

Software Architecture Document

Project Management Cell 1.0

Abstract:

This is a software architecture document for Project Management(PM) cell. It identifies and explains important architectural elements. This document will serve the needs of stake holders to understand system concepts and give a brief summary of the use of the PM message format.

Revision History

Revision Number	Date	Author	Description
1.0	8.27.07	Mike Mendis	Version 1.0

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1. Overview

The Project Management cell (PM) is an i2b2 Hive Core cell. This cell has two basic functions: to control user access to various services and to keep track of where these services are located. User access is determined by a user's 'role', which is a variable associated with a user that serves to define the actions that user may perform. The role may determine how much data to return and whether or not there is access to a particular service. The default role is 'user' and there are other roles, such as 'manager', 'administrator', and 'protected_access', each with its own set of privileges regarding what data can be viewed. An individual i2b2 user has one or more roles. In addition, there is the concept of a 'target location' or 'domain' that further defines the environment and associated permissions. The target location is a variable that defines the PM server location to be accessed.

When a person logs in to the i2b2 workbench, a login screen comes up that requires the username, password and target location to be entered. The target location is also called the domain and it is used to authenticate the user. The domain is actually shorthand for the domain name. i2b2 cells have mappings of domain names to URLs, which tell where the service is that will authenticate the user. If the domain does not exist in the lookup table, the person is not authenticated. If the domain exists, the user is authenticated. In effect, the mapping of domain name to url provides an extra layer of security to the authentication process.

The PM cell next performs authorization, the process of determining the user's roles and permissions and privileges, and returns what the user is allowed to see. The message used by the PM cell for this information is **get_user_configuration**.

1.1. PM Definitions, Acronyms and Abbreviations

1.1.1 Vocabulary Data Object (VDO)

1.2 User Role

The primary roles/participants in the PM system are as follows:

- User – Authentication to verify that specific user is valid and authorization providing the proper roles and user specific information.
- Group – Maintain all the projects for the hive and which user and roles are related to the project.
- Cell Services – Maintain location of cell services and variables associated with that specific cell.

1.3 Security

Users may access PM with a user-id and password combination, secure http (https) can be used to encrypt the username, password and all transmitted data to and from the PM cell.

1.5 Assumptions/Constraints

-

.6 Technical Platform

The technology used to build the product is as follows

- Java 2 Standard Edition 5.0 version 11
- Oracle Server 10g database (optional)
- Apache Tomcat 5.5
- GridSphere 2.2
- Axis2.1.1 web service (SOAP/REST messaging)

1.6.2 Security

The application must implement basic security behaviors:

- Authentication: Authenticate using at least a user name and a password
- Authorization: User may only access categories that they are allowed to by role
- Confidentiality: Sensitive data must be encrypted
- Data integrity : Data sent across the network cannot be modified by a tier
- Auditing: In the later releases we may implement logging of sensitive actions

1.6.3 Persistence

This application utilizes JDBC calls to retrieve persisted data.

1.6.4 Reliability/Availability

The Reliability/Availability will be addressed through the J2EE platform

Targeted availability is 16/7: 16 hours a day, 7 days a week

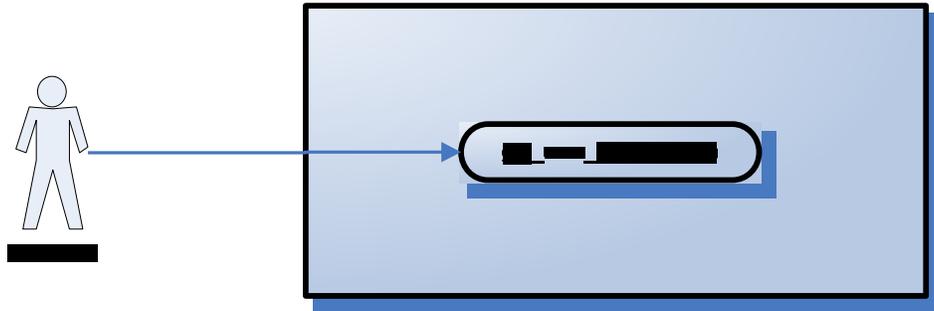
The time left (8 hours) is reserved for any maintenance activities

1.6.5 Performance

The user authentication and authentication must be under 10 seconds.

2. Use Case

The diagram below depicts common use cases a user may perform with the PM cell.



2.1 Operations

The PM service is designed as a collection of operations, or use cases:

get_user_configuration: returns a list of project and roles available for a given user.
Also all the services cell information for the hive is provided

3. Architecture Description

This section provides a description of the architecture as multiple views. Each view conveys the different attributes of the architecture.

- 1) Components and Connector View
 - a) Client-Server Style
- 2) Module View
 - a) Decomposition Style
 - b) Uses Style
- 3) Data View
- 4) Deployment View

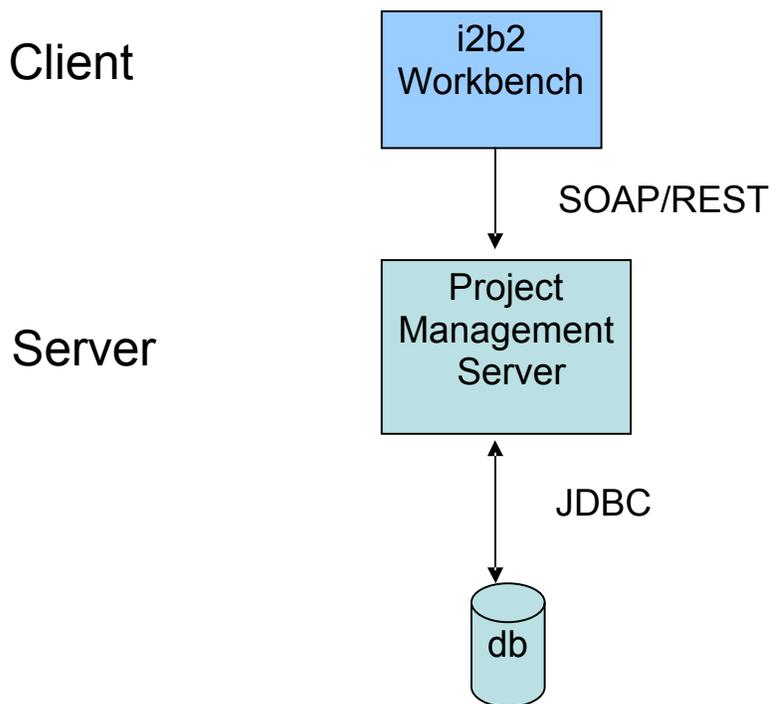
3.1 Components and Connector View

A Components and Connector view represents the runtime instances and the protocols of connection between the instances. The connectors represent the properties such as concurrency, protocols and information flows. Following diagram represents the Components and Connector view for the multi-user installation. As seen below, component instances are shown in more detail with specific connectors drawn in different notations.

3.1.1. Client-Server Style

The PM system is represented using the Client-Server view.

3.1.1.1 Primary Presentation



3.1.1.2 Element Catalog

Element Name	Type	Description
i2b2 Workbench	Client Component	Webservice client submits the requests to PM Server components and renders response XML.
Project Management Server	Server Component	ONT cell uses Project Management cell to authenticate user. ONT cell constructs PM request message and makes a web service call to Project Management Cell.
db	Data Repository Component	This repository is a database for the cell, group, role and user information.
JDBC	Query Connector	SQL query used as a connector between the ONT System and the Metadata database.
Web Service	Request Connector	SOAP or REST protocol used to communicate with the external system.

3.1.1.2 Design Rationale, Constraints

N-tier Architecture

The client-server style depicts an n-tier architecture that separates the presentation layer from business logic and data access layer thus providing for a high degree of portability.

3.2 Module View type

The module view shows how the system is decomposed into implementation units and how the functionality is allocated to these units. The layers show how modules are encapsulated and structured. The layers represent the “allowed-to-use” relation.

Following sections describe the module view using Decomposition and Uses Styles.

3.2.1 Decomposition Style

The “Decomposition” style presents system functionality in terms of manageable work pieces. It identifies modules and breaks them down into sub-modules and so on, until a desired level of granularity is achieved.

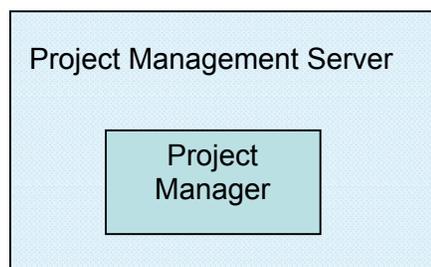
3.2.1.1 Primary Presentation

System	Segment
Project Management Server	Project Manager

3.2.1.2 Element Catalog

Element Name	Type	Description
project Manager	Subsystem	This subsystem manages queries for user and cell operations.

3.2.1.3 Context Diagram



3.2.2 Uses Style

The “Uses” style shows the relationships between modules and sub-modules. This view is very helpful for implementing, integrating and testing the system.

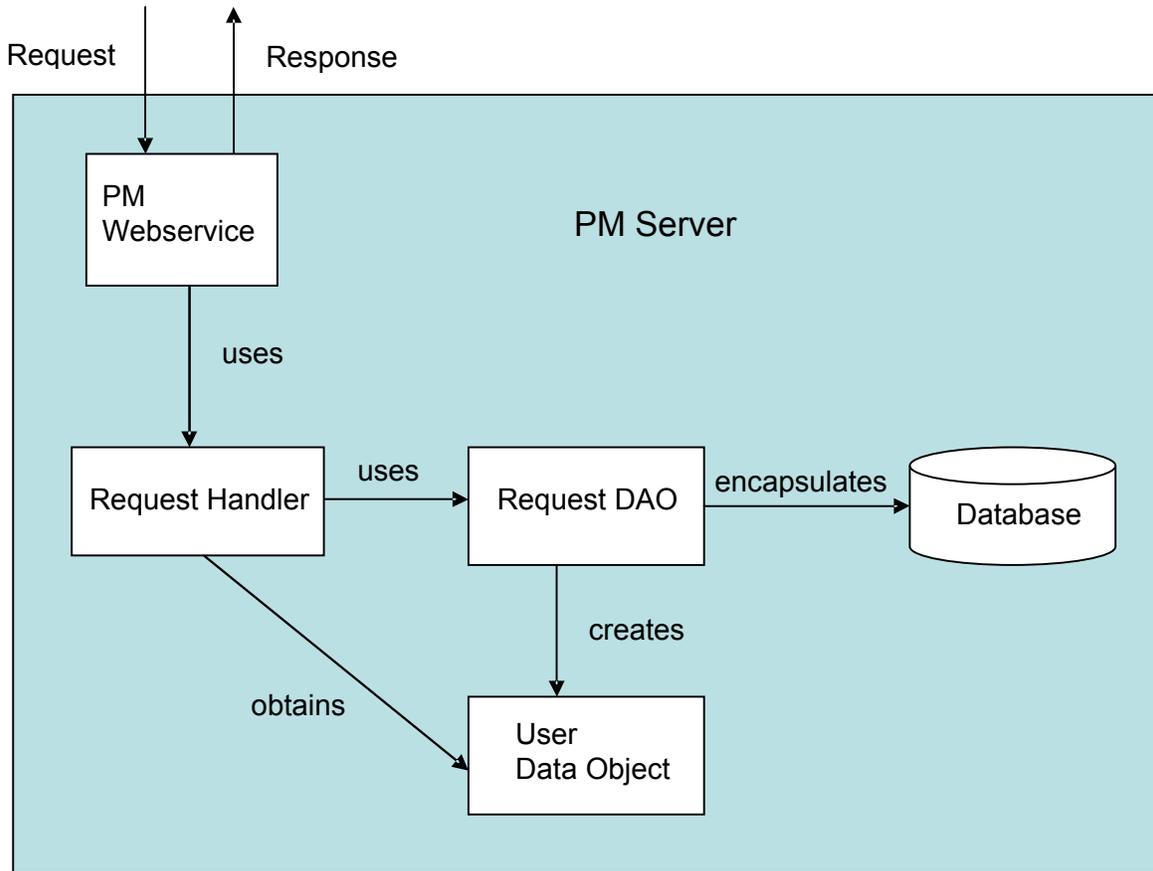
3.2.2.1 Primary Presentation

System	Segment
Project Management Server	PM Module
Project Manager Subsystem	PM Webservice
	Request Handler
	Request DAO
	User Data Object

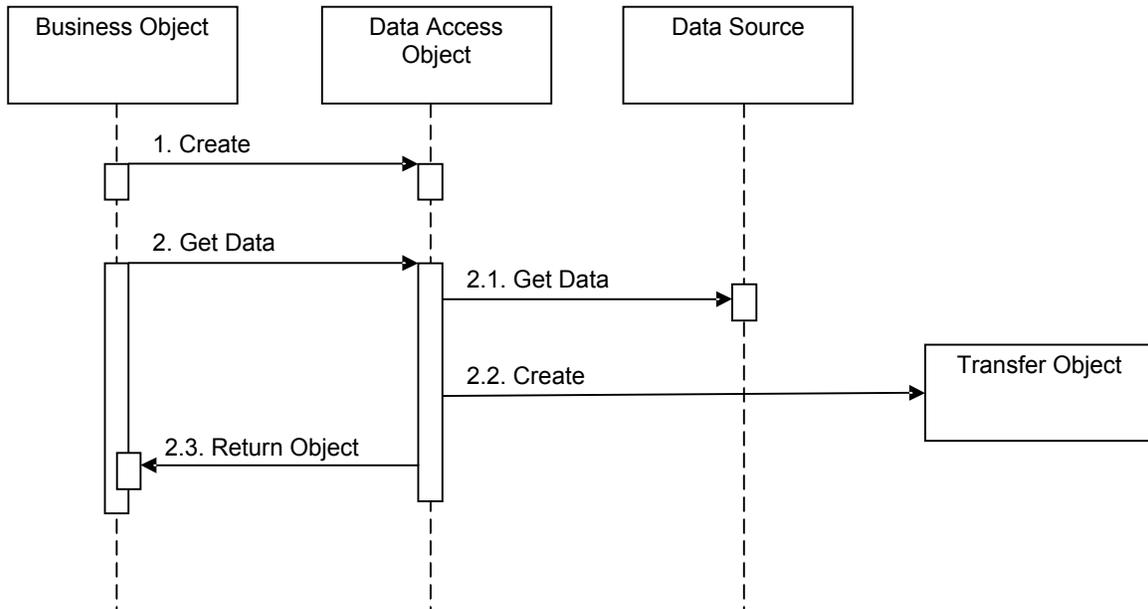
3.2.2.2 Element Catalog

Element Name	Type	Description
PM Module	Module	Authenticates user through Gridsphere Server System
PM Webservice	Communication Module	Provides web service interface to project manager operations.
Request Handler	Business Object	Delegates Ontology requests to Data Access Object layer to perform database operations.
Request DAO	Data Access Object	Supports database query operations.
User Data Object	Transfer Object	Object representation of persisted data

3.2.2.3 Context Diagram



3.2.2.4 Sequence Diagram



3.3 Mappings of Styles

The following table is a mapping between the elements in the Component & Connector Client-Server view shown in section 3.1.1, and the Modules Decomposition and Uses views shown in sections 3.2.1 and 3.2.2.

The relationship shown is *is-implemented-by*, i.e. the elements from the C&C view shown at the top of the table are implemented by any selected elements from the Modules views, denoted by an “X” in the corresponding cell.

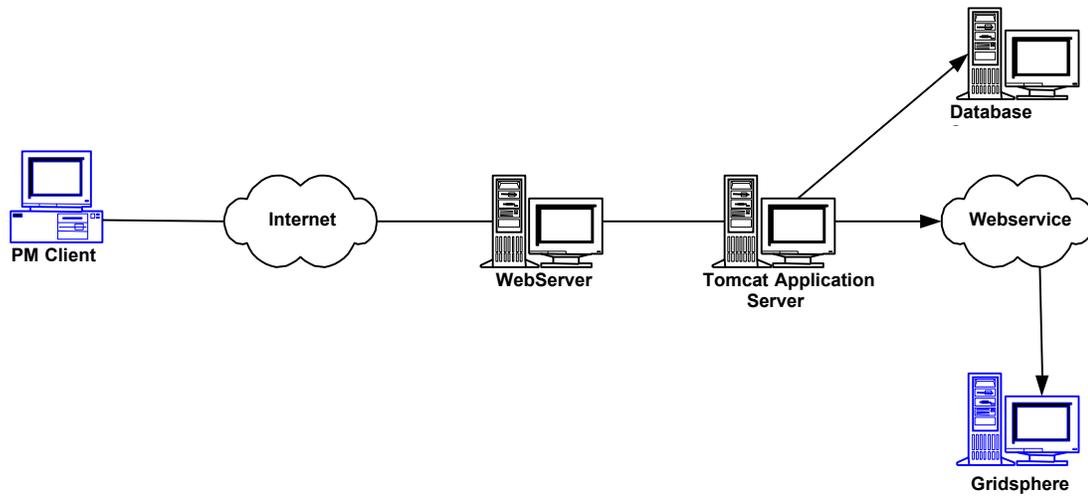
	PM Server	Gridsphere Management Server	Metadata Database
PM Service	X	X	
PM Webservice	X		
Request Handler	X		
Request DAO	X		X
User Data Object	X		

4. Data View

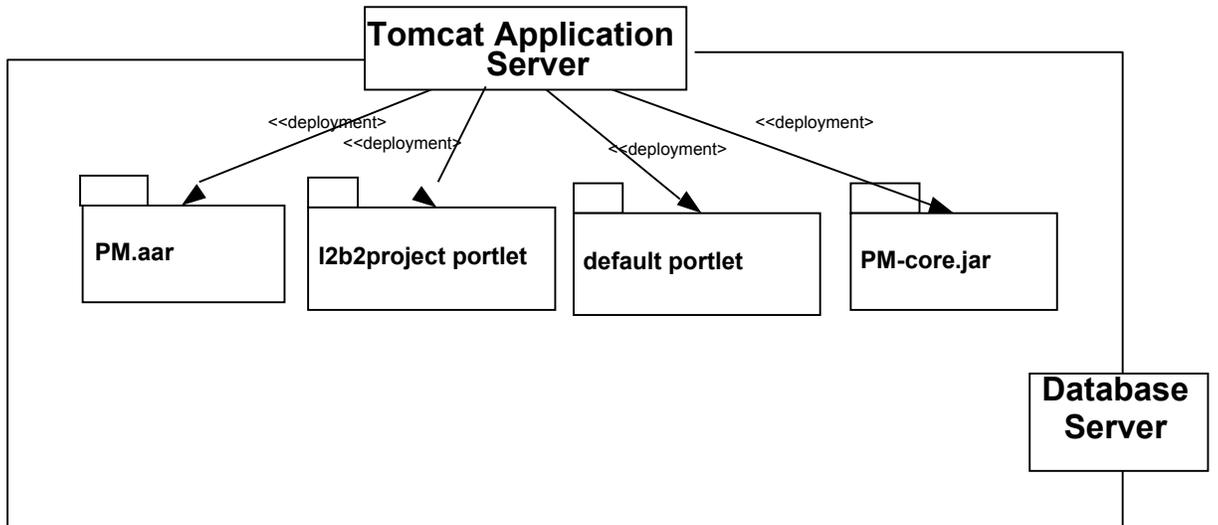
The key data elements related to the PM system are:

5. Deployment View

5.1 Global Overview



5.2 Detailed deployment model



References

i2b2 (Informatics for Integrating Biology and the Bedside)
<https://www.i2b2.org/resrcs/hive.html>
