Integrating Informatics for Biology and the Bedside

Release Notes for i2b2 Version 1.3

These release notes address issues found and information about the i2b2 version 1.3. Unless otherwise specified, these notes apply to the following operating systems:

- Apple Macintosh OS x 10.4/5
- Microsoft Windows 2000
- Microsoft Windows XP Professional
- Microsoft Windows Server 2003

Additional Information

Included in this document are the following sections:

Section	Includes
Installation	Information related to installing the release.
Third Party Software	Software that is utilized by i2b2 but is owned, maintained and licensed by other companies is referred to as "Third Party Software". Any version changes made or needed to be made to the users system will be noted in this section.
New Features	A list of new enhancements will be included in this section. A brief description and a reference to the specification will be provided.
Updates	Any changes that are not considered an enhancement will be included in this section. This may be a fix for a problem found or it may be a change to existing code but not related to a problem.
Licensing	i2b2 licensing information
Copyright	Legal information regarding copyright laws
Trademarks	Trademark information

Installation

This release note applies to you if you are upgrading to 1.3 from a computer running an earlier version of the i2b2 workbench. This release does contain server changes so it is important to update both the client and the server.

If you are installing 1.3 from a computer running the i2b2 workbench, ensure that the workbench and all eclipse applications are closed prior to installing this release.

WHERE DO I START?

Prior to setting up the i2b2 server or workbench it is highly recommended that you read one of the following documents located in the documentation folder.

1. Hive Installation Guide_1-3 .pdf;   use for new installations
2. Hive Upgrade Guide_1-3.pdf;   use for upgrading existing environment to 1.3

Both of these documents will explain what needs to be done during the setup and in what order.

IMPORTANT CHANGES TO HIVE INSTALLATION

The i2b2 Hive is segmented by domain and by project. A separate i2b2 Hive is defined by its Project Management cell, the cell which controls user authentication and serves to store the references to all cells considered to be part of that particular Hive.

Each i2b2 Hive is labeled with a "domain" name. When one logs into the Hive, the domain is part of the login information. Other login information is the user name and password. The user name and password are only tested to be valid within this domain, and the user name and password are kept in the domain's Project Management cell.

Each domain may house several projects. Each user may be part of several projects, or just one project. If a user is part of two projects, they should not expect work that they do in one project to appear in a second project. The work is kept separated. Each project may have its own ontology and data repository.   A user may switch between databases containing the ontology/data repository for that project by switching projects. In the i2b2 workbench, only one project can be viewed at a time. This is to keep the previous queries and workspace objects consistent with the ontology and data repository of the project.

IMPORTANT CHANGES TO i2b2 VMWARE IMAGE INSTALLATION

The VMware image of the i2b2 server will now be installed with a NAT network connection. Previous to this release, the network connection was set to Bridge. The main difference between the two is that

NAT will assign an IP address specifically for the machine the image is being installed. Only the user logged onto the machine will be able to use it. Bridge obtains an IP address from the network and allows multiple users to connect to the machine with the image installed. This setting was changed due to a number of problems arising with the various network configurations not assigning an IP address. If you wish to use Bridge, you can change this setting in the VMware Image Console by going into the Edit Virtual Machine Settings.

In addition to the above item, the following three changes were made to the VMware image.

1. Gridsphere ports have been changed from 9090 to 7070.
2. Jboss ports have been changed from 7070 to 9090.
3. Domain name is Demo.

Third Party Software

i2b2 release 1.3 was upgraded to work with Eclipse Ganymede version 3.4.

Information about Eclipse Ganymede version 3.4 can be found on the eclipse website (www. eclipse.org)

New Features

i2b2 release 1.3 contains new features that have been outlined below.

Workplace Management Cell 1.0

Workplace Management is a new cell in the i2b2 core hive. As part of this enhancement a new view in the i2b2 workbench is available to users. Information in this view is related to the most common concepts and queries used by an individual and in essence become their personal workspace.

Detailed information regarding the functionality of the workplace can be found in one of the following three documents included in this release:

1. Workplace Architecture_1-0.pdf
2. Workplace Installation Guide_1-0.pdf
3. Workplace Messaging_1-1.pdf

Provided below is an outline of some key features of workplace management cell 1.0.

- Add the workplace view to the i2b2 workbench.
- Create folders to organize terms, queries, templates, etc that have been saved by the user.
- Create a shared folder to share terms, queries, templates, etc with other project team members. What is shared with others is determined by the individual users. Keep in mind once it is shared it will be available to anyone who has access to the project.

- Copy different items/elements to and from the workplace by dragging and dropping them between the different views within i2b2. See the basic charts below on what can be copied to and from the workplace. For more detailed information please see the workplace documentation included in this release.

TO Workplace

Item/element	i2b2 Views
Concept	Navigate Terms, Find Terms
Query	Previous Query, Query Tool
Group/Panel	Query Tool
Patient List	Previous Query

FROM Workplace

Item/element	i2b2 Views
Concept	Query Tool, Export Data
Previous Query	Query Tool, Timeline, Export Data
Template	Query Tool, Timeline, Export Data
Patient List	Timeline, Export Data

- Managers will have access to view the workplace for each member of their team.

File Repository Cell 1.0

The File Repository Cell (FRC) is an i2b2 Hive Core cell. This cell manages i2b2 files between cells and within the i2b2 applications such as the i2b2workbench. SOAP service calls are used to access files on the FRC. In the rare instance where users will need to have more of a direct access, the server administrator will need to create an account with the same username and password as the on in the Project Management Cell.

Detailed information regarding the functionality of the file repository can be found in one of the following documents included in this release:

1. FR_Architecture_1-3.pdf
2. FR_Installation_Guide_1-3.pdf
3. FR_Messaging_1-3.pdf

Data Importer Client/Server

The data importer has been developed to work specifically with the File Repository Cell. This feature enables users to import data from an external file into the CRC data. The data to be imported must be in either a "csv" file or patient data object (pdo) xml object. The following can be imported.

1. Patient demographics
2. Observations
3. Events

In order to support this enhancement, modifications were made to both the client (workbench) and to the server (CRC).

Client Changes

1. Import Data view created.
2. File Import Wizard
   - Designed to walk the user through each step of the upload process.
3. Drag and drop pdo xml from an external source directly to the Import Data view within the i2b2 workbench.
4. Monitor the status of the files being uploaded.

Server Changes

1. CRC web services created to load the data uploaded into the CRC database.

Client Data Exporter

The client data exporter uses data from within the CRC and Ontology cells and displays it in a number of different graphical formats. The following are some of the available formats.

- Histogram
- 3-D Histogram
- Pie Chart
- Bar Graph
- Scattered Plots
- Table view

SQL Database

Modifications were made to the server to accommodate the usage of SQL Server.

CRC Queue Enhanced

The CRC queue used for running queries has now been divided into three queues. A "small", "medium" and "large" queue and the size of the job plus the number of jobs running will determine which queue is used. The following are the parameters used to determine which queue is used.

	Query Timeout	Total simultaneous jobs/instances	Queue Size
Small Queue:	3 mins	Unlimited	Unlimited
Medium Queue:	30 mins	2	Unlimited
Large Queue:	12 Hrs	1	Unlimited

Constraining Items by Values in Queries

The query tool view has been modified to allow users to set specific values for test results that they are including in their query. This can be done by right clicking on the item in the query tool panel and selecting set values from the selection menu. Depending on the test and the result value one or many of the following search options are available in the set value enhancement.

1. By high/low flag – based on the abnormal flag defined by the clinical laboratory and stored with the result in the data repository.

2. By numeric value – can search for a specific value or a range of values using one of the following operators:

    a. Less than (<)
    b. Less than or Equal to (<=)
    c. Equal to (=)
    d. Between
    e. Greater than (>)
    f. Greater than or Equal to (>=)
    g. Not equal to (<>)

Changes to the server were made to support this enhancement.

XML File Returns Patient Count

The result output for the query tool has been enhanced to allow users to run a query and returns the number of patients that match the search criteria. In order to support this enhancement, modifications were made to both the client (workbench) and to the server (CRC).

Client Changes

Two check boxes have been added to the query tool view.

    1. Timeline

- When checked, the system will function as it does in previous versions. A set of patients and their related information will be returned and the timeline view will be automatically rendered.

2. Patient Count

   - When checked a numerical value in an XML file will be returned. The number returned is the total number of patients found that match the search criteria. No additional information is returned.

Server Changes

PATIENT_COUNT_XML was created and added as an xml result output option in setfinder.

Patient Gender Count

Similar to the Patient Count enhancement, this enhancement is designed to return the numerical value for the number of patients that meet the search criteria. The only difference is this one will breakdown the numbers by gender.

Client Changes

At this time, the i2b2 workbench does not handle being able to ask for or display patient gender count. The changes are strictly on the server side.

Server Changes

PATIENT_GENDER_COUNT_XML was created and added as an xml result output option in setfinder.

Ajax Client

The i2b2 web client is an alternative web-based interface to the i2b2 Hive, which reproduces much of the functionality of the desktop client through a web browser. The primary advantage of the web client is that software does not have to be installed on user's computers. This aids greatly in enterprise-wide rollout of i2b2 across an institution.

Correlation Analysis Plug-in

The Correlation Cell is a specialized analysis plug-in for the i2b2 hive. It uses model-less data mining and clustering techniques based on direct pair-wise correlation calculation. The most common 'similarity measures' used are the Mutual Information Content (MIC), the *Pearson's* linear correlation coefficient, and the Euclidean distance between the vectors. Both time-independent and time-resolved versions of the main algorithm were developed which makes the general approach suited for analysis of medical

data (like diagnostic labs, diagnoses, medications etc.), as well as various "omic" data sets (genomics, proteomics, etc.).

Updates

Demo Data

The data in the demo database has been updated to include the following:

- Some clinical data from Partners Healthcare contains values that will display in the timeline.
- Clinical trials data from OASIS
- RNA expression data from GEO
- Updated to include a wider range of patients and a broader sampling of patient results.

NOTE: Due to the size of the file the data is loaded into the SQL database via SQL Loader.

Notes Viewer

Notes viewer has been added to the timeline and some sample PFT notes have been included.

Documentation:

The 1.3 release documentation can be found in a zip file located on the i2b2 web page. This file includes documentation for the following:

- Hive installation documents
- Design documents for all the core cells have been updated to 1.3
- Workplace documents for the new workplace core cell.
- File Repository
- Correlation Analysis

Fixes:

FIX: Excessive logging on server

Tracking Number: 155

Category: Ontology

Applies To: Windows and Mac OS

Description:	Output to the server and the size of the log files can get large.

Resolution:	In order to limit output on the server and the size of the log files, the following were changed from log.info to log.debug.

1. ConceptDao.java 1.9
2. DataSourceLookupHelper.java 1.3
3. PMResponseMessage.java 1.6

FIX: Single data source

Tracking Number:	161

Category:	CRC

Applies To:	Windows and Mac OS

Description:	Allow a single data source that can allow for multiple projects.

Resolution:	Add dbo.{project name} to the tables such as concept_dimension

FIX: Time missing from create_date column

Tracking Number:	181

Category:	CRC

Applies To:	Windows and Mac OS

Description:	The create_date column in QT_Query_Master table is missing the time.

Resolution:	The time will now be stored with the date in the create_date column.

FIX: Previous query not viewable for new users

Tracking Number:	126

Category:	Previous Queries

Applies To:	Windows and Mac OS

Description:	When a new user runs a query, the previous query view does not display the query.

Resolution:	Add query to previous query view.

FIX: Highlight "Query Name" box

Tracking Number:	165
Category:	Query
Applies To:	Windows and Mac OS
Description:	Query name box in query tool view needs to be highlighted so that users know it can be dragged into the workplace view.
Resolution:	Outline of the query name box will be highlighted when the user mouse over it.

FIX: Update "Subject" label to say "Patients"

Tracking Number:	177
Category:	Query
Applies To:	Windows and Mac OS
Description:	In the query tool view the field labeled "Number of subject returned:" needs to be modified to say, "Number of patients returned:"
Resolution:	For consistency purposes the label was changed as stated above.

FIX: Problem with upgrade scripts

Tracking Number:	201
Category:	CRC
Applies To:	Windows and Mac OS
Description:	Problem upgrading the CRC using the scripts provided in the source code. There seems to be an error in the script. The first three commands reference the following tables: visit_dim_lookup, patient_dim_lookup, and FACT_LOOKUP. These tables were not included in a previous release and should not be referenced.
Resolution:	Fixed the upgrade script to populate "code_lookup" and "crc_db_lookup" table. CRC install documentation has been updated with how to do this.

FIX: Support for xml result output in setfinder

Tracking Number: 179

Category: CRC

Applies To: Windows and Mac OS

Description: Setfinder request change to support the following options:

a)   PATIENTSET
b)   PATIENT_COUNT_XML

FIX: Revert back pdo jaxb generation

Tracking Number: 200

Category: CRC

Applies To: Windows and Mac OS

Description: Stop using PDO classes from commons project.

FIX: New icons

Tracking Number:

Category: Framework

Applies To: Windows and Mac OS

Description: The icons in the i2b2 workbench have been given a new look and feel. In addition they have been updated to be consistent across plug-ins.

FIX: Display option settings not saved across sessions

Tracking Number: 280

Category: Previous Queries

Applies To: Windows and Mac OS

Description: In display options 20 defaults as the number of queries to display in the previous query view. If you change this to another number it will save it for

that session but when you log back in to the workbench it defaults back to 20. This can also be duplicated if you don't log out and simply go back into the display options you will notice it defaults back to 20.

FIX: Need to enter 'Y' twice during install

Tracking Number: 114

Category: Project Management/ Install

Applies To: Linux

Description: No longer need to enter 'Y' twice during the install when using ANT.

Licensing

The i2b2 source code is licensed under the i2b2 Software License 2.0. This includes but is not limited to all code in the edu.harvard.i2b2.* package namespace.

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