them as a Windows process via SQl Server Agent.

### Remote Procedure Calls (RPC)

Data will be imported into the IRDS system directly from the Vista using RPC calls. VistA data is stored against a MUMPS back end, which uses text based files for data storage. For each source of VistA data imported from into IRDS:

1. Either a custom RPC will be written (in M) or a currently existing one will be leveraged
2. An automated java process will execute the RPC and return the query results in text format
3. Those results will be stored in a flat file on the IRDS server to be imported into the reach database via a SSIS package (using the steps listed in the section above)



Figure - IRDS Data Import Process Flow

## Communications Methods

### IRDS Surveillance Dashboard

The REST APIs provide programmatic access to read only IRDS data that is customized to provide data for visualization components and widgets. Web service APIs that adhere to the REST architectural constraints are called RESTful. HTTP based RESTful APIs are defined with these aspects:

* base URI, such as http://example.com/resources/
* an Internet media type for the data. This is often JSON but can be any other valid Internet media type (e.g. XML, Atom, microformats, images, etc.)
* standard HTTP methods (e.g., GET, PUT, POST, or DELETE)
* hypertext links to reference state

This allows the dashboard to have real-time data responses available in JSON, a lightweight data-interchange format. The dashboard architectural approach implements all data requests in an asynchronous and non-blocking way which allows for multiple data connections. To address safety and security the REST API will be managed through a session token or API key which will provide for privileged based access and will prevent unauthorized use.

## Performance Requirements

Table : Performance Requirements

| Requirement | Specification |
| --- | --- |
| Availability |  |
| Capacity |  |
| Backup Capacity |  |
| Number of Users |  |
| Maximum Number of Simultaneous Users |  |
| Maximum Downtime |  |
| Network Interface(s) |  |
| Database Interface(s) | Data imports will be run during non-business hours and be completed before the next business day. (i.e. SDR imports will run 1st of month at 11PM EST and be completed before 6AM the next day). |
| Help Desk Support |  |

## Security

TBD

# Interface Verification

TBD

## Data Source Imports

### Batch Imports

Batch imports will be run periodically using SQL Server integration services (SSIS). One output of an SSIS package run will be a completion report that contains information on the run including:

1. No of records imported(inserts, updates)
2. Any errors that occurred during the run
3. Any data integrity issues identified per specific records( i.e. a field that should be numeric contained the letter ‘a’)

These completion reports should be reviewed and verified after an import is run.

# Approval Signatures

This section is used to document the initial approval of the draft Suicide Data Repository Interface Design Specification and subsequent updates and modifications of the document.

All members of the governing Suicide Data Repository Management Team are required to sign:

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Signed: Date:

*Krista Stephenson, Contracting Officer’s Representative*

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Signed: Date:

*Robert Bossarte, VA Program Manager*