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Regis University
College for Professional Studies Graduate Programs
Final Project/Thesis

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Development of a Web Based Application for Tracking Human Resource Utilization for a consulting firm.

Martin Kyne

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A Project Report submitted in partial fulfillment of the requirements for the degree of Master of Science in Computer Information Technology

School for Professional Studies
Regis University
Denver, Colorado

April 10, 2007

Front Matter

Abstract

Velocity Systems LLC is a privately owned company located in Franktown, Colorado that specializes in the implementation of PeopleSoft ERP, CRM and data warehouse solutions. Velocity Systems' and its partners have been involved in this community for over a decade and have created a large network of relationships with both clients and other consultants who provide services similar to Velocity Systems. The implementation of a PeopleSoft packaged application requires a high degree of coordination of a lot of different skills. The resources provided by Velocity have worked in the industry as consultants for at least seven years and in that time generally have acquired multiple skills. A typical Velocity Systems consultant will have technical knowledge of how to customize the PeopleSoft application and either detailed functional business process knowledge or detailed infrastructure knowledge. The depth and diversity of skills provided by the resource is what gives Velocity Systems its excellent reputation in the PeopleSoft community.

Velocity Systems is constantly marketing its services to PeopleSoft's user community base. When a prospect communicates an upcoming requirement, Velocity starts to identify and lineup potential resources to fill the need. Timing is everything in this business and Velocity must act quickly to prevent its competitors from taking the opportunity. Potential projects are monitored using a spreadsheet.

Velocity's resource manager is constantly communicating with consultants to determine their next availability and capabilities. The resource manager maintains a spreadsheet of consultants and their availability.

When a project is authorized, the resource manager and salesperson work together to identify the best resource to present to the client based on a combination of skill-sets, availability and to some extent profit margin. If the client accepts the resource, the resource is assigned to the project and the project is marked staffed, if not, alternate resources (if available) may be proposed or the project may be marked un-staffed.

Velocity wishes to use an enterprise level web based application to more quickly identify and propose resources on projects. An application that can match projects and available resources should allow Velocity's salespeople to continue to prospect for work and also allow Velocity's resource manager to track and manage a larger pool of potential resources and facilitate efficient communication as the company grows and expands.

Acknowledgements

Thanks to Regis University for a great educational opportunity, especially to Mark James and Don Archer for their great guidance and advice.

I would like to thank my wife Patti and my children, Aisling and Aodhan for keeping me smiling through this process and for being my biggest cheerleaders.

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Chapter 1. Introduction

Statement of the Problem

Velocity Systems is a systems integrator based in Franktown, Colorado. Velocity needs to be able to match the skill set requirements of open opportunities with the skills of available resources quickly to secure the limited available opportunities before their competitors. Velocity currently uses a combination of paper, email and spreadsheets to track resources, skills and opportunities. Velocity has no ability to forecast future availability and is losing sales due to its inability to react rapidly to market demands.

Thesis Statement

A database that provides the ability to track resource availability, resource skills, resource assignments, customers and opportunities will: (a) allow Velocity to rapidly identify opportunities that are a good fit for Velocity's resources, (b) enable Velocity to forecast future resource availability, (c) identify trends in market skill requirements, and (d) win more opportunities.

A web based application based on the advanced Oracle Fusion Application Architecture will allow Velocity to update the database, provide a central source of information and improve the communication between Velocity's resources, managers and customers.

Project Objective

The objective of the project is to develop an application prototype that –

1) Provides accurate and timely information
2) Is intuitive and easy to use
3) Helps to improve the business environment at Velocity

The project will begin in October 2006 and the prototype version will be completed in June of 2007.

The project will be developed using Oracles Fusion Application Architecture. Many of Velocity's customers will be contemplating migration of their PeopleSoft, JD Edwards and Oracle E-Apps applications to Oracle Fusion based applications when Oracle releases the next generation applications – currently projected 2008/2009. Velocity will have a marketing edge over its competition if it can demonstrate that it has experience in the Oracle Fusion technology and is running production applications using it.

Project Scope

The project scope includes the analysis and development of an application that -

- Tracks
    - Resource Contact information
    - Resource Skills
    - Resource Assignments
    - Resource Rates
    - Customer Contact Information
    - Customer Project Information
    - Customer Project Skills Requirements
    - Customer Project Rates

- Performs Resource / Project matching - identifies the most suitable resources for each project based on skills and availability.

The scope of the project does not include the following functionality (though these will be considered for follow-up phases) -

- Billing
- Payroll
- Time Entry
- Automated Resume scanning and processing
- Training administration
- Resource Self Service
- Customer Self Service

Challenges and Barriers to Success

There are two major challenges to the success of the project –

1) Familiarity with the Fusion Architecture -

   The Oracle Fusion Architecture is new and constantly evolving. Velocity does not have any resources that have been trained or have used the Oracle Fusion Application architecture and there is no budget for training. The development skills will need to be acquired quickly and "on the fly". Oracle does provide a considerable amount of documentation which will need to be quickly consumed and understood to meet the project timelines.

2) Time

   I will be the only resource allocated to this project. The project will need to be done above and beyond my daily activities. Scope will need to be controlled tightly to ensure that the project is completed in a timely manner.

Organization of this paper

The following chapters document the process of bringing this project from planning thru to delivery.

Chapter 2 of this paper describes the technologies that were reviewed and selected for use in the project.

Chapter 3 documents the Methodology used to design, develop, test and implement the final product. It provides an in-depth look at the elements of the Oracle Application Development Framework (ADF) and JHeadstart and how these elements work together to provide a robust Enterprise application.

Chapter 4 describes the report development process using Oracle XML Publisher.

Chapter 5 shows the pages of the completed application and the functions that are enabled by ADF.

Chapter 6 describes the projects successes, failures and future.

Chapter 7 provides a personal reflection on the benefits of the project and the future of Oracles ADF.

The Appendixes exhibit the database scripts used to create the database and samples of the final reports.

Chapter 2: Review of Literature / Research

An important component of the project is to investigate the technologies available in the Oracle Fusion Architecture and after reviewing the various components determine the components that best meet the needs of the project and Velocity. The following components and technologies are all deployed in the final RUTRACK solution.

Oracle Fusion Architecture

Oracle Fusion Architecture is a standards-based technology that defines the connections between enterprise applications, middleware and grid infrastructure technologies. Oracle Fusion Architecture focuses on architectural integrity and openness for business applications and business information, it defines the technology components required for Fusion Applications. Velocity has chosen the Oracle Fusion Architecture for RUTRACK for a variety of reasons including its leading edge use of the most up to date technology for distributed computing and application availability but also for very strategic reasons as it attempts to become familiar with the technologies which form the basis of the next generation PeopleSoft applications, implementation of which provide 99% of Velocity's revenue.

According to Charles Philips, President of Oracle [4] - "Oracle Fusion Architecture is a unifying model of emerging trends in grid computing architecture, service oriented architecture, and enterprise information architecture. While each trend is a study unto

itself, the fact that these techniques can now be united into a single architecture is an exciting idea. It gives customers and partners a good view of the direction that Oracle is taking to make the most of our core strengths in database, middleware and business applications."

The Oracle Fusion Architecture is designed to enable a Service Oriented Architecture (SOA) and Event Driven Architecture (EDA). Velocity has not identified SOA or EDA requirements for Phase I deployment but the architecture will enable Velocity to expose electronic services to its partners. Examples in the future might include allowing partners to review the skills and availability of resources or accepting project requirements electronically from customers. SOA and EDA technology in the Oracle Fusion Architecture includes a services registry for discovering and managing the life cycle of processes, Oracle Business Process Execution Language (BPEL) to manage business processes, business rules and workflow and security solution to enable authentication and authorization to services.

Services and Applications developed using Oracle ADF can be deployed and consumed by several types of user interfaces, including desktop clients, browsers, and mobile and telnet devices. In future Phases of this project Velocity may wish to enable mobile access to RUTRACK for its sales people and resource managers, Oracle ADF will enable this capability.

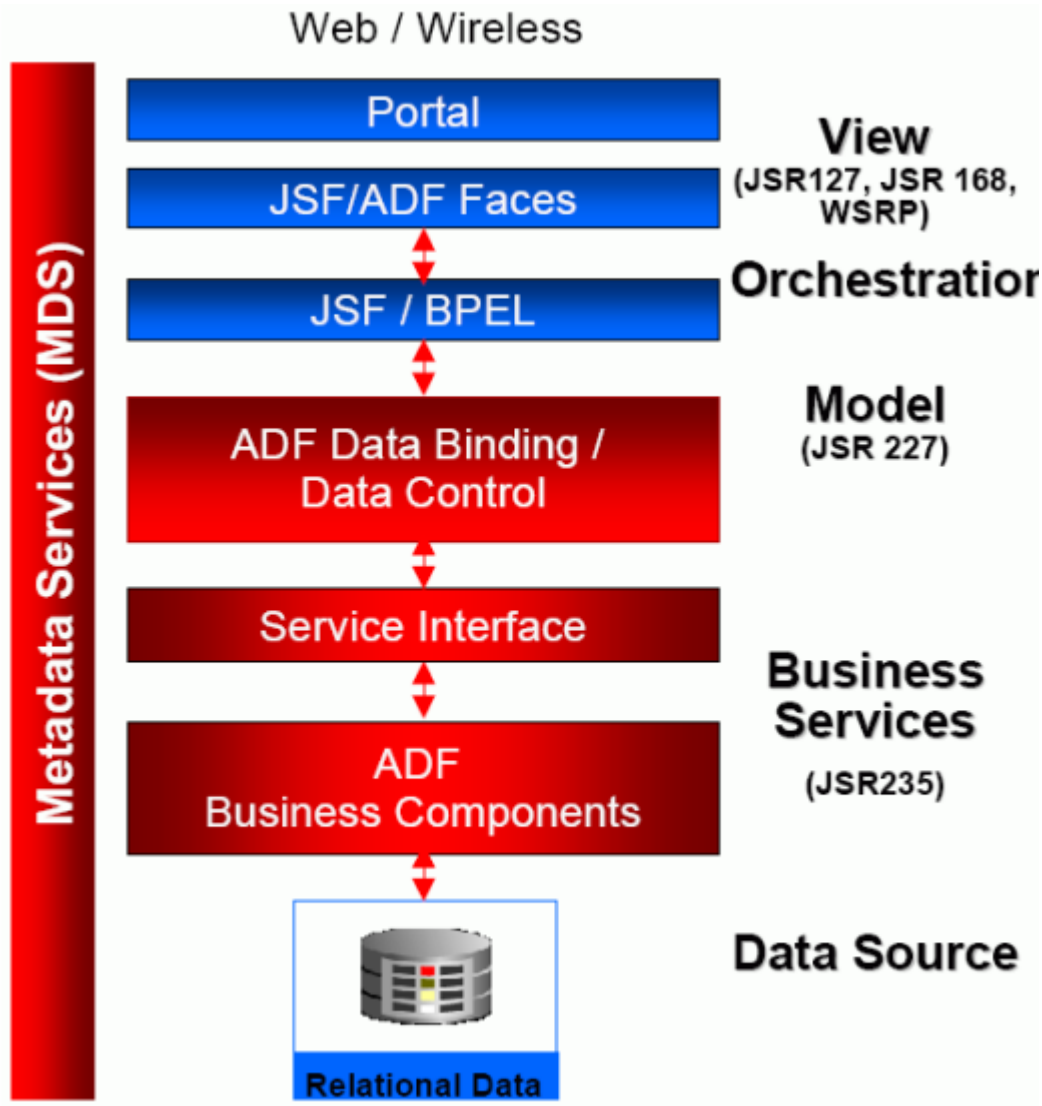


Figure 1 Oracle Fusion Architecture

Oracle ADF

Oracle Application Development Framework will be used to develop and control the GUI for RUTRACK. Oracle ADF is a model-driven SOA framework that hides many of the complexities of J2EE development by providing features that automate and manage business and data connection services, process flows and page flows. Oracle ADF [6] is

based on the Model View Controller (MVC) design pattern. An MVC application is separated into three layers:

1. The first layer is the model layer that handles interaction with data-sources (Oracle DB 10G in our case) and runs the business logic – Oracle ADF separates this into a Model Layer and Business Services Layer.
2. The second layer is a view layer that manages the presentation of the GUI to the end user.
3. The third and final layer is a controller layer manages how the application flows from page to page and acts as the interface between the Model and View layers.

Separating applications into these three layers simplifies maintenance and reuse of components across applications. We can easily change the View layer without impacting the underlying data model which may be used by multiple applications. This independence of each layer from others results in a loosely coupled SOA [6].

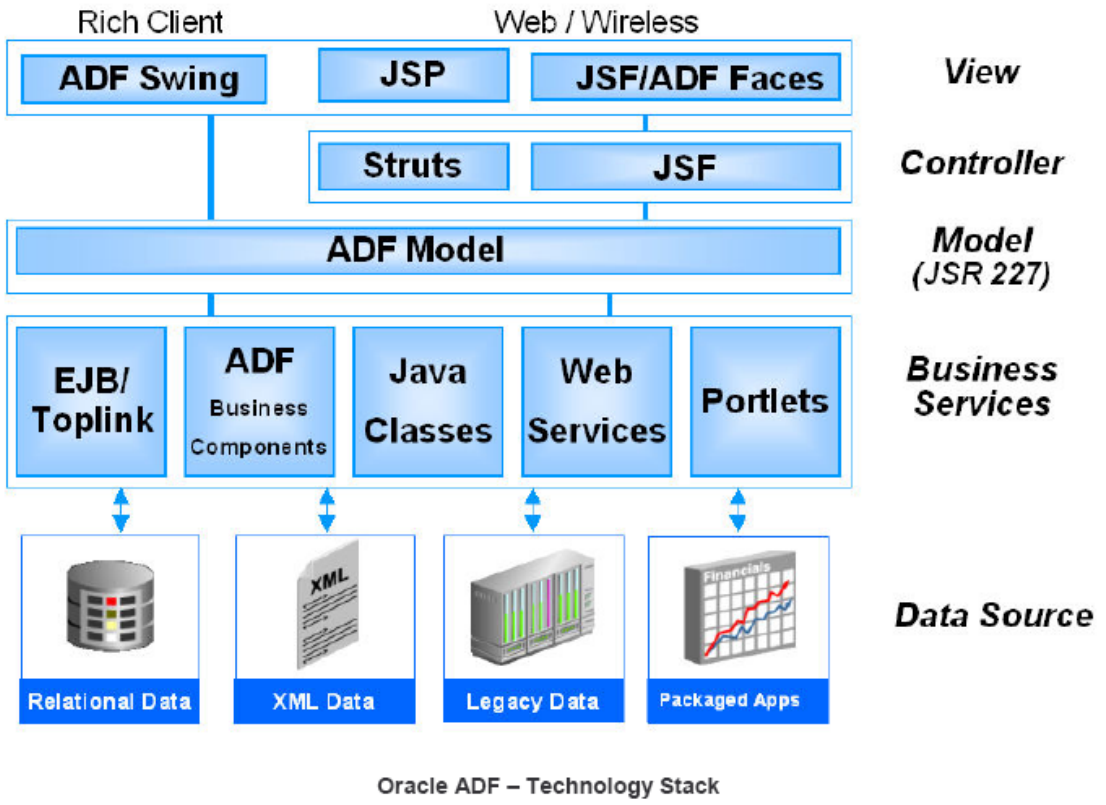


Figure 2 - Oracle ADF - Technology Stack

Oracle ADF Faces Components

Oracle ADF Faces [5] consists of a rich set of user interface components based on the new JavaServer Faces. The components provided by Oracle ADF will be used to enhance the user interface for RUTRACK. Components used during the project will include the date picker, data tables and hierarchical tables and the various styles of input boxes. Oracle has been actively involved in the Java Server Faces specification development since its beginning. Oracle ADF Faces Components forms a huge part of Oracles GUI strategy. ADF Faces also includes many framework enhancements most needed by JSF developers including -

1) Support for File Uploads – in future phases Velocity may store a resume copy in the database.
2) Client-side validation is automatically derived from Validators and Converters for an improved user experience.
3) Values can be passed between pages using a pageFlow scope
4) A new hybrid state saving strategy gives developers the best of both client and server-side state saving.

ADF Faces Components use Partial Page Rendering (PPR) to provide the ability to refresh individual regions of a page without refreshing the entire page. PPR provides AJAX like functionality, improving the UI experience.

Oracle TopLink

Oracle TopLink is an integral part of Oracle ADF and Oracle JDeveloper and is used in RUTRACK to create and maintain the mappings between View and Model layers of the ADF framework. Oracle TopLink provides tools that enable the developer to visually map object or entities to relational structures. [15].

Oracle TopLink combined with JDeveloper and Oracle ADF provide a complete environment and framework that facilitate the development of flexible model-driven applications and business processes that can more easily adapt to changing business

requirements. These applications can be deployed and registered as applications, services, or business processes on a variety of target devices.

JHeadstart

JHeadstart is a product developed and maintained by Oracle Consulting, it is a development toolkit built on top of ADF that uses JDeveloper's extension API to fully integrate with the JDeveloper IDE [7]. JHeadstart will be used in the RUTRACK project to rapidly generate pages for prototyping application functionality with users. JHeadstart generates fully functional, ADF web-based web applications with advanced features such as wizards, trees, shuttles (multi-selected fields), LOV's with validation, advanced search, quick search, and role based security. JHeadstart provides an editor that allows the developer to configure these details without any code.

Oracle JHeadstart adds a set of integrated editors to the Oracle JDeveloper environment [8]. Using these editors with the data model designed for RUTRACK allows us to create and iteratively refine a high-level application definition for the project. This application definition lets us control the functionality and organization of information in the Web user interface, based on the view objects in the application data model.

The Oracle JHeadstart application generator doesn't actually generate Java code. Instead, it creates (or regenerates) all of the declarative artifacts for the view and controller layers within your Oracle ADF-based Web application. These artifacts use the Oracle ADF

application module as their business service and the Oracle ADF Model layer for declarative data binding. The generated files Oracle JHeadstart creates are the same ones you would produce on your own when using Oracle JDeveloper's built-in visual editors. The key difference is that Oracle JHeadstart creates them en masse, based on a higher-level application definition you can iteratively refine until the generated pages match your end users' requirements [8]. This provides a huge time saving when developing new applications when you don't have any previous UI developed.

The generated files include

1) JSF application pages with data-bound ADF Faces UI components
2) Oracle ADF Model page definition XML files describing each page's data bindings
3) JSF managed bean settings and navigation rules to handle application page flow
4) Resource files containing localizable UI strings

Once you're satisfied with your Oracle JHeadstart-generated pages, you can use the Oracle JDeveloper development environment to fine-tune the UI or develop additional pages. JHeadstart uses the open source Velocity Template Engine to generate pages.

Velocity Template Engine

Velocity is a Java-based template engine developed as part of the Apache Open Source project. It permits anyone to use a simple yet powerful template language to reference

objects defined in Java code as part of Web page presentation and is the default template used by Oracle JHeadstart.

The Velocity Template Engine enables us to further abstract the presentation layer thereby resulting in Web pages that are more easily maintainable over the systems lifecycle. The Web page can be redesigned with images and colors independent of the Java code it calls [13]. Oracle JHeadstart provides a set of predefined Velocity templates for all the components it provides, these templates provide a default web presentation for each component such as textinput, buttons etc. The JHeadstart editor allows the designer to override the default template used for a particular field or object or to change the default template itself.

The Velocity Templates combined with JHeadstart provide a consistent user interface for RUTRACK and allows us to rapidly create a crisp, clean and professional web presentation.

Oracle JDeveloper

Oracle JDeveloper is the integrated development environment (IDE) that enables us to link the various development components of Oracle Application Development Framework (Oracle ADF) together. JDeveloper provides support for the most up-to-date SOA principles and XML Web services standards, as well as support for traditional Java and J2EE development, and also for PL/SQL development [14]. Oracle provides a Web Service which allows you to update JDeveloper automatically with the latest product

releases and fixes. JDeveloper also supports JSF for building Web applications through the use of a Visual Designer that provides WYSIWYG editing, drag-and-drop capabilities for inserting JSF components onto pages, and a visual diagrammer for development of JSF navigation.

Oracle JDeveloper provides a single development environment for creating the MVC layers for RUTRACK. Its tight integration with Oracle JHeadStart, Oracle ADF, Oracle Application Server and Oracle Database enables us to develop, test and deploy the application from a single integrated tool.

Oracle XML Publisher

Oracle XML Publisher services is as much a publishing solution as it is a reporting solution. XML Publishers produces “pixel perfect” output that can be used to complete forms, such as w-2’s or publish high quality reports such as board of director’s financials statements. XML Publisher pursues the common theme of Oracle Fusion applications by separating the presentation layer from the data-source extraction layer. The data-sources can include XML, SQL Query and other files. The presentation layer is commonly developed using Word Rich-Text-Format (RTF) templates which make use of all of the formatting and presentation capabilities of word. Templates can also be developed using Adobe PDF forms. At runtime, XML Publisher merges your designed template files with the report data to create a variety of outputs Report output formats include PDF, HTML Web page, Excel spreadsheet, or other predefined document format.

All reports in RUTRACK will be developed using XML Publisher, XML Publisher Enterprise will provide the ability to manage the report repository and schedule the execution and delivery of reports as needed.

Oracle Application Server

Oracle Application Server is a J2EE standards compliant platform designed to scale to meet the demands of 24*7 operations. The architecture comprises a web server, components to manage user sessions and connections, process management and restart, administrative processes and backup and recovery processes. Oracle Application Server is the central component of the Oracles Fusion Middleware Architecture. RUTRACK will use Oracle 10G Application Server (10.1.3) for the deployment of the Web Application and for the XML Publisher Enterprise [10]. The RUTRACK Application Server architecture will consist of one application server with two OC4J instances. The RUTRACK Oracle ADF application will be deployed to one and the XML Publisher Enterprise will be deployed to the other. In the future an additional application server will be needed to implement redundancy and failover [16].

Component Name	Description
Oracle HTTP Server and mod_oc4j	HTTP Server and router
Oracle Process Management and Notification	Process management
Oracle Containers for J2EE	J2EE containers
Oracle TopLink	Persistence
Oracle Application Server Control	Management and Administration
Backup and Restore	Backup and Restore utility
Disaster Recovery	Disaster Recovery utility
Application Development Framework	Development framework
Oracle Business Rules	Rules engine
Oracle JDeveloper	Released separately from Oracle Application Server 10g R3.

Figure 3 Oracle Application Server Components

Oracle Database 10G

The foundation of the RUTRACK application is the Oracle Database. Oracle Database 10g is designed for lower cost and higher scalability. Using grid computing, one can scale the available memory and CPU by using a large pool of standard lower cost servers. Units can be added to or redeployed from the grid as necessary.

According to Oracle, Oracle Database 10G offers the following benefits to the Enterprise user [11]:

1) Provide proven performance, scalability, and capacity on demand for any business requirement.
2) Guarantee that critical business information is available when needed.
3) Secure and protect the privacy of sensitive business information.
4) Reduce the time it takes for a business to make better business decisions.
5) Enable an organization to develop and deploy business solutions quickly.
6) Reduce costs for managing, deploying and maintaining the information

Experience with the complete Oracle Fusion Architecture is a goal for this project as well as scalability for future growth. Integration with Oracle ADF, JHeadstart and Oracle Application Server make the Oracle 10G Database a natural choice for the RUTRACK application. It should be noted that the Oracle Application Server and Oracle ADF is supported with databases other than Oracle.

Chapter 3. Project Methodology

Agile Methods Methodology

The Agile Methods approach to systems development was used for this project. The analyze-design-code-test cycle was most appropriate for the following reasons –

1) The team size is limited to one
2) The scope of the application is limited
3) The deliverable is not safety critical
4) The culture at Velocity is highly dynamic and empowers the individual.
5) The project resource is unfamiliar with the implementation technology and prototyping small units of development will validate the design and development efforts early in the process.

Analyze- Design-Code-Test Cycle

In general the project followed the typical iterative analyze-design-code-test cycle of Agile Methodologies.

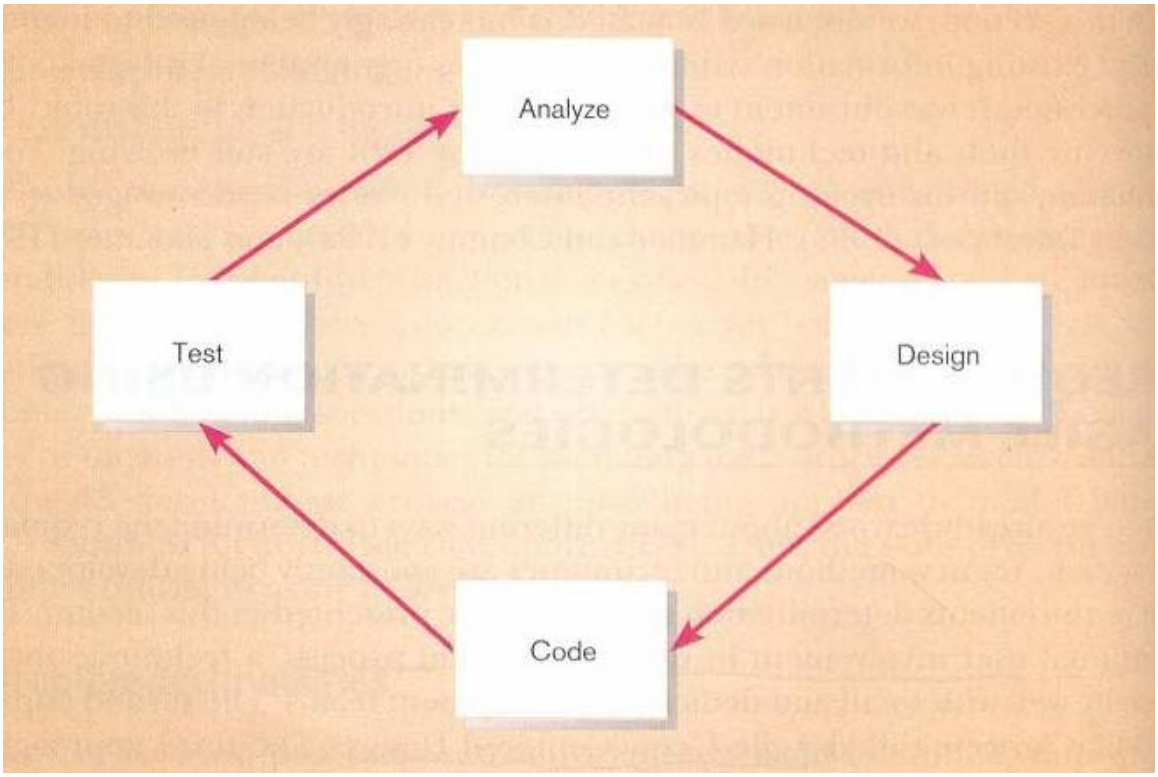


Figure 4 Analyze-Design-Code-Test Cycles

The initial cycles of the Analyze/Design process focused on enterprise level issues such as the general market and Velocity's position in it. A general design framework was developed with conceptual screens mocked up on paper to guide discussion and to establish a vision for the final product.

Subsequent cycles focused more on the individual organizational roles and the interaction between the roles and the various entities of the organization. These cycles led to the initial draft of the data model entities. During these cycles the database was installed and configured, the database schema was established and test data was modeled using SQL scripts.

The final iterations of the Analyze- Design-Code-Test cycles solidified the data model, finalized the reporting requirements and established user interface preferences. Each functional system area was prototyped and refined with user involvement. JDeveloper with its standalone OC4J instances facilitated the code and prototype sessions. The skills catalog pages were first prototyped with the Resource Manager and Sales Manager. The Resource pages were prototyped next, followed by Customer pages and Projects. The prototype and refinement process provided immediate feedback to the users.

After the UI prototypes were completed the deployment infrastructure was installed and configured. The infrastructure consists of the Oracle 10g Database, Oracle 10g Application Server on a Windows XP server. A connection was established between JDeveloper and the Oracle Application Server and the RUTRACK application was deployed to the default OC4J home container. Oracle XML Publisher Enterprise edition was then deployed and configured on a separate OC4J instance.

Using the configured instance of Oracle XML Publisher the final ADTC cycle focused on the development of the reports and followed a similar prototyping process to the prior cycles. First drafts of the reports were presented to the users who either refined the layouts to better match their information needs or approved the prototype.

Requirements Analysis

Requirements were identified by interviewing the Sales, Resource Managers and Recruiters at Velocity. Current issues were discussed in detail and future plans were also analyzed to determine potential impacts on proposed designs.

The following high level requirements were identified at the beginning of the project.

Functional Requirements

1. Velocity will need to maintain a catalog of the skills provided by its resources.

2. Velocity will need to be able to track Resource Details including

   Name

   Hire Date

   Termination Date

   Hourly Pay Rate

3. Each Resource may have one or more of the skills in the Velocity Systems Skills catalog. Resource skill level is determined by the length of experience with that skill.

4. Velocity needs to track basic customer information such as name, address and phone.

5. Customers may ask Velocity to assist with their projects. Projects have a description, a project start date and end date, projected number of resources and a status. Velocity uses the status to track the current state of the Project. Currently a project can be

    N - New – Just Initiated

    A - Awaiting Decision

    T - Terminated Stopped

    S - Staffed

    U – Unstaffed

    F – Finished Complete

    L - Lost

6. Projects also have a list of desired skills.

7. Velocity's Resource Manager assigns resources to projects with a start date and a projected end date.

Reporting Requirements

1. Customer List – The application must generate a list of customers and their projects sorted by start date.

2. Project Status – The application must generate a list of projects, sorted by status, based on project start date range and ordered by finished, staffed, un-staffed, awaiting staffing, lost, stopped and new.

3. Project Requirements – For a particular project the application must generate a report listing the required skill-sets, start and end date, and bill rate.

4. Resources Coming Available – The application should list resources expected to come available in a specific date range. The report should list their name, skill-sets and pay rate.

5. Resource Best Match – For new or awaiting staffing projects, the application should produce a list of available resources and rate matches based on skill-set, available date and profit margin.

6. Project Extension Report – The application should produce a list of projects and their resources ordered by expected completed date.

7. Skills Inventory – The application should produce a list of resources that have a particular skill.

Schedule

When the needs analysis was complete the following schedule was developed and agreed upon for development and delivery of the final product. The preliminary schedule was divided by target functionality analyze-design-code-test cycle. Each item of functionality is designed, developed and tested. A final End to End testing process will validate that the system supports the full business process lifecycle.

The Planned Schedule

Task	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Requirements Analysis									
Install Development Environment									
Resource Development									
Customer Development									
Projects Development									
Resource Matching									
Assignment Development									
Report Development									
End to End Testing									
Documentation									

As the Analyze- Design-Code-Test Cycles were completed some of the tasks were re-sequenced to better match the needs of the prototype cycles. The infrastructure installation and configuration task was completed concurrent with the other prototype processes. Effort was adjusted as needed through out the project schedule to ensure that

each deadline was met. Confidence in development skills grew consistently as each proof of concept yielded positive results and the final project was delivered three months ahead of schedule.

The Final Schedule

Task	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Requirements Analysis									
Install Development Environment									
Resource Development									
Customer Development									
Projects Development									
Assignment Development									
Resource Matching									
Report Development									
End to End Testing									
Documentation									

Data Model Design

Based on the results of the requirements analysis the following Entities and Relationships were identified.

The model contains only the pure application data; it contains no logic describing how to present the data to a user.

Entity Definition

- SKILLS → lists all skills provided by Velocity Systems.
- CUSTOMERS → includes customer information required to open projects.
- RESOURCES → includes basic contact information for Resources that Velocity staff's.
- RESOURCESKILLS → lists skills for each resource
- PROJECTS → contains basic project details
- PROJECTSKILLS → lists skills desired for the project
- PROJECTRESOURCES → lists resources assigned to projects

There are three composite relationships –

- PROJECTSKILLS – Eliminates the many-to-many relationship between PROJECTS and SKILLS

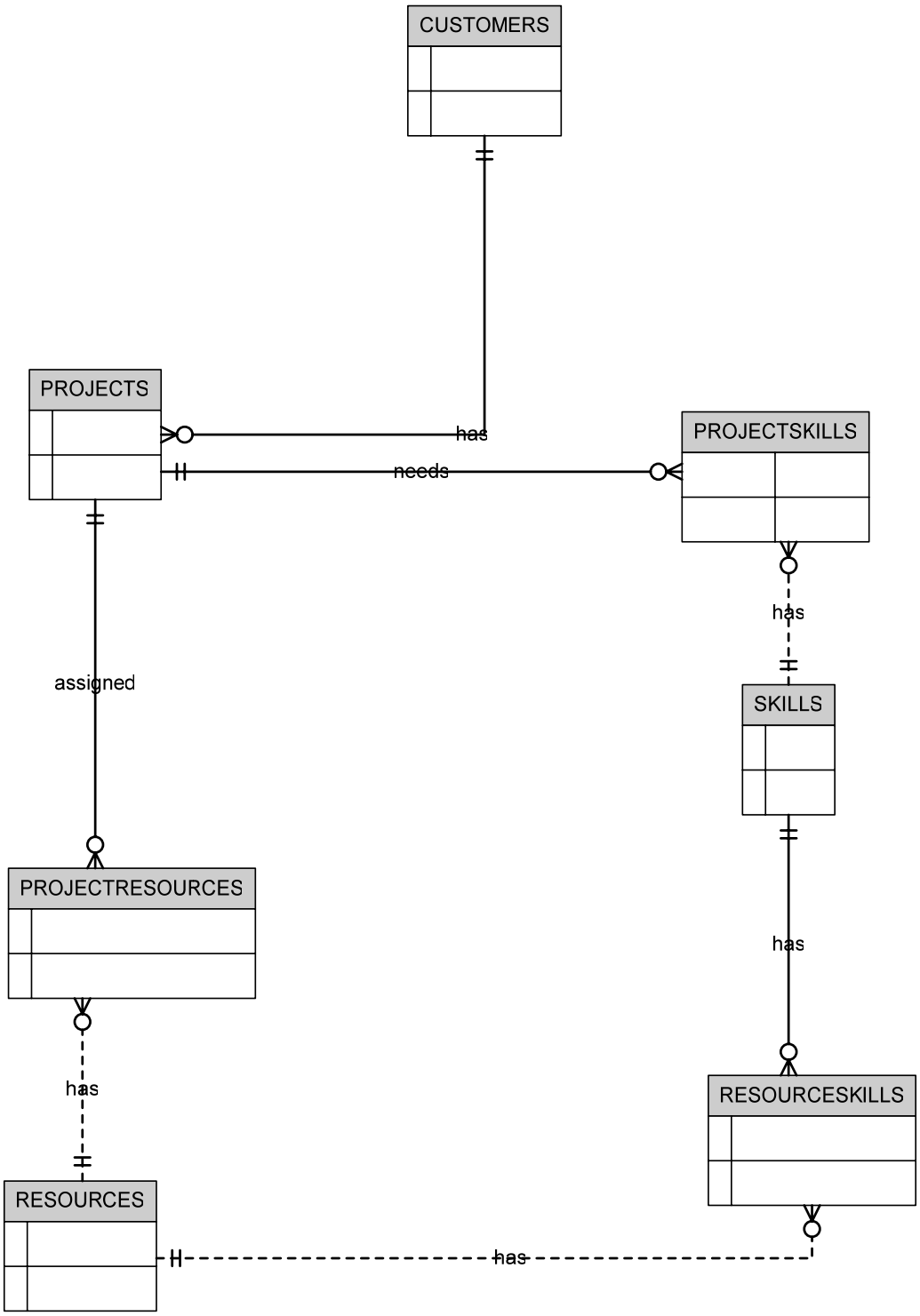
- RESOURCESKILLS – Eliminates the many-to-many relationship between RESOURCES and SKILLS
- PROJECTRESOURCES – Eliminates the many-to-many relationship between PROJECTS and RESOURCES

Relationships -

- Each CUSTOMERS has zero-to-many PROJECTS
- Each PROJECTS has one or more PROJECTSKILLS
- Each PROJECTSKILLS has one SKILLS.
- Each RESOURCES has one or more RESOURCESKILLS.
- Each RESOURCESKILLS has one SKILLS.
- Each PROJECTS has zero or more PROJECTRESOURCES.
- Each PROJECTRESOURCES has one RESOURCES.

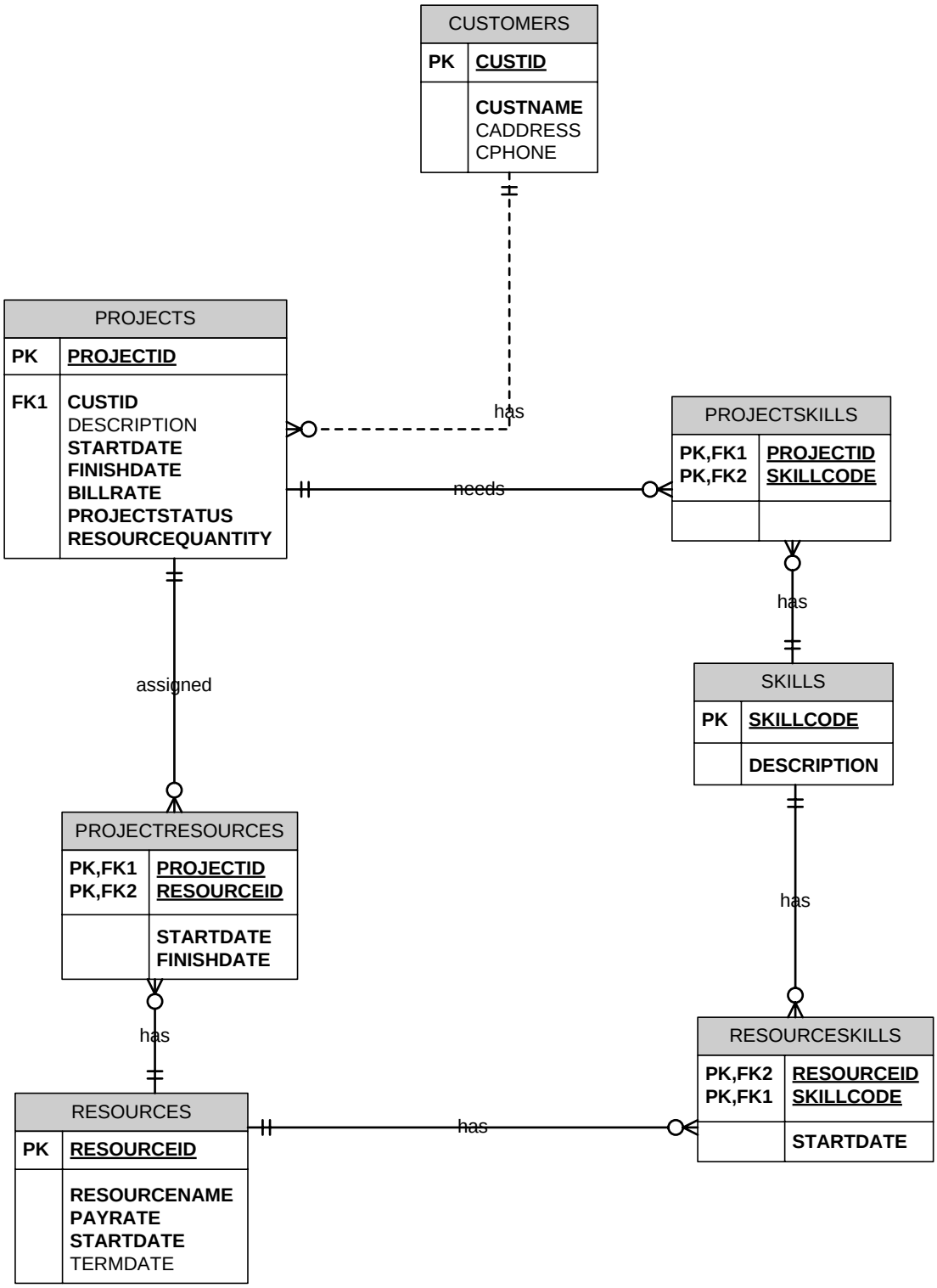
Logical ERD

Logical ERD for Resource Utilization Database



Physical Design

ERD for Resource Utilization Database



Data Dictionary

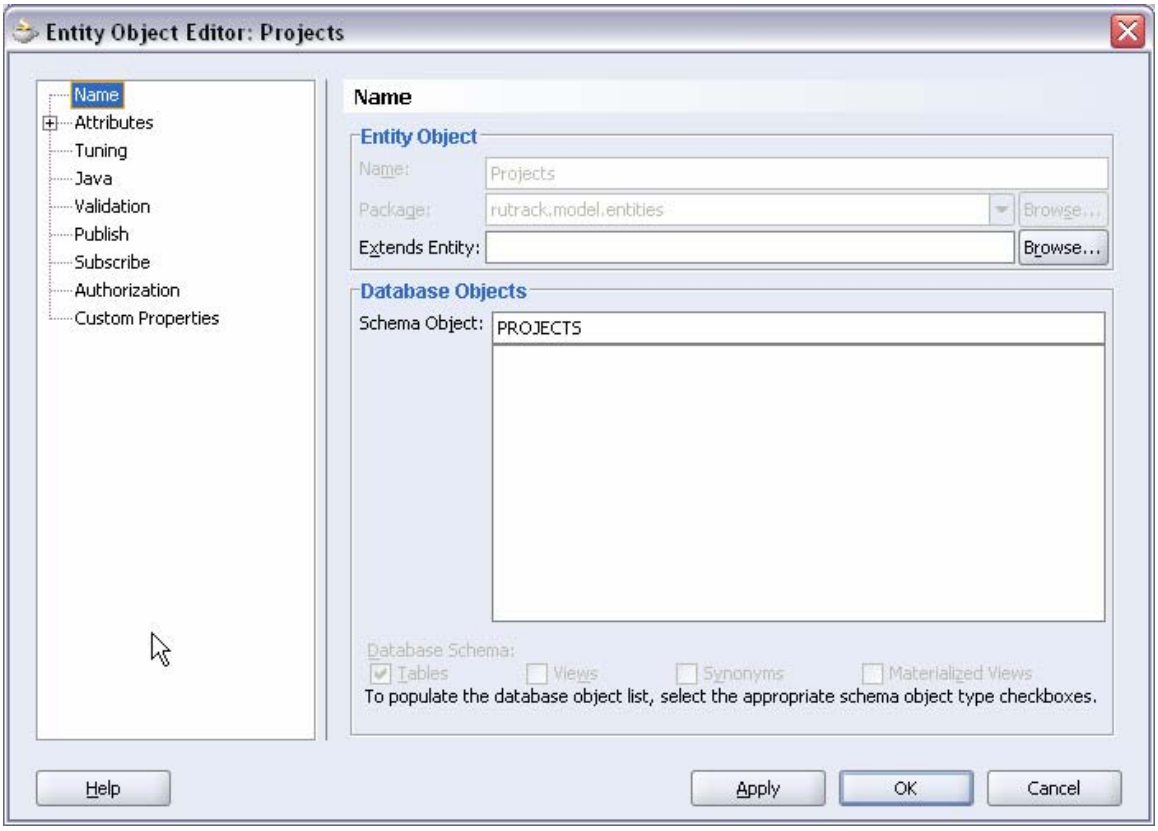
Attribute Name	Column Name	Relation Member	Data Type	Field Length	Constraint	Description
CUSTID	CUSTID	CUSTOMERS	NUMERIC	6	Not Null, PK	Unique Customer ID
CUSTNAME	CUSTNAME	CUSTOMERS	VARCHAR2	30	Not Null	Customers Name
CADDRESS	CADDRESS	CUSTOMERS	VARCHAR2	100		Customer Address
CPHONE	CPHONE	CUSTOMERS	VARCHAR2	15		Customer Phone
PROJECTID	PROJECTID	PROJECTS	NUMERIC	6	Not Null, PK, FK	Unique Customer Project ID
CUSTID	CUSTID	PROJECTS	NUMERIC	6	Not Null, FK	Unique Customer ID
DESCRIPTION	DESCRIPTION	PROJECTS	VARCHAR2	50	Not Null	Customer Project Description
STARTDATE	STARTDATE	PROJECTS	DATE		Not Null	Customer Project Start Date
FINSHDATE	FINISHDATE	PROJECTS	DATE		Not Null	Customer Project Finish Date
BILLRATE	BILLRATE	PROJECTS	NUMERIC	4,2	Not Null	Customer Project Hourly Bill Rate
PROJECTSTATUS	PROJECTSTATUS	PROJECTS	CHAR	1	Not Null , N – New, T – Stopped, L – Lost, A – Awaiting Staffing, S – Staffed, U – Un-Staffed, F - Finished	Customer Project Status
RESOURCEQUANTITY	RESOURCEQUANTITY	PROJECTS	NUMERIC	3,2	Not Null	Customer Project Number of Resources Needed
PROJECTID	PROJECTID	PROJECTSKILLS	NUMERIC	6	Not Null, PK, FK	Unique Customer Project ID
SKILLCODE	SKILLCODE	PROJECTSKILLS	VARCHAR2	10	Not Null, PK, FK	Skill Code needed for Customer Project
PROJECTID	PROJECTID	PROJECTRESOURCES	NUMERIC	6	Not Null, PK, FK	Unique Customer Project ID
RESOURCEI	RESOURCEI	PROJECTRESO	NUM	6	Not Null,	Resource ID

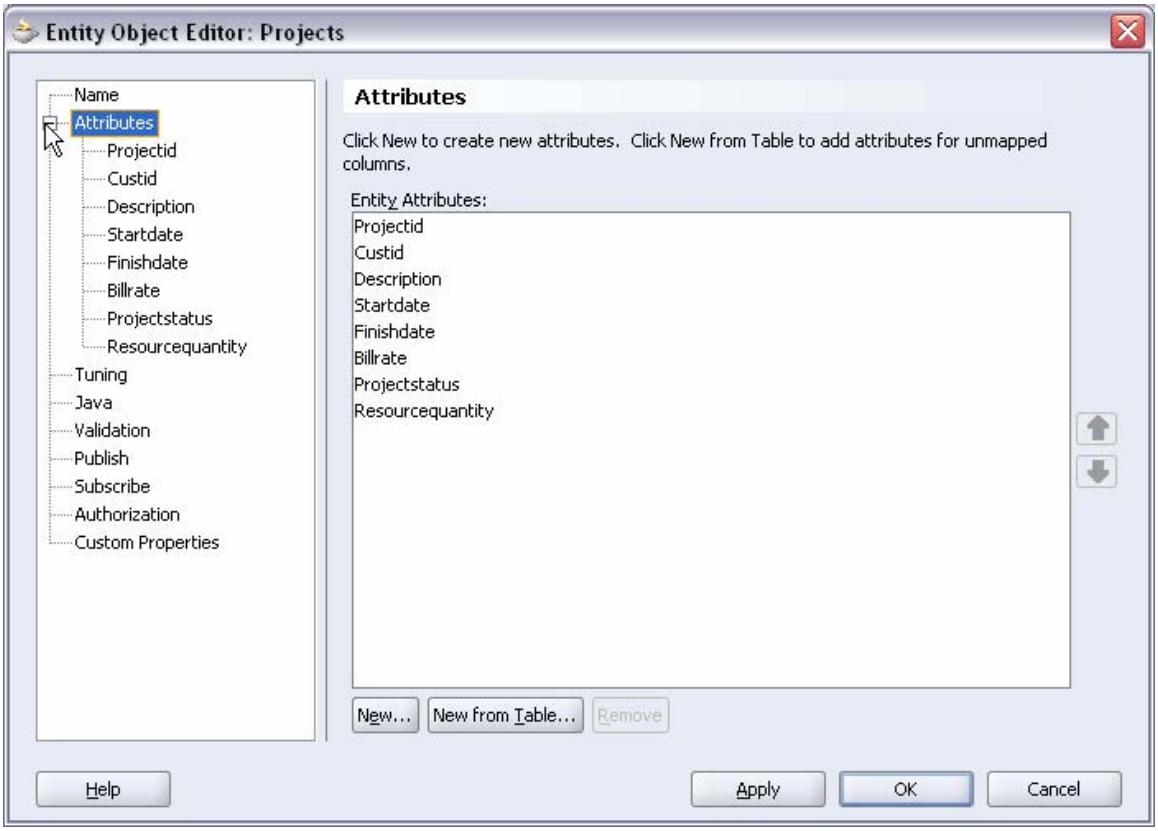
Attribute Name	Column Name	Relation Member	Data Type	Field Length	Constraint	Description
D	D	URCES	ERIC		PK, FK	assigned to customer project
STARTDATE	STARTDATE	PROJECTRESOURCES	DATE		Not Null	Resource Customer Project Start Date
FINISHDATE	FINISHDATE	PROJECTRESOURCES	DATE		Not Null	Resource Customer Project Start Date
RESOURCEID	RESOURCEID	RESOURCES	NUMERIC	6	Not Null, PK, FK	Unique Resource ID
RESOURCENAME	RESOURCENAME	RESOURCES	VARCHAR2	30	Not Null	Resource Name
PAYRATE	PAYRATE	RESOURCES	NUMERIC	6,2	Not Null	Resource Hourly Pay Rate
HIREDATE	HIREDATE	RESOURCES	Date		Not Null	Date Resource is available to work for company
TERMDATE	TERMDATE	RESOURCES	Date		Not Null	Date Resource is no longer working for company
RESOURCEID	RESOURCEID	RESOURCESKILLS	NUMERIC	6	Not Null, PK, FK	Unique Resource ID
SKILLCODE	SKILLCODE	RESOURCESKILLS	VARCHAR2	10	Not Null, PK, FK	Skill Code acquired by Resource
STARTDATE	STARTDATE	RESOURCESKILLS	DATE		Not Null	Date Resource acquired skill
SKILLCODE	SKILLCODE	SKILLS	VARCHAR2	10	Not Null	Unique code for a skill
DESCRIPTION	DESCRIPTION	SKILLS	VARCHAR2	50	Not Null	Description for Skill Code

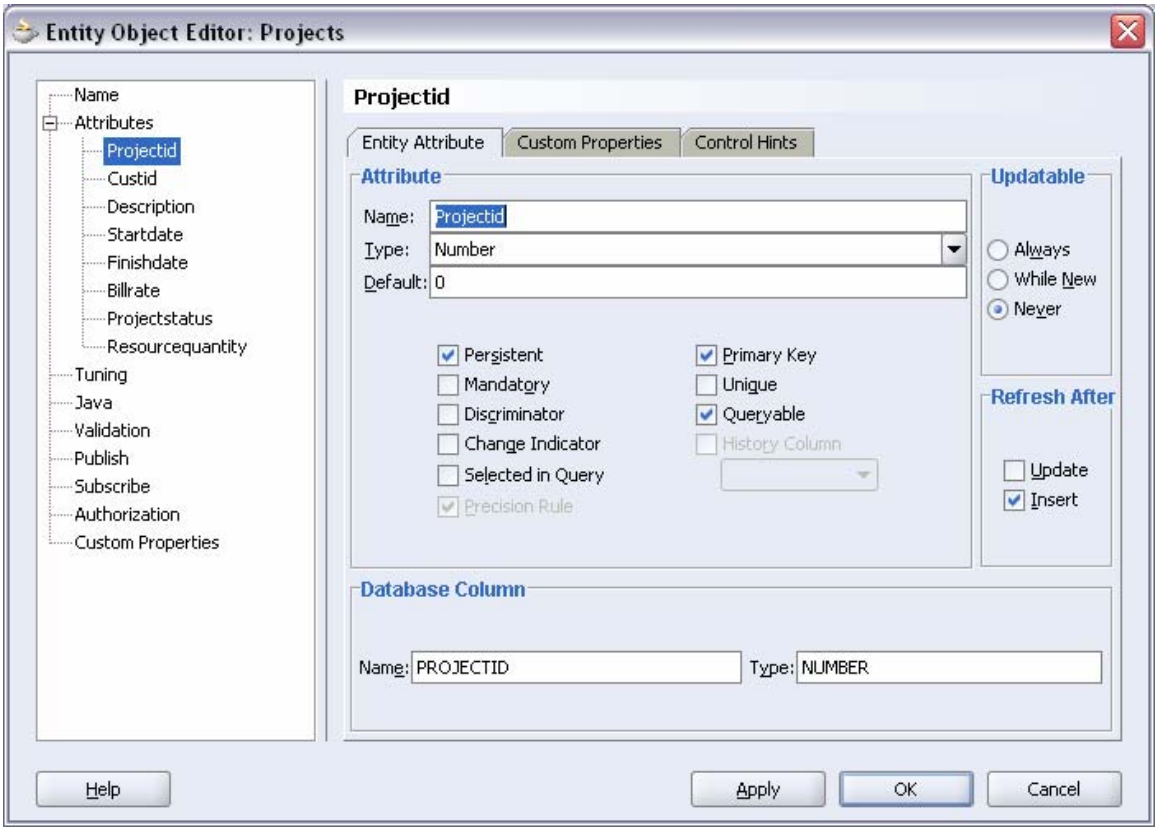
Entity Objects

Oracle ADF entity objects are business components that encapsulate the business model, including data, rules, and persistence behavior, for items that are used in the application. For example, entity objects can represent: Elements of the logical structure of the business, such as product lines, departments, sales, and regions Business documents, such as invoices, change orders, and service requests Physical items, such as warehouses, employees, and equipment [17]. In our project the Entity Objects are the same as the

Data Model Entities - CUSTOMERS, SKILLS, RESOURCES, PROJECTS, PROJECT RESOURCES, RESOURCE SKILLS and PROJECT SKILLS

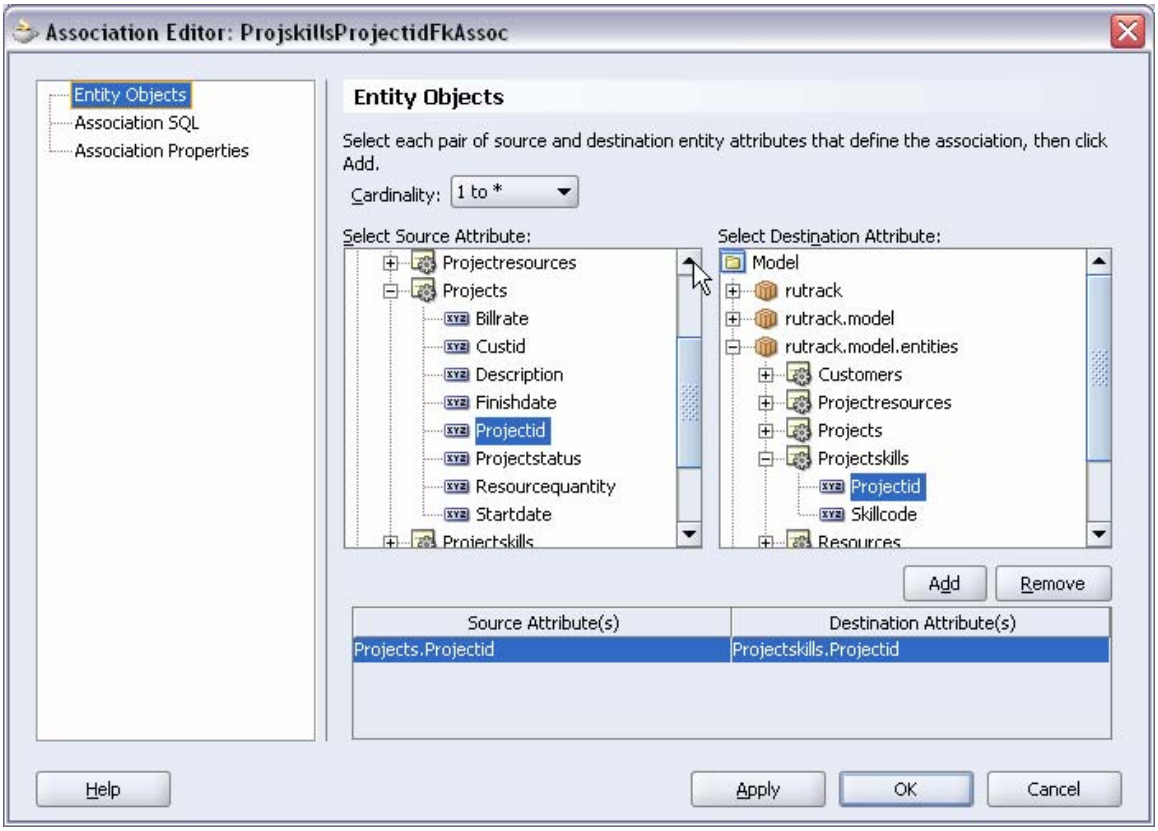


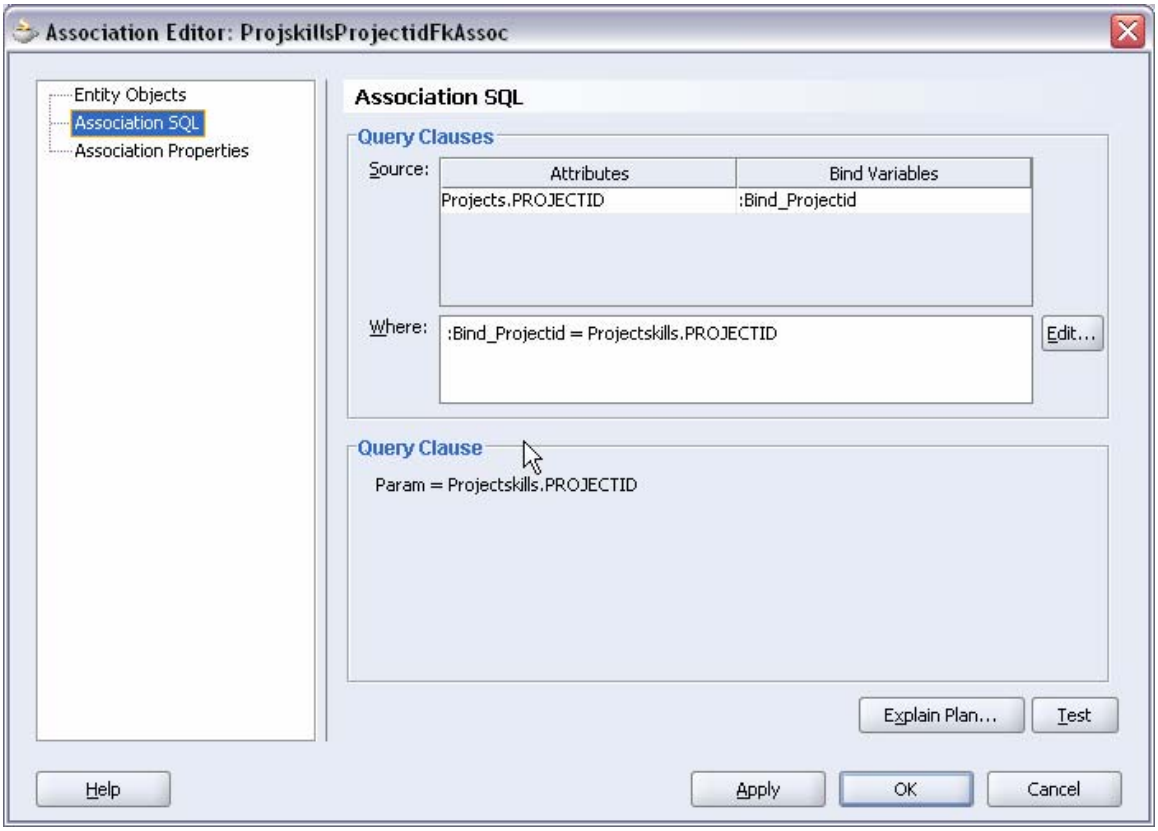

Entity Object Editor: Projects
Name
Attributes
Projectid
Custid
Description
Startdate
Finishdate
Billrate
Projectstatus
Resourcequantity
Tuning
Java
Validation
Publish
Subscribe
Authorization
Custom Properties
Attributes
Click New to create new attributes. Click New from Table to add attributes for unmapped columns.
Entity Attributes:
Projectid
Custid
Description
Startdate
Finishdate
Billrate
Projectstatus
Resourcequantity
New...
New from Table...
Remove
Help
Apply
OK
Cancel


Entity Object Editor: Projects
Name
Attributes
Projectid
Custid
Description
Startdate
Finishdate
Billrate
Projectstatus
Resourcequantity
Tuning
Java
Validation
Publish
Subscribe
Authorization
Custom Properties
Projectid
Entity Attribute
Custom Properties
Control Hints
Attribute
Name: Projectid
Type: Number
Default: 0
Persistent
Primary Key
Mandatory
Unique
Discriminator
Queryable
Change Indicator
History Column
Selected in Query
Precision Rule
Updatable
Always
While New
Never
Refresh After
Update
Insert
Database Column
Name: PROJECTID
Type: NUMBER
Help
Apply
OK
Cancel

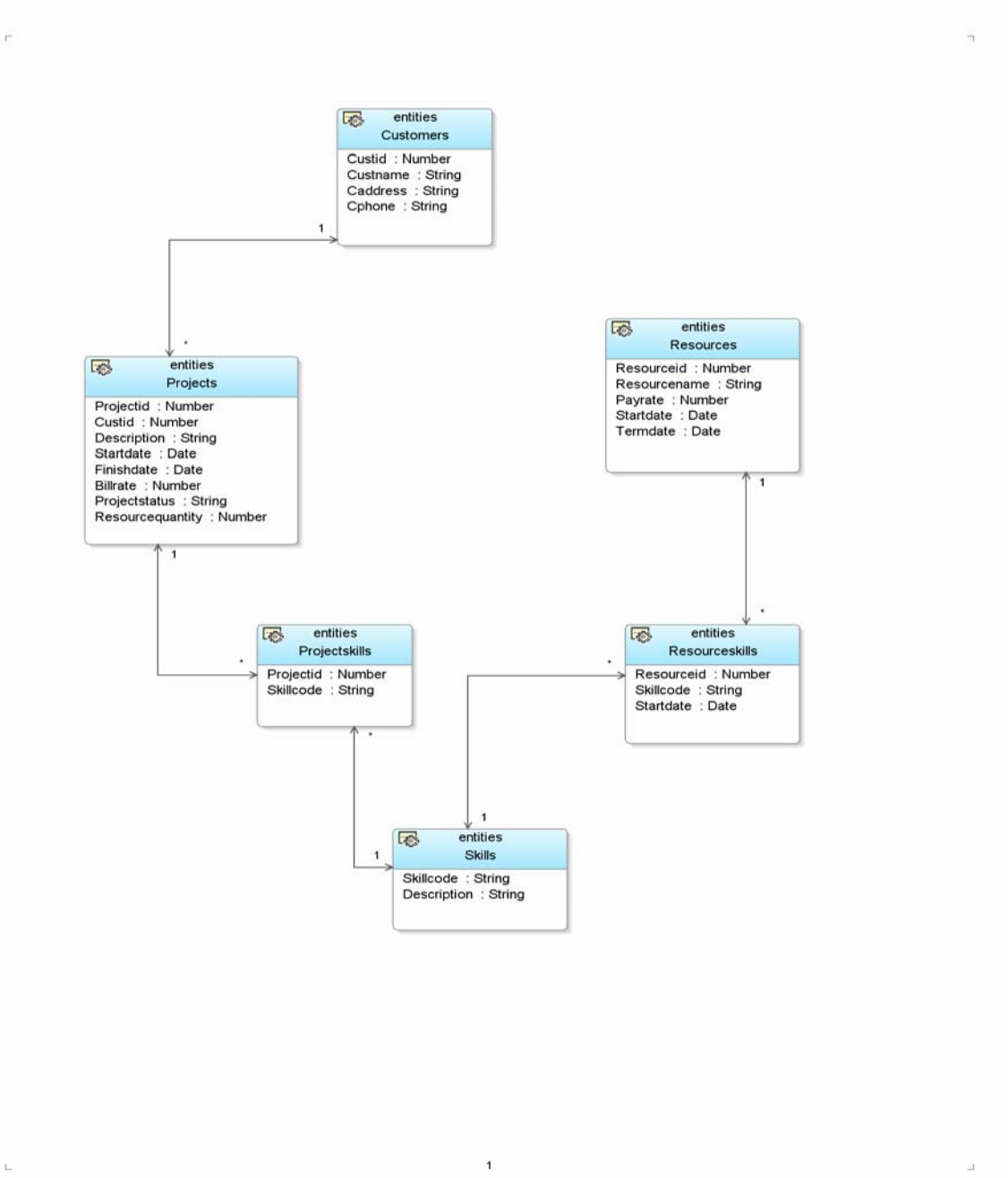
Associations

Oracle ADF associations are business components that define a relationship between two Oracle ADF entity object definitions (the "source" and "destination" entity objects) based on sets of entity attributes (the "source" and "destination" attributes) from each. These can range from simple one-to-many relationships based on foreign keys to complex many-to-many relationships [17].





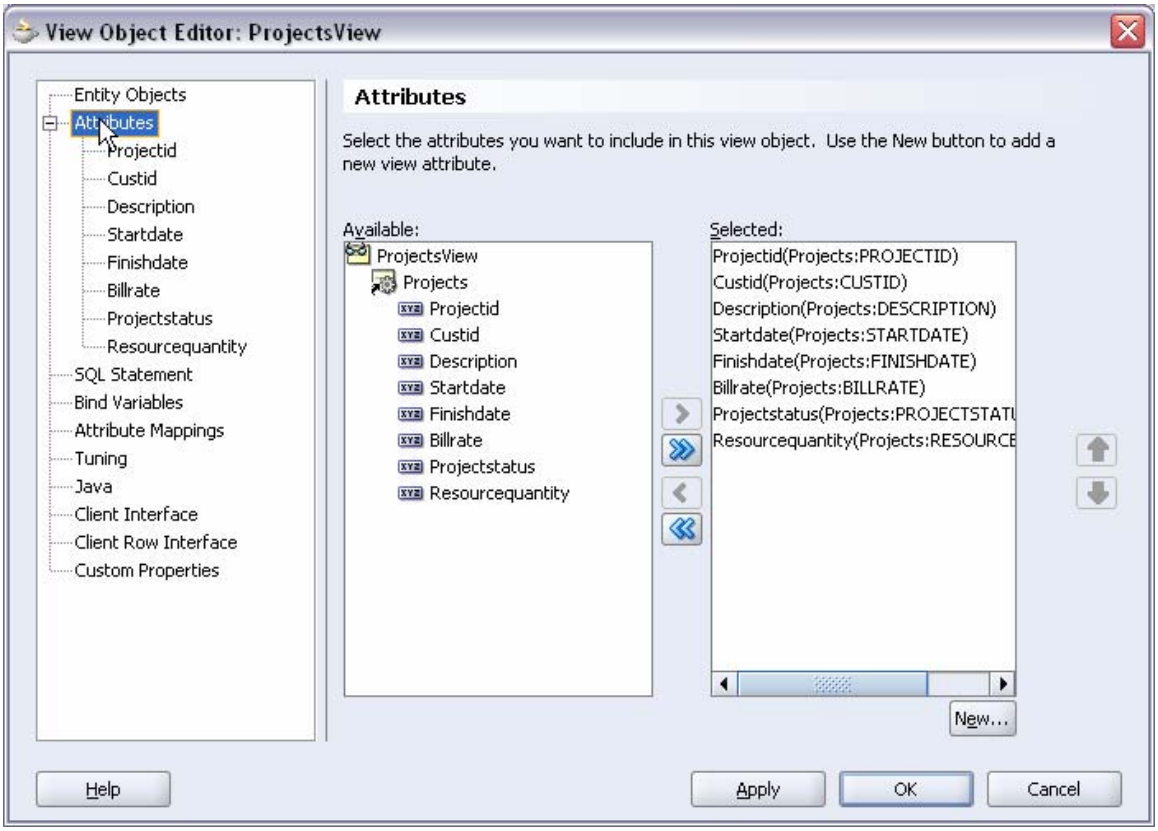
The following business components diagram shows the entities used in RUTRACK and the associations between them -

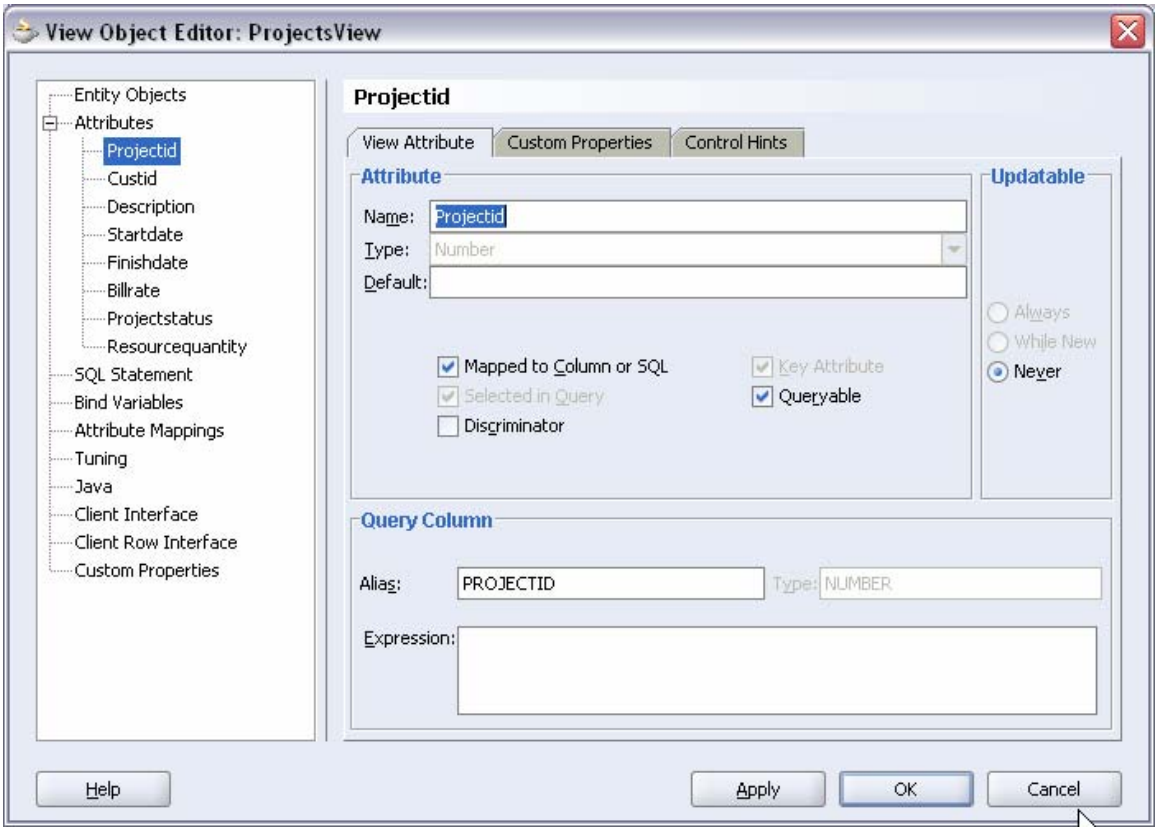


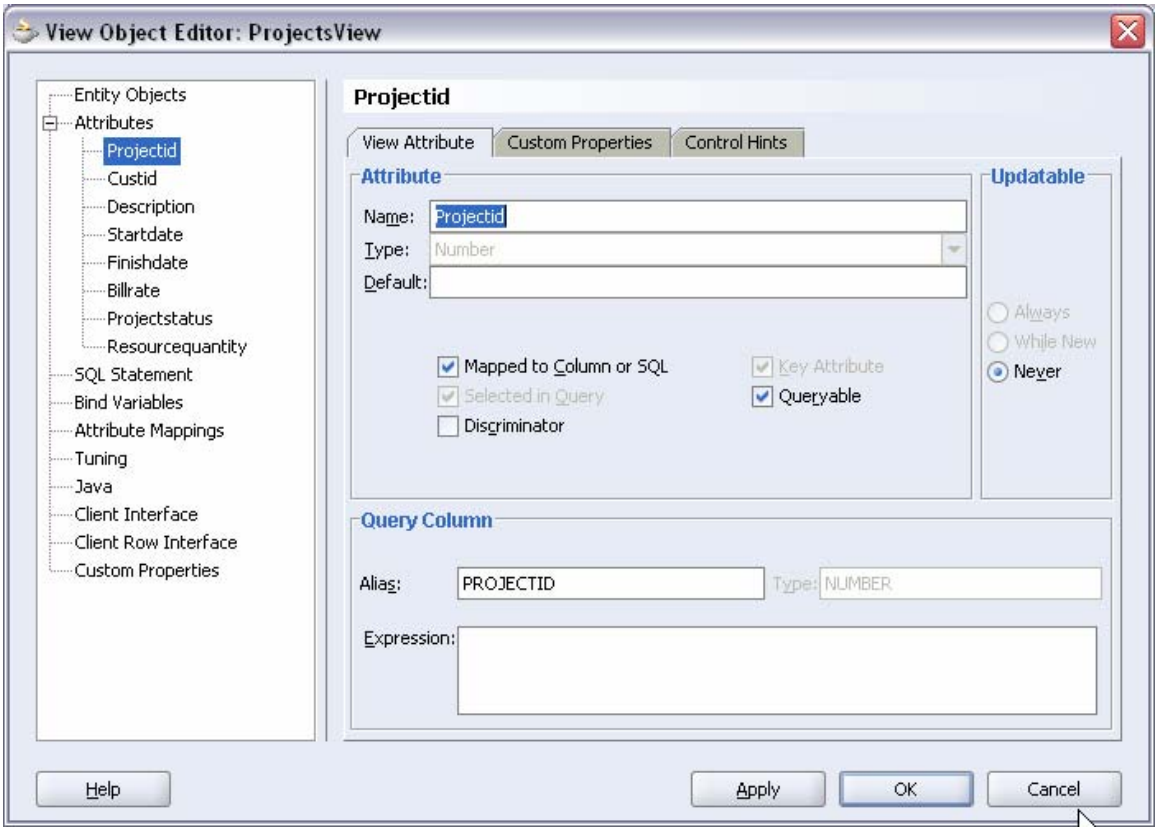
View Objects

About Oracle ADF View Objects: Oracle ADF view objects are business components that collect data from the data source, shape that data for use by clients, and allow clients to change that data in the Oracle ADF Business Components cache. For example, a view object can gather all the information needed to: Populate a single table element in a form,

create and process an insert or edit form, and create an LOV (List of Values) for populating a dropdown list [17]. RUTRACK presents all of the data available in each object (other than system maintained primary keys) for add / update on the application pages. Each of the entity objects is represented as a view in RUTRACK with two additional views one for Project Status Lookup and a second one to for Customer Name lookup. The Project Status lookup uses a SQL query which selects status code and descriptions from dual to present Project Status options as a dropdown list of descriptions to the user instead of codes A, U, etc. The Customer Name lookup view is required to show the customer name as a dropdown on the projects page because of an issue encountered with the custid field being described as a DBSequence type on the Customer Entity and a number type on the Project Entity, using the CustomerViewNonPK was a workaround which allowed us to describe the custid as a number which then allowed the Projects page to populate customer name on the page.

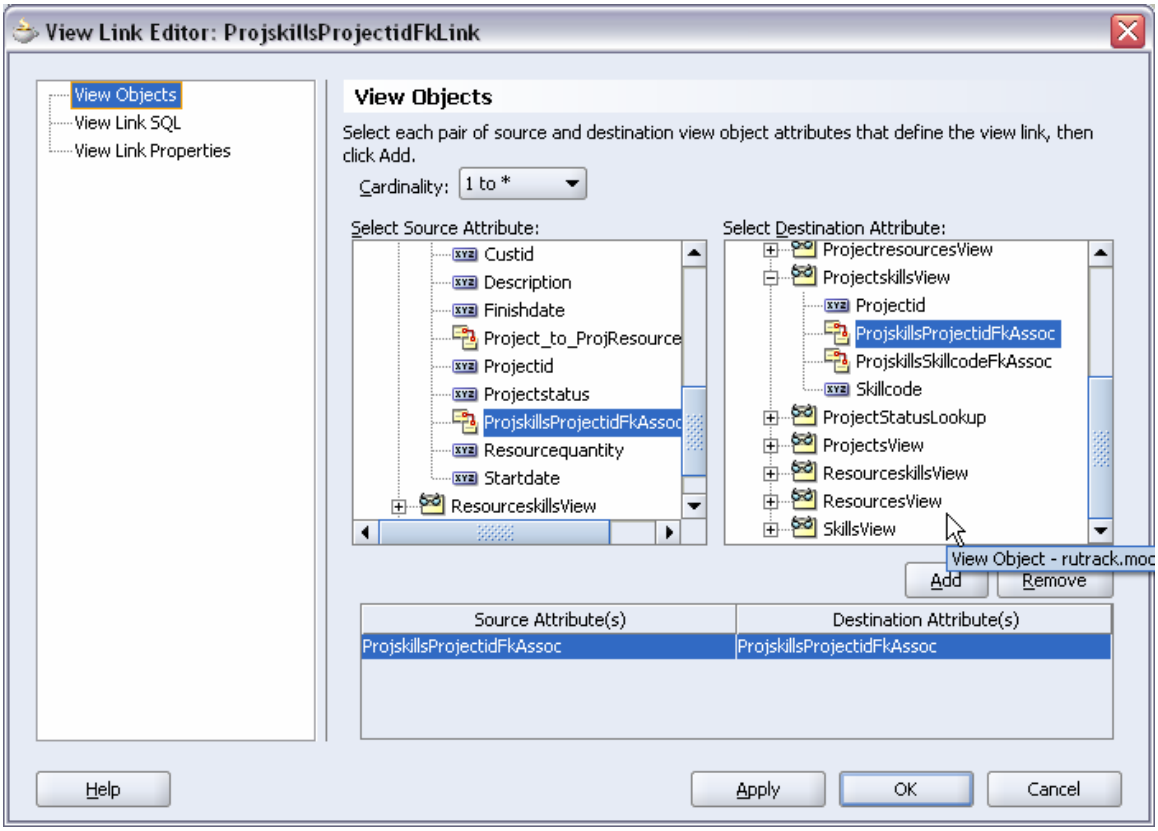

View Object Editor: ProjectsView
Entity Objects
Attributes
Projectid
Custid
Description
Startdate
Finishdate
Billrate
Projectstatus
Resourcequantity
SQL Statement
Bind Variables
Attribute Mappings
Tuning
Java
Client Interface
Client Row Interface
Custom Properties
Attributes
Select the attributes you want to include in this view object. Use the New button to add a new view attribute.
Available:
ProjectsView
Projects
Projectid
Custid
Description
Startdate
Finishdate
Billrate
Projectstatus
Resourcequantity
Selected:
Projectid(Projects:PROJECTID)
Custid(Projects:CUSTID)
Description(Projects:DESCRIPTION)
Startdate(Projects:STARTDATE)
Finishdate(Projects:FINISHDATE)
Billrate(Projects:BILLRATE)
Projectstatus(Projects:PROJECTSTATU
Resourcequantity(Projects:RESOURCE
New...
Help
Apply
OK
Cancel

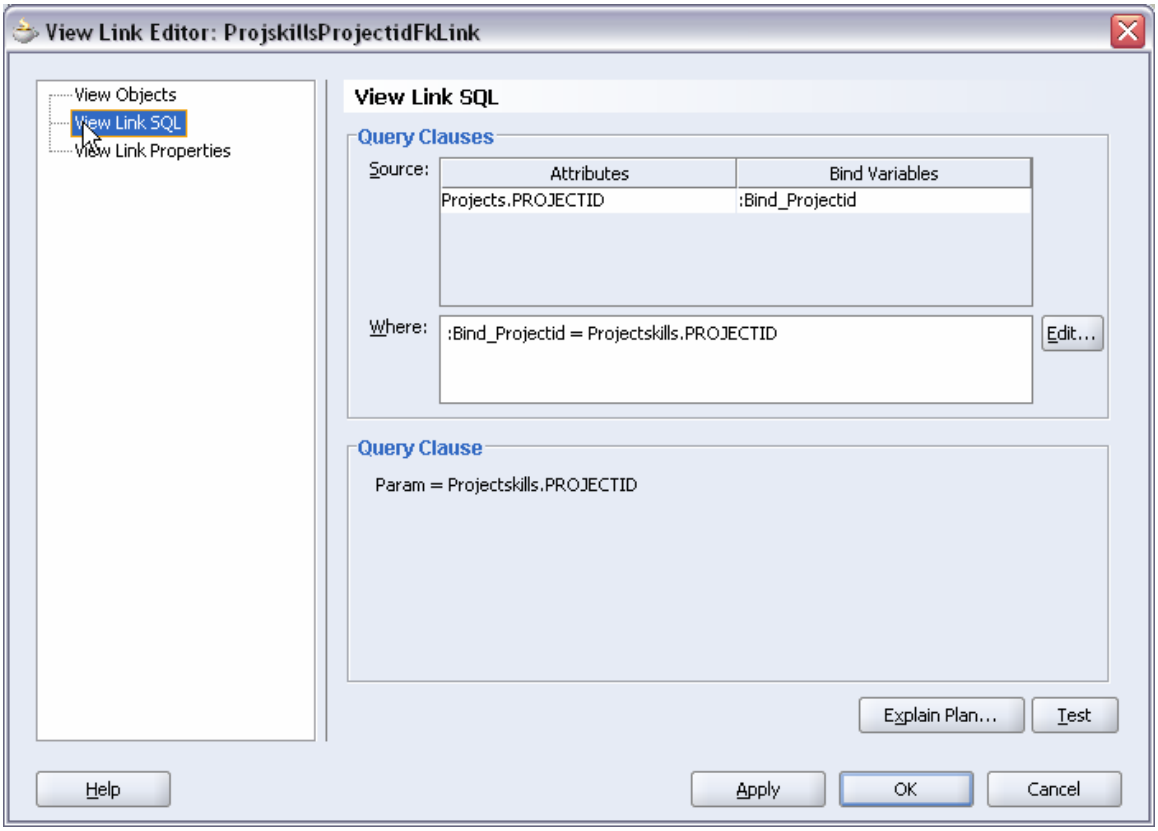

View Object Editor: ProjectsView
Entity Objects
Attributes
Projectid
Custid
Description
Startdate
Finishdate
Billrate
Projectstatus
Resourcequantity
SQL Statement
Bind Variables
Attribute Mappings
Tuning
Java
Client Interface
Client Row Interface
Custom Properties
Projectid
View Attribute
Custom Properties
Control Hints
Attribute
Name: Projectid
Type: Number
Default:
Mapped to Column or SQL
Selected in Query
Discriminator
Key Attribute
Queryable
Updatable
Always
While New
Never
Query Column
Alias: PROJECTID
Type: NUMBER
Expression:
Help
Apply
OK
Cancel

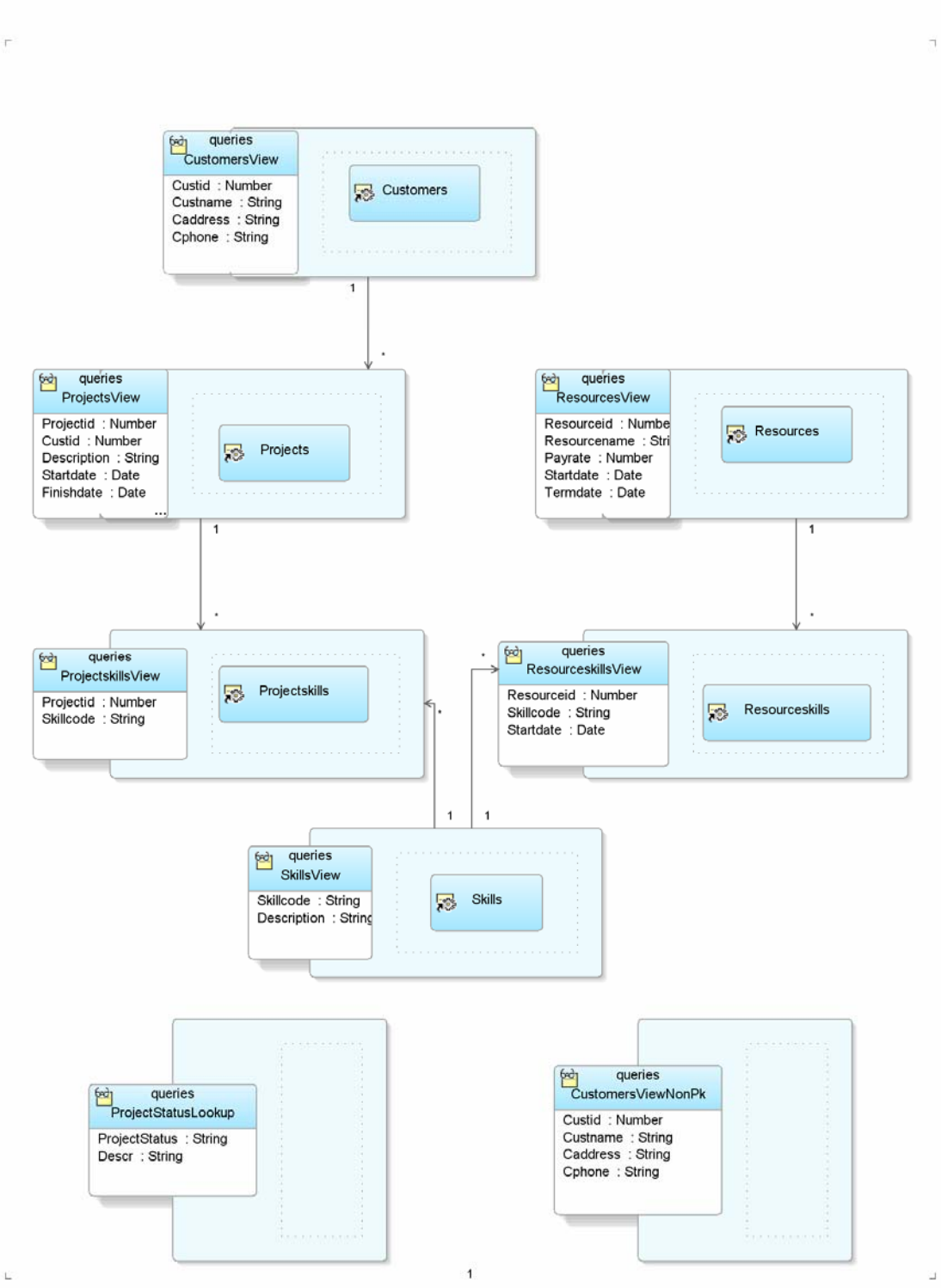


View Links

Use the View Objects page to select source and destination view objects. The relationship between the source and destination is the view link. The source end is also referred to as the master end; the destination is referred to as the detail end. Default view links are created if the business components framework detects a relationship between view objects. In a default view link, the source view object references the entity object containing the primary key of a foreign key constraint [17].


View Link Editor: ProjskillsProjectidFkLink
View Objects
View Link SQL
View Link Properties
View Objects
Select each pair of source and destination view object attributes that define the view link, then click Add.
Cardinality: 1 to *
Select Source Attribute:
Custid
Description
Finishdate
Project_to_ProjResource
Projectid
Projectstatus
ProjskillsProjectidFkAssoc
Resourcequantity
Startdate
ResourceskillsView
Select Destination Attribute:
ProjectresourcesView
ProjectskillsView
Projectid
ProjskillsProjectidFkAssoc
ProjskillsSkillcodeFkAssoc
Skillcode
ProjectStatusLookup
ProjectsView
ResourceskillsView
ResourcesView
SkillsView
View Object - rutrack.mod
Add
Remove
Source Attribute(s)
Destination Attribute(s)
ProjskillsProjectidFkAssoc
ProjskillsProjectidFkAssoc
Help
Apply
OK
Cancel

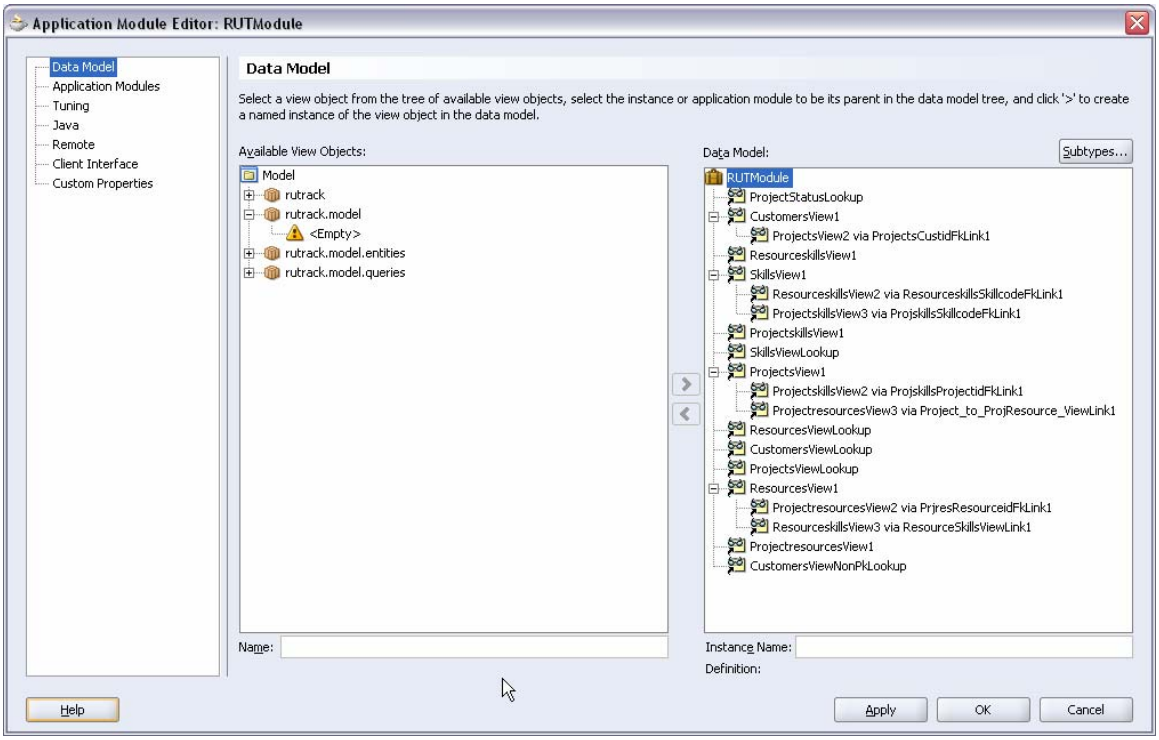

View Link Editor: ProjskillsProjectidFkLink
View Objects
View Link SQL
View Link Properties
View Link SQL
Query Clauses
Source:
Attributes
Bind Variables
Projects.PROJECTID
:Bind_Projectid
Where:
:Bind_Projectid = Projectskills.PROJECTID
Edit...
Query Clause
Param = Projectskills.PROJECTID
Explain Plan...
Test
Help
Apply
OK
Cancel

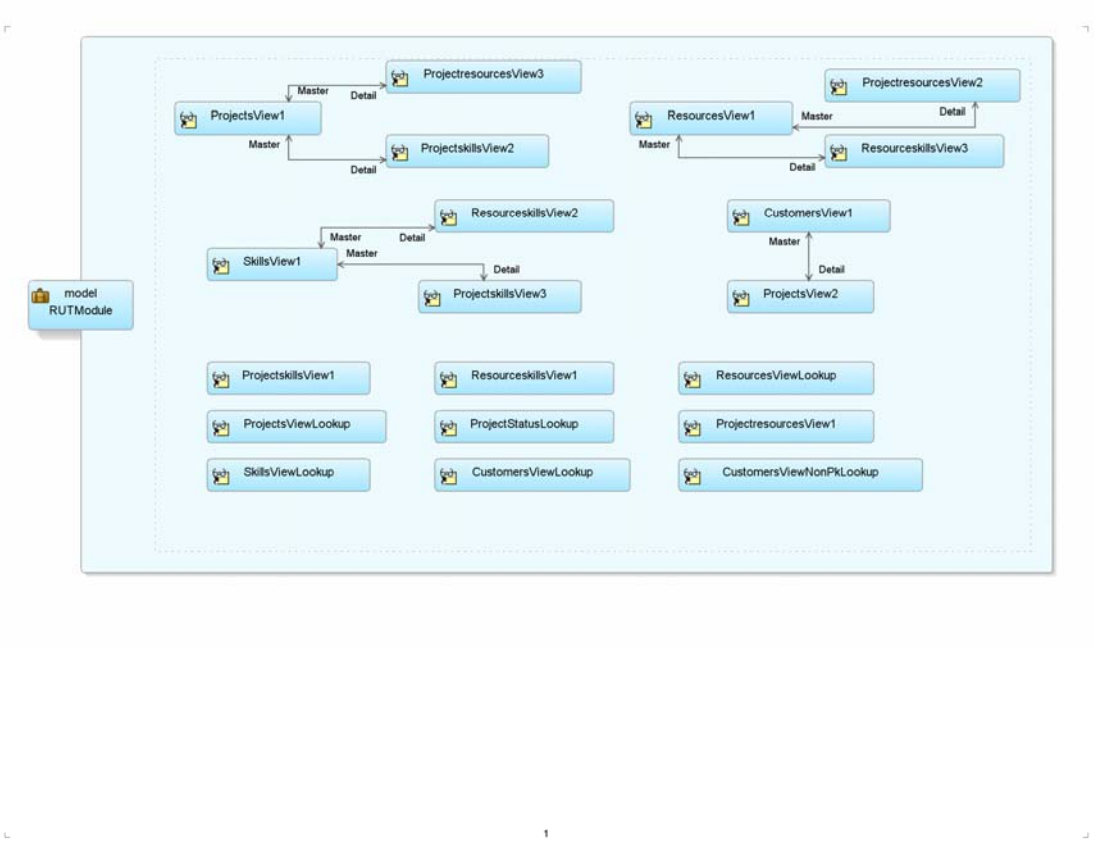

queries
CustomersView
Custid : Number
Custname : String
Caddress : String
Cphone : String
Customers
1
queries
ProjectsView
Projectid : Number
Custid : Number
Description : String
Startdate : Date
Finishdate : Date
Projects
queries
ResourcesView
Resourceid : Numbe
Resourcename : Stri
Payrate : Number
Startdate : Date
Termdate : Date
Resources
queries
ProjectskillsView
Projectid : Number
Skillcode : String
Projectskills
queries
ResourceskillsView
Resourceid : Number
Skillcode : String
Startdate : Date
Resourceskills
queries
SkillsView
Skillcode : String
Description : String
Skills
queries
ProjectStatusLookup
ProjectStatus : String
Descr : String
queries
CustomersViewNonPk
Custid : Number
Custname : String
Caddress : String
Cphone : String

ADF Application Modules

Oracle ADF application modules are business components that represent particular application tasks. The application module provides a data model for the task by aggregating the view object and view link instances required for the task. It also provides services that help the client accomplish the task. For example, an application module can represent and assist with tasks such as: Updating customer information, Creating a new order or Processing salary increases [17].

RUTRACK is comprised of one module called RUTModule. The module identifies all of the views available for use and the path that links views together. In the screenshot below you can see that ProjectsView1 (an instance of ProjectsView) is linked to ProjectSkillsView2 (an instance of ProjectSkillsView) via ProjectSkillsProjectidFKLink1 (an instance of ProjectSkillsProjectIdFKLink) -


Application Module Editor: RUTModule
Data Model
Application Modules
Tuning
Java
Remote
Client Interface
Custom Properties
Data Model
Select a view object from the tree of available view objects, select the instance or application module to be its parent in the data model tree, and click '>' to create a named instance of the view object in the data model.
Available View Objects:
Model
rutrack
rutrack.model
<Empty>
rutrack.model.entities
rutrack.model.queries
Data Model:
Subtypes...
RUTModule
ProjectStatusLookup
CustomersView1
ProjectsView2 via ProjectsCustidFkLink1
ResourceskillsView1
SkillsView1
ResourceskillsView2 via ResourceskillsSkillcodeFkLink1
ProjectskillsView3 via ProjskillsSkillcodeFkLink1
ProjectskillsView1
SkillsViewLookup
ProjectsView1
ProjectskillsView2 via ProjskillsProjectidFkLink1
ProjectresourcesView3 via Project_to_ProjResource_ViewLink1
ResourcesViewLookup
CustomersViewLookup
ProjectsViewLookup
ResourcesView1
ProjectresourcesView2 via PrjresResourceidFkLink1
ResourceskillsView3 via ResourceSkillsViewLink1
ProjectresourcesView1
CustomersViewNonPkLookup
Name:
Instance Name:
Definition:
Help
Apply
OK
Cancel


model
RUTModule
ProjectsView1
ProjectresourcesView3
ProjectskillsView2
Master
Detail
ResourcesView1
ProjectresourcesView2
ResourceskillsView3
SkillsView1
ResourceskillsView2
ProjectskillsView3
CustomersView1
ProjectsView2
ProjectskillsView1
ResourceskillsView1
ResourcesViewLookup
ProjectsViewLookup
ProjectStatusLookup
ProjectresourcesView1
SkillsViewLookup
CustomersViewLookup
CustomersViewNonPkLookup

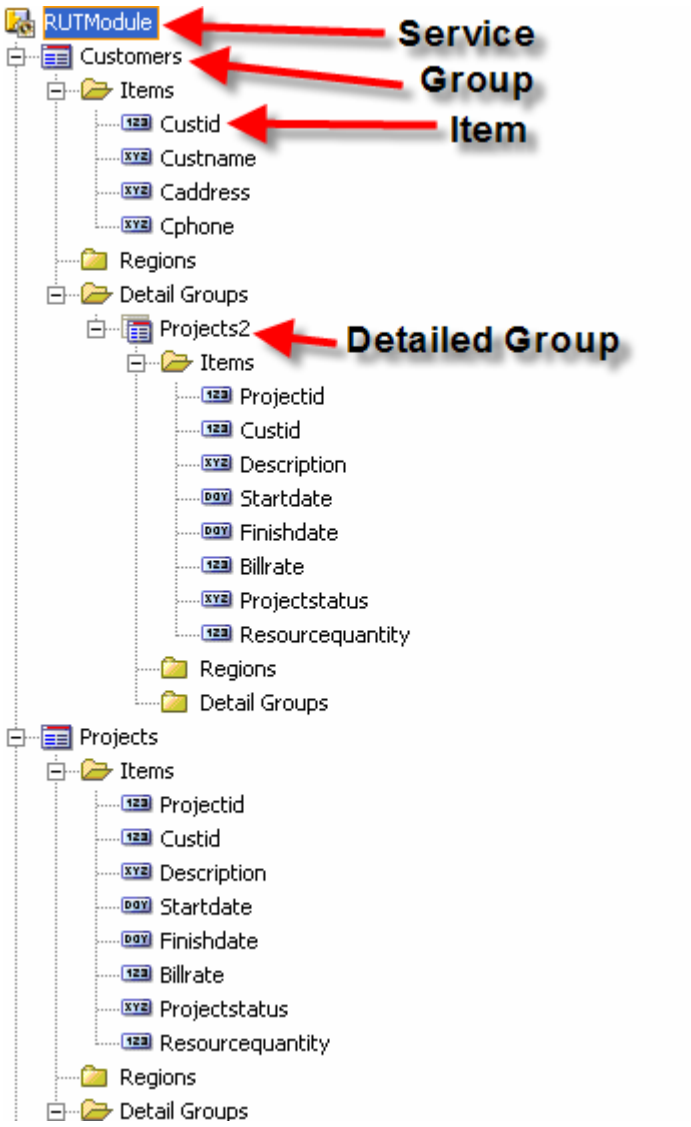
View Controller Design

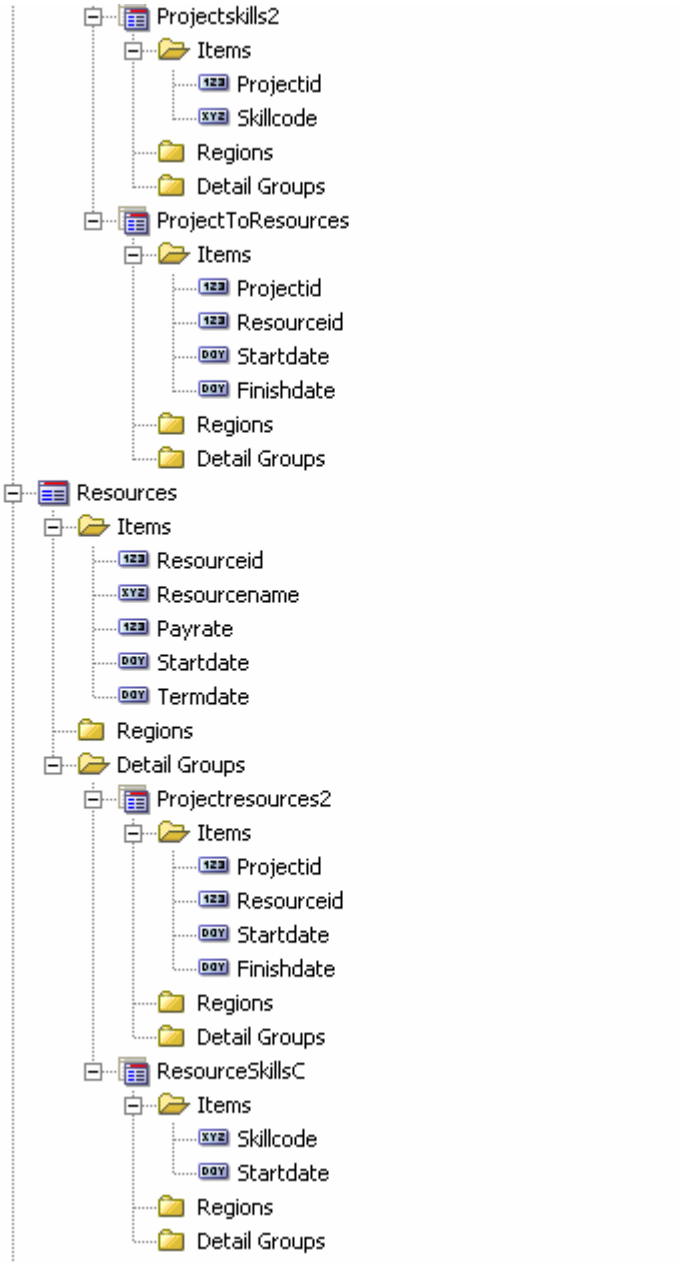
JHeadStart for Rapid Application Development

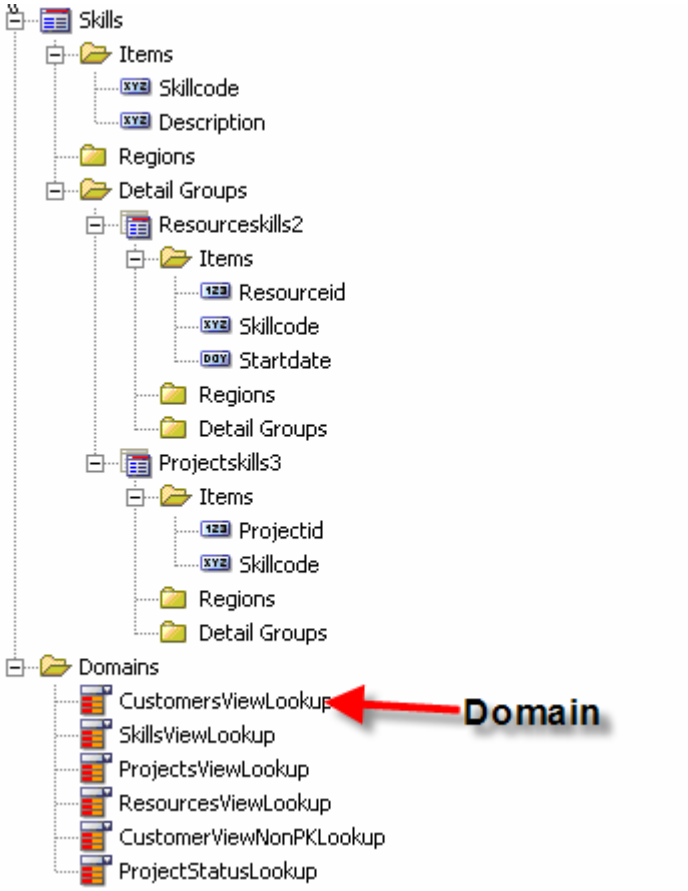
One of the most time consuming portions of any web development project is the development of the user interface (UI). After extensive analysis of the various available options we decided to try the JHeadstart product from Oracle to assist us developing the pages from the model that we had already defined.

Application Definition

The first step in configuring a JHeadStart application is to define the Application Definition. The application definition contains several elements that you can manipulate (as shown in the following screen shot from the RUTRACK Application Definition Editor): a service, groups, items, list of values (LOV), region containers, item regions and group regions, and domains. Each element has a number of properties [7].


RUTModule
Service
Customers
Group
Items
Custid
Item
Custname
Caddress
Cphone
Regions
Detail Groups
Projects2
Detailed Group
Items
Projectid
Custid
Description
Startdate
Finishdate
Billrate
Projectstatus
Resourcequantity
Regions
Detail Groups
Projects
Items
Projectid
Custid
Description
Startdate
Finishdate
Billrate
Projectstatus
Resourcequantity
Regions
Detail Groups


Projectskills2
Items
Projectid
Skillcode
Regions
Detail Groups
ProjectToResources
Items
Projectid
Resourceid
Startdate
Finishdate
Regions
Detail Groups
Resources
Items
Resourceid
Resourcename
Payrate
Startdate
Termdate
Regions
Detail Groups
Projectresources2
Items
Projectid
Resourceid
Startdate
Finishdate
Regions
Detail Groups
ResourceSkillsC
Items
Skillcode
Startdate
Regions
Detail Groups



Service

The top-level node in the application definition is the service —a functional subsystem of the application. It includes logically related functionality on which a user performs tasks that are logically linked together. The service level contains definitions for the application module.

The Service level properties define settings that apply to the application as a whole, like generation directories, date format, internationalization and security settings. The service includes properties to specify file locations, general UI settings (for example, date and date-time formats) [7]. The service definition for RUTRACK follows

Identification	
Name *	RUTModule
Description	Application Definition for RUTModule
Generator Flavours	
View Type *	ADF Faces
JSP Version *	2.0
File Locations	
Main Faces Config *	/WEB-INF/faces-config.xml
Common Beans Faces Config *	/WEB-INF/JhsCommon-beans.xml
Group Beans Faces Config Directory *	/WEB-INF/
UI Pages Directory *	/pages/
UI Page Regions Directory *	/regions/
Java	
View Package *	rutrack.view
Page Definitions Sub Package *	pagedefs
Page Lifecycle Class *	oracle.jheadstart.controller.jsf.lifecycle.JhsPageLifecycle
Data Control *	RUTModuleDataControl
Data Control Implementation	rutrack.model.RUTModule
Set Application Module Superclass to JhsApplicationModuleImpl	☑
Supporting Files	
Templates Base Directory *	C:\RUTRACK\ViewController\templates

UI Settings	
Show Hint Text As Popup?	☑
Date Format *	dd-MMM-yyyy
DateTime Format *	dd-MMM-yyyy HH:mm
Unselected Label in Dropdown List	
Allow Partial Last Page in ViewObject Page Iteration	☑
Authorization	
Use Role-based Authorization	☐
Use Group Name As (Default) Role	☐
Role/Function Prefix	
Insert Allowed EL Expression	
Update Allowed EL Expression	
Delete Allowed EL Expression	
When Access Denied go to Next Group	☐
Internationalization	
NLS Resource Bundle *	rutrack.view.ApplicationResources
Resource Bundle Type *	propertyFile
Override NLS Resource Bundle Entries?	☑
Generate NLS-enabled prompts and tabs?	☐
Generator Default Locale *	en
Generator Locales	

Generation Switches	
Show Template Names?	☑
Overwrite Default Run Target?	☑
Generate Faces Config XML file?	☑
Generate TabBar?	☑
Generate Date Format File?	☑
Generate NLS Resource Bundle?	☑
Generate ADF Page Definitions (bindings)?	☑
Show Generator Warnings?	☑

For RUTRACK we didn't change any of the defaults at the service level. We considered changing the Date Format, but ADF allows you to enter the date as dd/mm/yy and takes care of the conversion.

Group

A group is linked to a data collection that can be displayed on one or more pages depending on the layout style and search settings. The allowable operations (insert, update, delete) can be set on the group, and can be made conditional by specifying the user roles required for an operation. Groups can be nested to create master-detail pages

A service consists of one or more groups. A group is tied to one data collection within the data control, which maps to a view object instance when using ADF Business Components. The group contains properties to set the layout, the allowable operations (insert, update, delete) and to specify the query and search behaviours.

The number of pages generated for a group depends on the Layout Style property (form, table, table-form, select-form, tree, tree-form, parent-shuttle, intersection-shuttle) and the Advanced Search setting (samePage, separatePage or none). Groups can be nested to represent parent-child relations, and child groups are called detail groups [7].

The Same Page property for detail groups can be used to indicate whether the detail group should be generated on the same page as its parent. The following screenshot shows the definition of the customers group in RUTRACK:

Identification	
Name *	Customers
Short Name	
Description	Customers
Use as List of Values?	☐
Group Image / Icon	
Group Layout	
Layout Style *	table-form
Table Overflow Style	
Show Tree Expanded?	☐
Tree Width	
Wizard Style Layout?	☐
Stack Detail Groups on Same Page?	☐
Query Settings	
Data Collection *	CustomersView1
Data Collection Implementation *	CustomersView
Query Bind Parameters	
Tree Data Collection	
Tree Data Collection Implementation	
Domain for Unselected List in Shuttle	

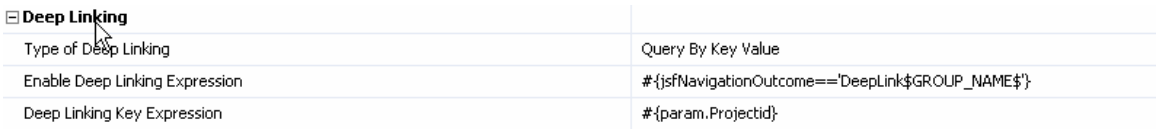
Search Settings	
Advanced Search?	samePage
Advanced Search Layout Columns *	2
Quick Search?	dropDownList
Single or Default Search Item	
Maximum Number of Search Hits	
Auto Query?	☑
Labels	
Tabname	Customers
Display Title (Plural) *	Customers
Display Title (Singular)	Customers
Descriptor Item *	Custname
Operations	
Single-Row Insert allowed?	☑
Single-Row Update allowed?	☑
Single-Row Delete allowed?	☑
Multi-Row Insert allowed?	☑
Multi-Row Update allowed?	☑
Multi-Row Delete allowed?	☑
New Rows	
Show New Rows At Top?	☐
Form Layout	
Form Width	10%
Columns *	2
Table Layout	
Table Width	50%
Use Table Range?	☑
Table range size	10
Table-Form Link *	button
Authorization	
Authorized Roles/Functions	
Insert Allowed EL Expression	
Update Allowed EL Expression	
Delete Allowed EL Expression	
Deep Linking	
Type of Deep Linking	
Enable Deep Linking Expression	#{jsfNavigationOutcome=='DeepLink$GROUP_NAME$'}
Deep Linking Key Expression	

Generation Settings	
Generate Pages?	☑
Generate Page Definition?	☑
Clear Page Definition Before Generation?	☑
Overwrite Page Definition Bindings?	☑
Overwrite Faces-Config Beans and Navigation Rules?	☑
Generate Level 2 TabBar?	☑
Generate Controller Group?	☑
Customization Settings	
Add Menu Entry for this Group?	☑
Add Verb to Form Title?	☑
Page Lifecycle Class	
Custom Property Description 1	
Custom Property 1	
Custom Property Description 2	
Custom Property 2	
Custom Property Description 3	
Custom Property 3	
Custom Property Description 4	
Custom Property 4	
Custom Property Description 5	
Custom Property 5	

The Customers View used most of the default settings for Page Layout etc, but for Projects we put the detail on the same page using the following settings

Group Layout	
Layout Style *	table-form
Table Overflow Style	
Show Tree Expanded?	☐
Tree Width	
Wizard Style Layout?	☐
Stack Detail Groups on Same Page?	☑

We also enabled some deep linking from the Customers Page to the Projects page using the following deep linking settings



Deep Linking	
Type of Deep Linking	Query By Key Value
Enable Deep Linking Expression	#{jsfNavigationOutcome=='DeepLink$GROUP_NAME$'}
Deep Linking Key Expression	#{param.Projectid}

Item

A group contains one or more items, components that represent single data elements. Items can be databound or unbound. Databound items are based on an attribute of the data collection associated with the group. Unbound items can be used to generate buttons, hyperlinks or “control” fields. The Display Type property of an item defines the user interface widget that is generated, for example text input, dropdown list, checkbox, radio group or file download link.

A group contains one or more items that can be displayed on the page. You can specify a wide variety of properties on the item including display settings, operations, validation and query settings [7].

Other properties that can be set include Prompt in Form Layout, Prompt in Table Layout, Display in Table Layout, Display in Form Layout, Width, Maximum Length, Height, Required, Insert Allowed, Update Allowed, Default Display Value and Disabled as shown in the next screenshot of the Custid Item which is part of the Customers Group of RUTRACK –

General	
Bound to Model Attribute?	☑
Name *	Custid
Attribute Name	Custid
Value	
Java Type *	Number
Display Type *	textInput
Domain	
Display Settings	
Display in Form Layout? *	true
Display in Table Layout? *	true
Display in Table Overflow Area? *	false
Prompt in Form Layout	Custid
Prompt in Table Layout	
Width	#{bindings.$BINDING_NAME$.displayWidth}
Height	#{bindings.$BINDING_NAME$.displayHeight}
Maximum Length	6
Column Alignment	right
Default Display Value	
Column Sortable?	☑
Column Wrap?	☐
Hint (Tooltip)	
Depends On Item	
Clear/Refresh Value?	☐

Operations	
Update Allowed?	false
Disabled?	
Validation	
Required?	#{bindings.$BINDING_NAME$.mandatory}
Validator Binding	
Regular Expression	
Regular Expression Error Message	
Query Settings	
Include in Quick Search?	☑
Include in Advanced Search?	☑
Prompt in Search Region	
Query Operator	
Customization Settings	
Custom Property Description 1	
Custom Property 1	
Custom Property Description 2	
Custom Property 2	
Custom Property Description 3	
Custom Property 3	
Custom Property Description 4	
Custom Property 4	
Custom Property Description 5	
Custom Property 5	

Custid is defined as a number with a text input as the type of input. Custid is a primary key that we want to show on the page but not allow the user to update so we have set the Update Allowed to false.

In the ProjectStatus item of the Projects group we have defined the item as a drop down list of project statuses as follows

General	
Bound to Model Attribute?	☑
Name *	Projectstatus
Attribute Name	Projectstatus
Value	
Java Type *	String
Display Type *	dropDownList
Domain	ProjectStatusLookup

Domain

The domain element specifies a static or dynamic list of allowable values. When the Domain Type property is set to “dynamic” you can use the Data Collection property to specify the data source of the allowable values. When the Type property is set to “static”, you can specify allowable value child elements (in the same way you add allowable values to a Designer domain). The allowable value element has two properties Value and Meaning. Domains can be used to generate items with a type of radio group, dropdown list, or checkbox [7]. The following screen shot shows the ProjectStatusLookup domain which is used to show the Status description instead of the status code in several of the RUTRACK pages.

General	
Domain Name *	ProjectStatusLookup
Domain Type *	Dynamic
Query Settings	
Data Collection	ProjectStatusLookup
Data Collection Implementation	ProjectStatusLookup
Dynamic Data Collection Expression	
Query Bind Parameters	
Display Settings	
Value Attribute	ProjectStatus
Meaning Attribute	Descr

You associate a domain with one or more items through the Domain property of the items. The Display Type property of the item determines if the list of allowable values is presented to the user as a radio group, a checkbox, a dropdown list, or a list box (text list). In the ProjectStatus item of the Projects Group we use a Display Type of dropDownList.

JHeadStart Application Generator

JHeadStart Application Generator (JAG) is an excellent way of generating first drafts of pages based on the ADF model.

The content of the generated JSP pages and faces-config.xml file is driven by templates. These templates can contain static content that will be included as is in the generated page, as well as dynamic content. Dynamic content is defined using the Velocity Template Language (VTL). Velocity is an open source Java-based template engine, which is an effort of the Apache Jakarta Project. The templates use the VTL to reference objects defined in Java code. When running the JAG, JHeadstart creates Java objects for the various elements of the application definition, and calls the Velocity Template Engine to resolve the VTL constructs in the various generator templates. [7]

The content of the generated pages is completely driven by generator templates. By defining custom templates you have full control over the generated output, you can customize it any way you want.

JHeadstart ships with a large set of default templates for generating the faces-config.xml file, menus, overall page layout, search regions, item regions, various group layout styles (tree, form, table, parent-shuttle, intersection-shuttle, select list), and all item types.

The JHeadstart Application Generator is capable of generating the following types of output:

• JSF JSP Pages in XML format (.jspx files)

• faces-config.xml file for the JSF Controller.

• PageDef files containing the ADF Model bindings for the generated pages.

• Resource bundles for internationalization.

JSF JSP Pages

The structure of a generated JSF JSP page is identical to the pages that you create manually using drag and drop. This means that you can open a generated page in the visual editor, and add or modify functionality manually. The following is a screen shot of the generated Customers.jspx detail page –



A look at an excerpt from the source for the above page shows the use of standard ADF components for the data inputs.

```
        <af:panelForm rows="1" maxColumns="2" width="10%" id="CustomersFormItems">


<!-- DEBUG:BEGIN:FORM_TEXT_INPUT : default/item/form/formTextInput.vm, nesting level: 4 -->
<af:inputText id="CustomersCustid" value="#{bindings.CustomersCustid.inputValue}"  label="Custid"       required="#{bindings.CustomersCustid.mandatory}" rows="#{bindings.Cu
    <f:convertNumber groupingUsed="false"
   pattern="#{bindings.CustomersCustid.format}"/>
</af:inputText><!-- DEBUG:END:FORM_TEXT_INPUT : default/item/form/formTextInput.vm, nesting level: 4-->




<!-- DEBUG:BEGIN:FORM_TEXT_INPUT : default/item/form/formTextInput.vm, nesting level: 4 -->
<af:inputText id="CustomersCustname" value="#{bindings.CustomersCustname.inputValue}"  label="Custname"       required="#{bindings.CustomersCustname.mandatory}" rows="#{bin
    </af:inputText><!-- DEBUG:END:FORM_TEXT_INPUT : default/item/form/formTextInput.vm, nesting level: 4-->




<!-- DEBUG:BEGIN:FORM_TEXT_INPUT : default/item/form/formTextInput.vm, nesting level: 4 -->
<af:inputText id="CustomersCaddress" value="#{bindings.CustomersCaddress.inputValue}"  label="Caddress"       required="#{bindings.CustomersCaddress.mandatory}" rows="#{bin
    </af:inputText><!-- DEBUG:END:FORM_TEXT_INPUT : default/item/form/formTextInput.vm, nesting level: 4-->




<!-- DEBUG:BEGIN:FORM_TEXT_INPUT : default/item/form/formTextInput.vm, nesting level: 4 -->
<af:inputText id="CustomersCphone" value="#{bindings.CustomersCphone.inputValue}"  label="Cphone"       required="#{bindings.CustomersCphone.mandatory}" rows="#{bindings.Cu
    </af:inputText><!-- DEBUG:END:FORM_TEXT_INPUT : default/item/form/formTextInput.vm, nesting level: 4-->


     </af:panelForm>
```

.

faces-config.xml

The main contents generated into the faces-config.xml file are the navigation rules.

```
<?xml version="1.0" encoding="windows-1252" ?>
<!DOCTYPE faces-config (View Source for full doctype...)>
- <faces-config xmlns="http://java.sun.com/JSF/Configuration">
    <!-- Navigation rules -->
  - <navigation-rule>
      <from-view-id>*</from-view-id>
    - <navigation-case>
        <from-outcome>StartCustomers</from-outcome>
        <to-view-id>/pages/CustomersTable.jspx</to-view-id>
      </navigation-case>
    - <navigation-case>
        <from-outcome>StartProjects2</from-outcome>
        <to-view-id>/pages/Projects2Table.jspx</to-view-id>
      </navigation-case>
    - <navigation-case>
        <from-outcome>DeepLinkProjects</from-outcome>
        <to-view-id>/pages/Projects.jspx</to-view-id>
      </navigation-case>
    - <navigation-case>
        <from-outcome>StartProjects</from-outcome>
        <to-view-id>/pages/ProjectsTable.jspx</to-view-id>
      </navigation-case>
    - <navigation-case>
        <from-outcome>StartResources</from-outcome>
        <to-view-id>/pages/ResourcesTable.jspx</to-view-id>
      </navigation-case>
    - <navigation-case>
        <from-outcome>StartSkills</from-outcome>
        <to-view-id>/pages/SkillsTable.jspx</to-view-id>
      </navigation-case>
    - <navigation-case>
        <from-outcome>StartResourceskills2</from-outcome>
        <to-view-id>/pages/Resourceskills2Table.jspx</to-view-id>
      </navigation-case>
    - <navigation-case>
        <from-outcome>StartProjectskills3</from-outcome>
        <to-view-id>/pages/Projectskills3Table.jspx</to-view-id>
      </navigation-case>
    - <navigation-case>
        <from-outcome>StartCustomersDetails</from-outcome>
        <to-view-id>/pages/Customers.jspx</to-view-id>
      </navigation-case>
    - <navigation-case>
        <from-outcome>StartSkillsDetails</from-outcome>
        <to-view-id>/pages/Skills.jspx</to-view-id>
      </navigation-case>
    </navigation-rule>
  - <navigation-rule>
      <from-view-id>/pages/CustomersTable.jspx</from-view-id>
    - <navigation-case>
        <from-outcome>CreateCustomers</from-outcome>
        <to-view-id>/pages/Customers.jspx</to-view-id>
      </navigation-case>
    - <navigation-case>
        <from-outcome>details</from-outcome>
        <to-view-id>/pages/Customers.jspx</to-view-id>
      </navigation-case>
    </navigation-rule>
  - <navigation-rule>
      <from-view-id>/pages/ProjectsTable.jspx</from-view-id>
    - <navigation-case>
        <from-outcome>CreateProjects</from-outcome>
        <to-view-id>/pages/Projects.jspx</to-view-id>
      </navigation-case>
    - <navigation-case>
        <from-outcome>details</from-outcome>
        <to-view-id>/pages/Projects.jspx</to-view-id>
      </navigation-case>
    </navigation-rule>
  - <navigation-rule>
      <from-view-id>/pages/ResourcesTable.jspx</from-view-id>
    - <navigation-case>
        <from-outcome>CreateResources</from-outcome>
        <to-view-id>/pages/Resources.jspx</to-view-id>
      </navigation-case>
    - <navigation-case>
        <from-outcome>details</from-outcome>
        <to-view-id>/pages/Resources.jspx</to-view-id>
      </navigation-case>
    </navigation-rule>
  - <navigation-rule>
      <from-view-id>/pages/SkillsTable.jspx</from-view-id>
    - <navigation-case>
        <from-outcome>CreateSkills</from-outcome>
        <to-view-id>/pages/Skills.jspx</to-view-id>
      </navigation-case>
    - <navigation-case>
        <from-outcome>details</from-outcome>
        <to-view-id>/pages/Skills.jspx</to-view-id>
      </navigation-case>
    </navigation-rule>
  - <application>
      <default-render-kit-id>oracle.adf.core</default-render-kit-id>
    </application>
</faces-config>
```

JHeadstart generates managed bean definitions into a separate XML file for each page definition. The bean classes provide behaviours like advanced search, multi-row insert and delete and shuttle functionality. The following is an example of the Customers-beans.xml file which contains the managed bean references for the Customers page.

```
<?xml version="1.0" encoding="windows-1252" ?>
<!DOCTYPE faces-config (View Source for full doctype...)>
- <faces-config xmlns="http://java.sun.com/JSF/Configuration">
  <!-- DEBUG:BEGIN:SEARCH_BEAN : default/misc/facesConfig/searchBean.vm, nesting level: 2 -->
  - <managed-bean>
    <managed-bean-name>searchCustomers</managed-bean-name>
    <managed-bean-class>oracle.jheadstart.controller.jsf.bean.JhsSearchBean</managed-bean-class>
    <managed-bean-scope>session</managed-bean-scope>
   - <managed-property>
      <property-name>bindings</property-name>
      <value>#{data.CustomersPageDef}</value>
    </managed-property>
   - <managed-property>
      <property-name>searchBinding</property-name>
      <value>#{data.CustomersPageDef.advancedSearchCustomers}</value>
    </managed-property>
   - <managed-property>
      <property-name>searchAttribute</property-name>
      <value>Custid</value>
    </managed-property>
   - <managed-property>
      <property-name>dataCollection</property-name>
      <value>CustomersView1</value>
    </managed-property>
   - <managed-property>
      <property-name>autoquery</property-name>
      <value>true</value>
    </managed-property>
  </managed-bean>
  <!-- DEBUG:END:SEARCH_BEAN : default/misc/facesConfig/searchBean.vm, nesting level: 2 -->
  <!-- DEBUG:BEGIN:COLLECTION_MODEL_BEAN : default/misc/facesConfig/collectionModelBean.vm, nesting level: 2 -->
- <managed-bean>
    <managed-bean-name>CustomersCollectionModel</managed-bean-name>
    <managed-bean-class>oracle.jheadstart.controller.jsf.bean.JhsCollectionModel</managed-bean-class>
    <managed-bean-scope>request</managed-bean-scope>
   - <managed-property>
      <property-name>jhsPageLifecycle</property-name>
      <value>#{jhsPageLifecycle}</value>
    </managed-property>
   - <managed-property>
      <property-name>bindings</property-name>
      <value>#{bindings}</value>
    </managed-property>
   - <managed-property>
      <property-name>rangeBinding</property-name>
      <value>#{bindings.CustomersTable}</value>
    </managed-property>
  </managed-bean>
  <!-- DEBUG:END:COLLECTION_MODEL_BEAN : default/misc/facesConfig/collectionModelBean.vm, nesting level: 2 -->
</faces-config>
```

PageDef files

ADF creates a PageDef file when you drag and drop objects from the DataControl palette to your page. The PageDef file holds the executables and bindings of your page, and is required to run your pages. JHeadstart-generated pages work in the same way. For each page, the JAG will create a PageDef file containing executables and bindings based on the information in the application definition [7]. The following is the PageDef for the Customers page.

```
<?xml version="1.0" encoding="UTF-8" ?>
<pageDefinition xmlns="http://xmlns.oracle.com/adfm/uimodel"
                version="10.1.3.36.73" id="CustomersPageDef"
                Package="rutrack.view.pagedefs" EnableTokenValidation="false">
  <parameters/>
  <executables>
    <iterator id="CustomersIterator" Binds="RUTModuleDataControl.CustomersView1"
              DataControl="RUTModuleDataControl" RangeSize="10"/>
  </executables>
  <bindings>
    <attributeValues id="CustomersCustid" IterBinding="CustomersIterator">
      <AttrNames>
        <Item Value="Custid"/>
      </AttrNames>
    </attributeValues>
    <attributeValues id="CustomersCustname" IterBinding="CustomersIterator">
      <AttrNames>
        <Item Value="Custname"/>
      </AttrNames>
    </attributeValues>
    <attributeValues id="CustomersCaddress" IterBinding="CustomersIterator">
      <AttrNames>
        <Item Value="Caddress"/>
      </AttrNames>
    </attributeValues>
    <attributeValues id="CustomersCphone" IterBinding="CustomersIterator">
      <AttrNames>
        <Item Value="Cphone"/>
      </AttrNames>
    </attributeValues>
    <table id="CustomersTable" IterBinding="CustomersIterator">
```

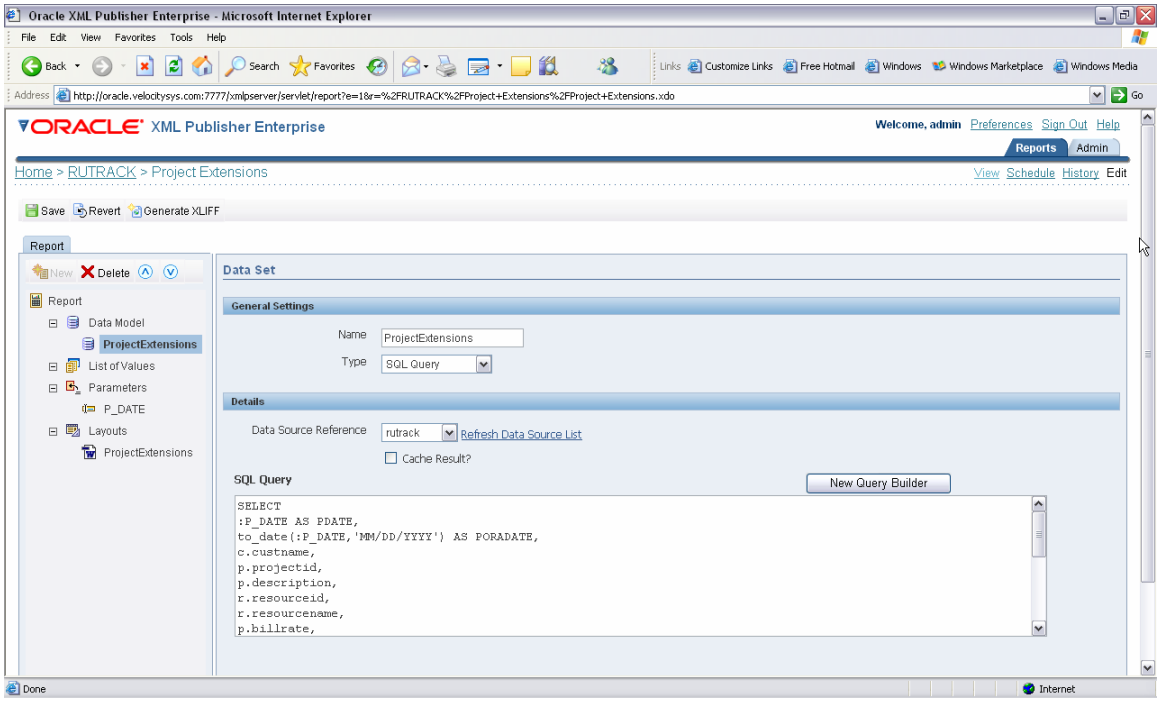
```
    <AttrNames>
      <Item Value="Custid"/>
      <Item Value="Custname"/>
      <Item Value="Caddress"/>
      <Item Value="Cphone"/>
    </AttrNames>
  </table>
  <action id="FirstCustomers" IterBinding="CustomersIterator"
          DataControl="RUTModuleDataControl" RequiresUpdateModel="true"
          Action="12"/>
  <action id="PreviousCustomers" IterBinding="CustomersIterator"
          DataControl="RUTModuleDataControl" RequiresUpdateModel="true"
          Action="11"/>
  <action id="NextCustomers" IterBinding="CustomersIterator"
          DataControl="RUTModuleDataControl" RequiresUpdateModel="true"
          Action="10"/>
  <action id="LastCustomers" IterBinding="CustomersIterator"
          DataControl="RUTModuleDataControl" RequiresUpdateModel="true"
          Action="13"/>
  <methodAction RequiresUpdateModel="true" Action="999"
                id="advancedSearchCustomers" IterBinding="CustomersIterator"
                DataControl="RUTModuleDataControl"
                InstanceName="RUTModuleDataControl.dataProvider"
                MethodName="advancedSearch"
                ReturnName="RUTModuleDataControl.methodResults.RUTModuleDataControl_dataProvider_advancedSearch_result"
                IsViewObjectMethod="false">
    <NamedData NDName="viewObjectUsage"
               NDValue="#{searchCustomers.dataCollection}"
               NDType="java.lang.String"/>
    <NamedData NDName="arguments" NDValue="#{searchCustomers.arguments}"
               NDType="java.util.ArrayList"/>
    <NamedData NDName="allConditionsMet"
               NDValue="#{searchCustomers.allConditionsMet}"
               NDType="java.lang.Boolean"/>
  </methodAction>
```

```
    <action id="setCurrentRowWithKeyCustomers" IterBinding="CustomersIterator"
            InstanceName="RUTModuleDataControl.CustomersView1"
            DataControl="RUTModuleDataControl" RequiresUpdateModel="false"
            Action="96">
      <NamedData NDName="rowKeyStr" NDValue="#{row.rowKeyStr}"
                 NDType="java.lang.String"/>
    </action>
    <action id="CreateCustomers" IterBinding="CustomersIterator"
            DataControl="RUTModuleDataControl" RequiresUpdateModel="true"
            Action="40"/>
    <action id="DeleteCustomers" IterBinding="CustomersIterator"
            DataControl="RUTModuleDataControl" RequiresUpdateModel="false"
            Action="30"/>
    <action id="Commit" RequiresUpdateModel="true" Action="100"
            DataControl="RUTModuleDataControl"/>
    <action id="Rollback" RequiresUpdateModel="false" Action="101"
            DataControl="RUTModuleDataControl"/>
  </bindings>
</pageDefinition>
```

Chapter 4. Report Development – XML Publisher

Oracle XML Publisher was chosen as the development environment for all reports. Oracle XML Publisher provides the ability to schedule reports to run at predefined intervals and also produces a wide variety of report output formats including pdf, rtf, excel, xml and html.

The first step when creating a report in Oracle XML publisher is to define the report data source – in our case all of our reports are based on SQL Queries -

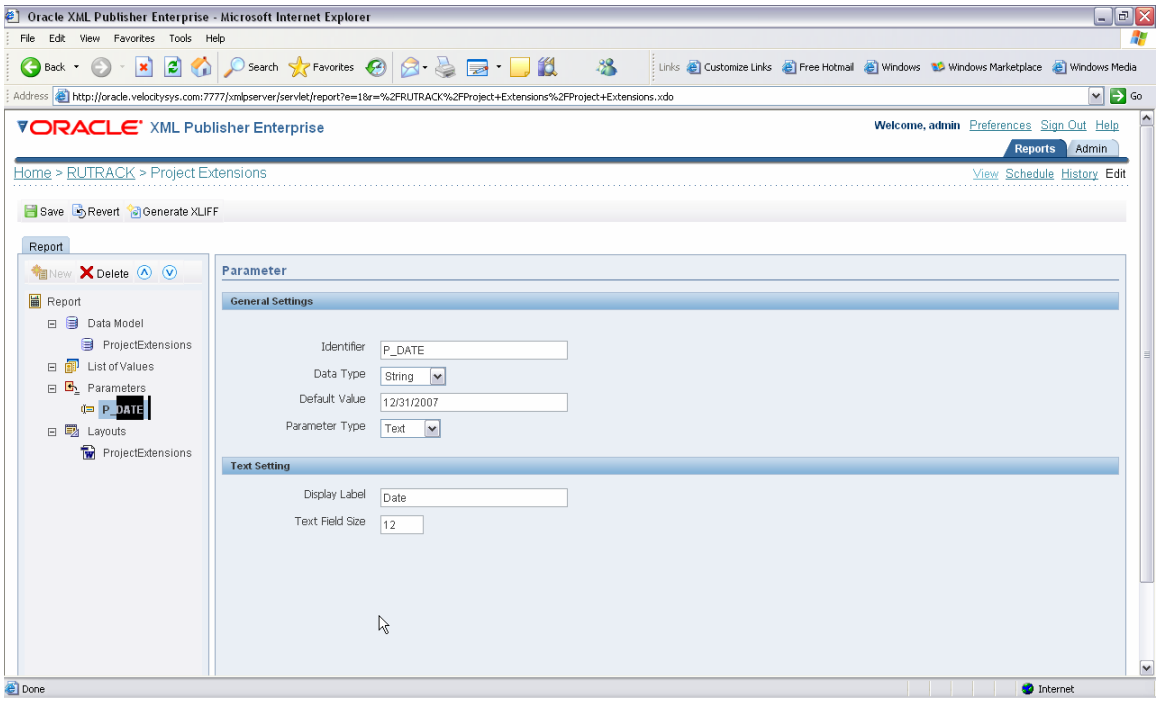


The SQL query for the ProjectExtensions contains a variable parameter (as of date) named p_date and is incorporated in the SQL Query as follows –

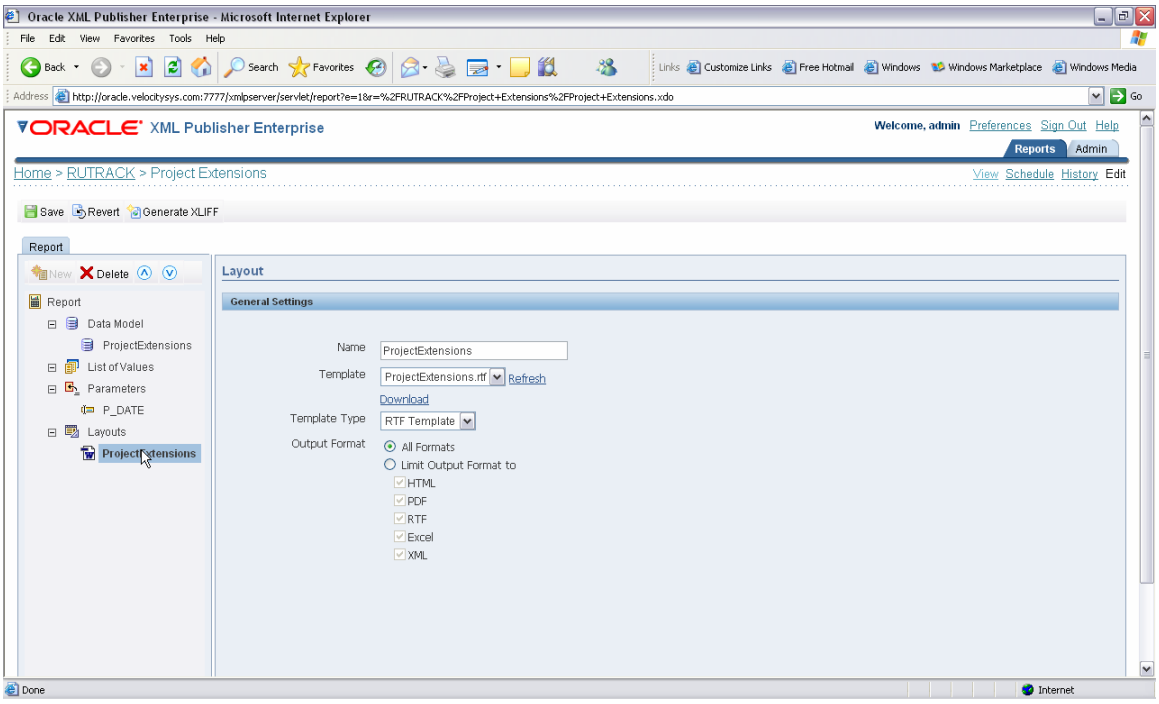
```
SELECT
:P_DATE AS PDATE,
```

```
to_date(:P_DATE,'MM/DD/YYYY') AS PORADATE,
c.custname,
p.projectid,
p.description,
r.resourceid,
r.resourcename,
p.billrate,
r.payrate,
pr.startdate,
pr.finishdate
FROM
        rutadm.customers c
        JOIN rutadm.projects p ON c.custid = p.projectid
        JOIN rutadm.projectresources pr ON pr.projectid = p.projectid
        JOIN rutadm.resources r ON r.resourceid = pr.resourceid
WHERE
        pr.finishdate >=  to_date(:P_DATE,'MM/DD/YYYY')
AND     pr.finishdate <= to_date(:P_DATE,'MM/DD/YYYY') + 30
AND     p.projectstatus = 'S'
```

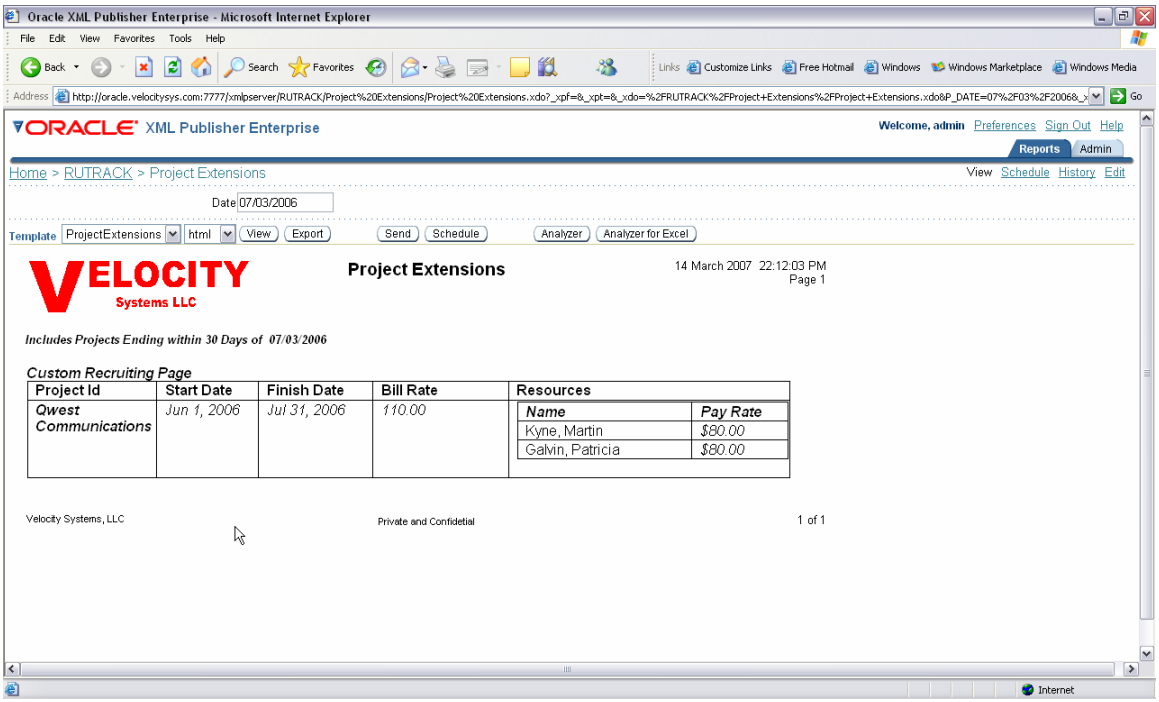
The p_date parameter for As of Date is defined in the report parameters definition page as follows –



The report is tied to an RTF based report template (developed using Oracle XML Publisher Desktop) as follows –



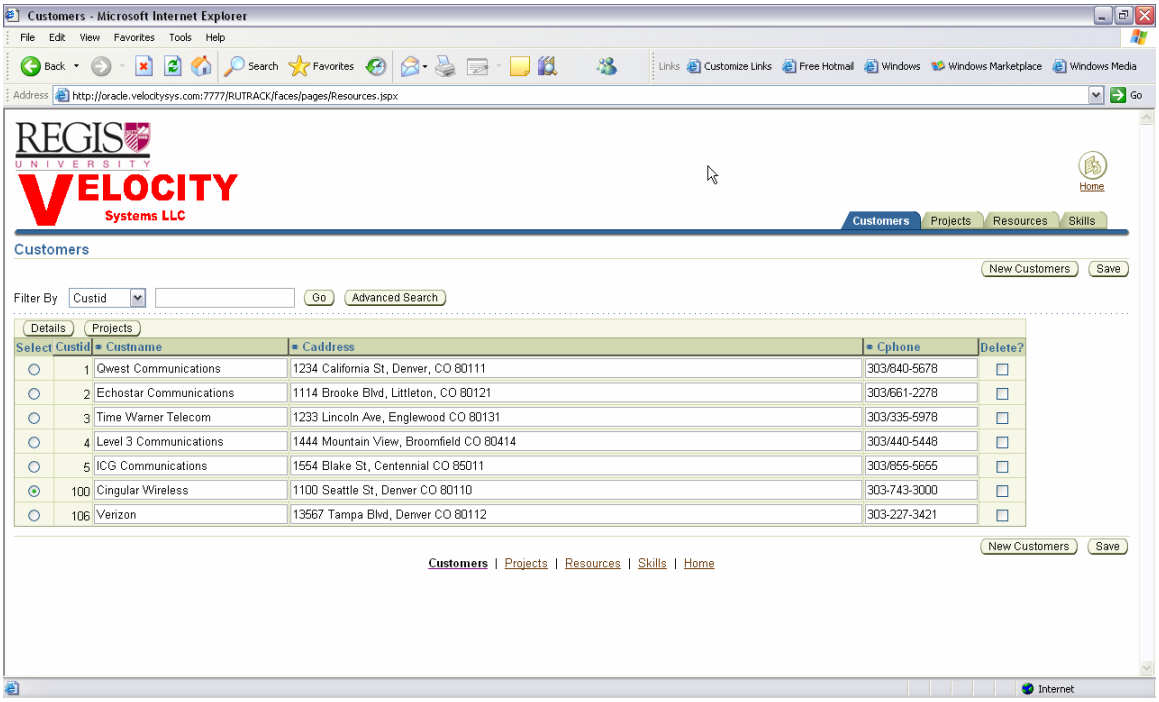
The following is an example of running the report via Oracle XML Publisher Enterprise.



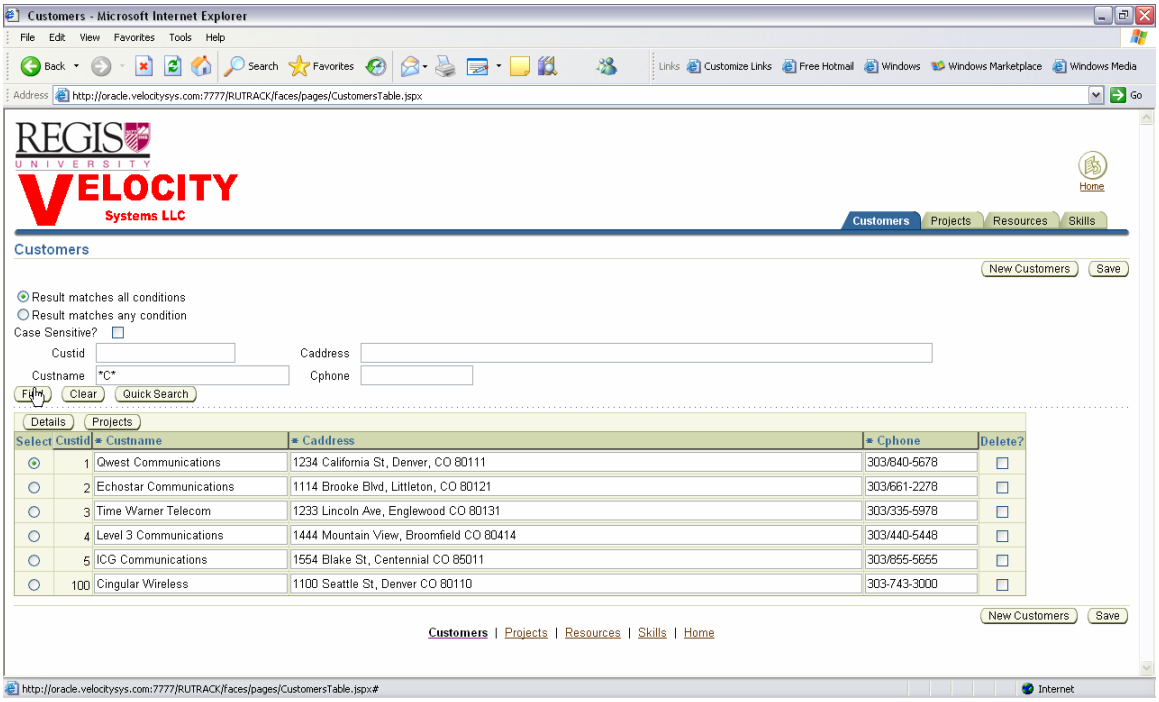
Chapter 5. RUTRACK - The Application

This chapter provides screen shots that show the functionality of the RUTRACK application.

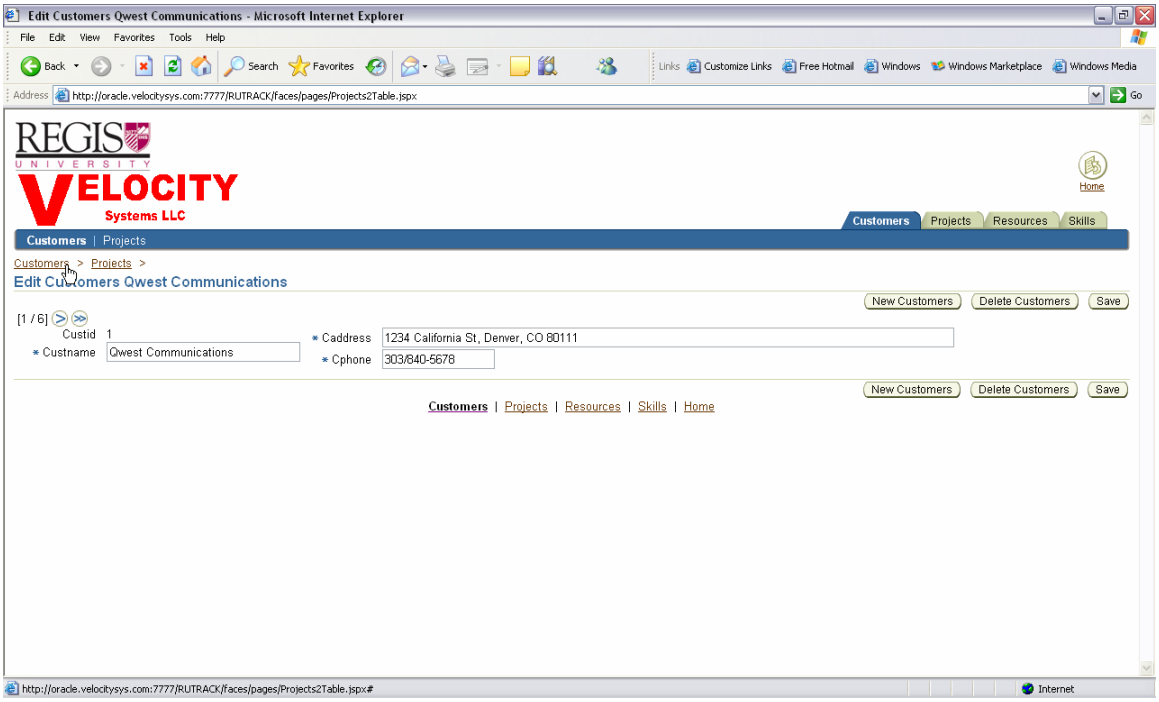
The Initial Customers page follows -



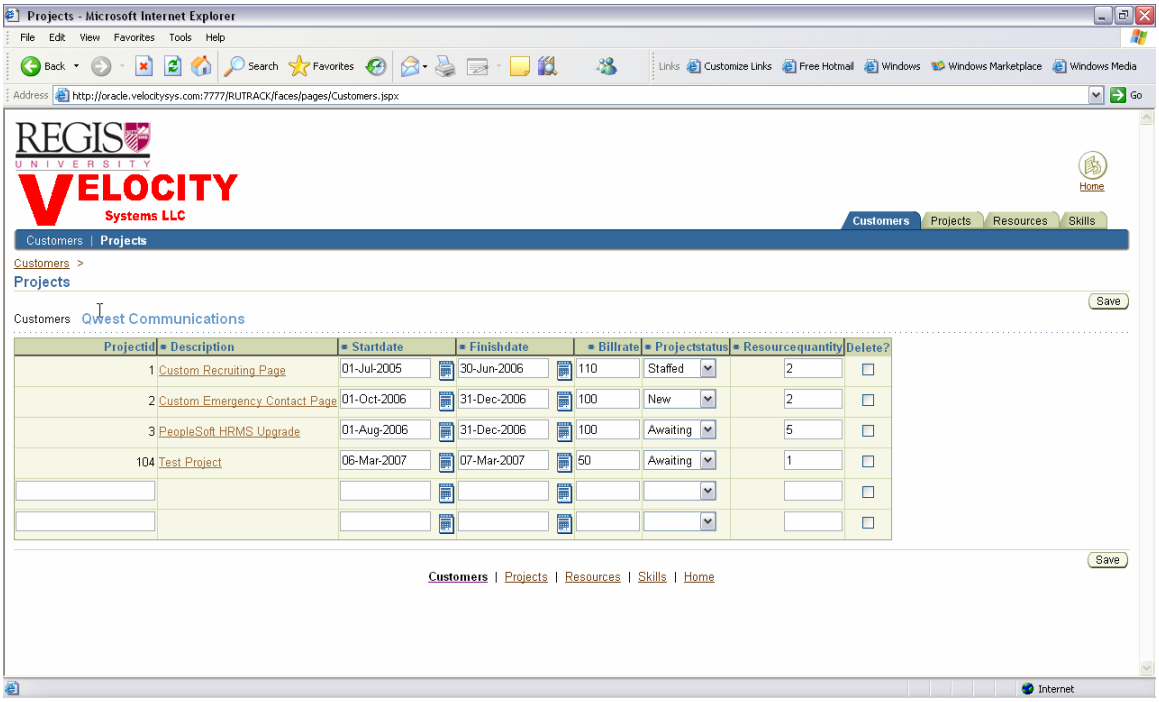
An example of an Advanced Search



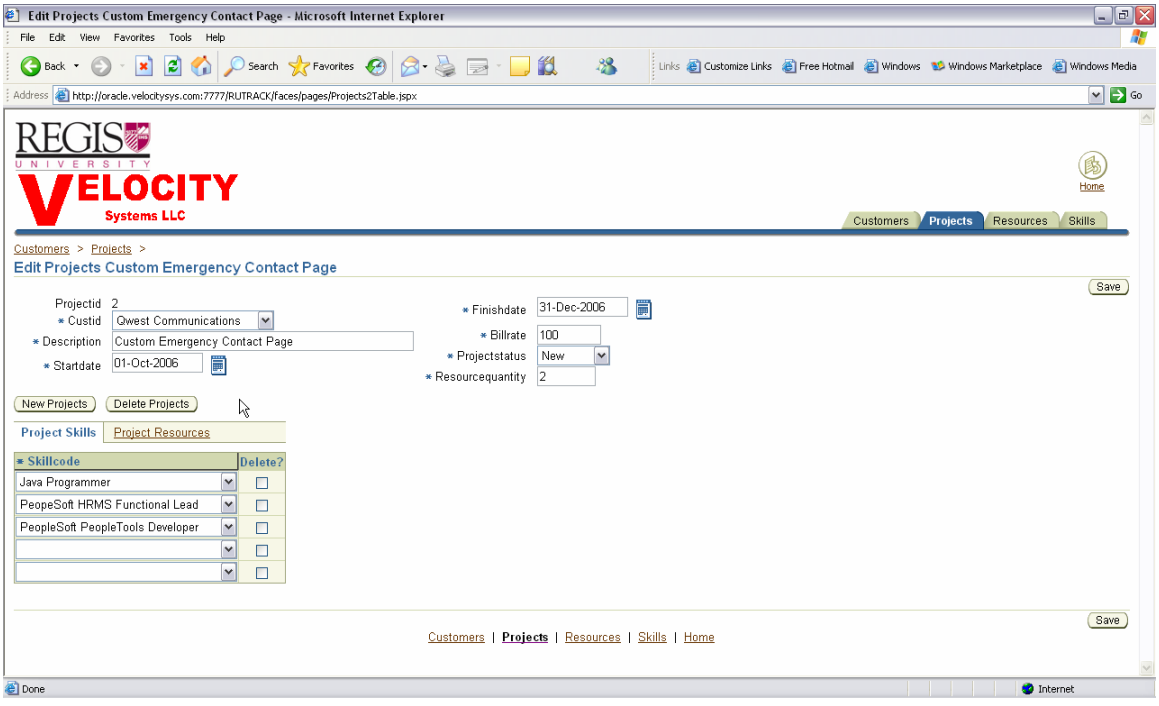
Clicking the Details Button gives



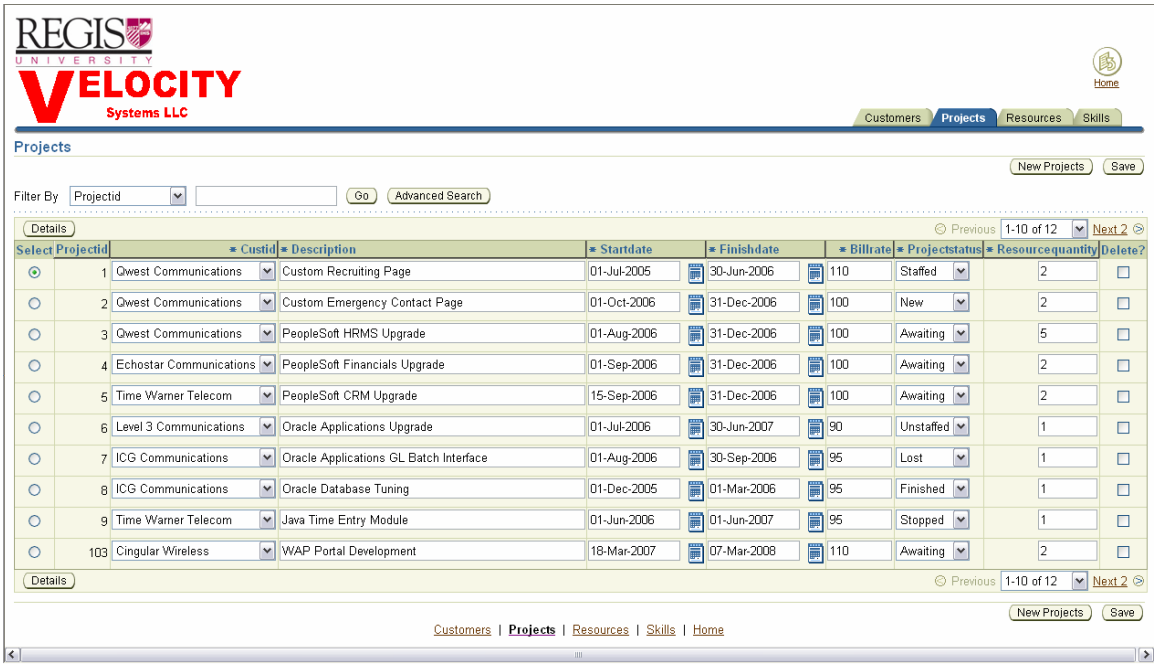
Clicking the Projects Button gives a list of the projects for the customer.



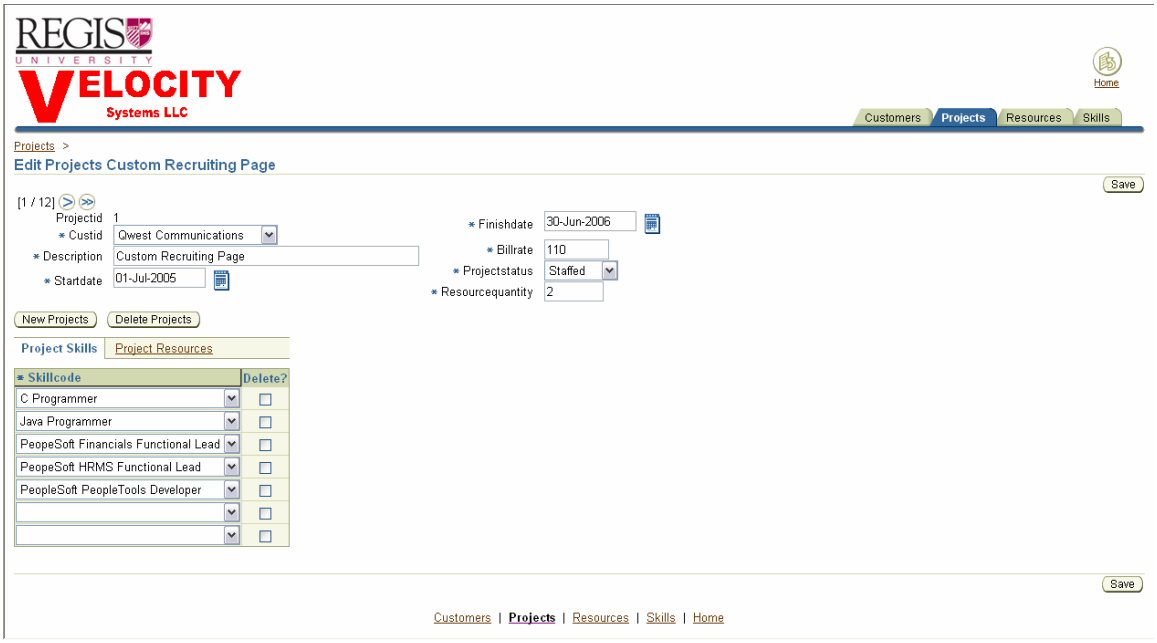
From this page we can click thru (using Deep Linking) to the Project Detail



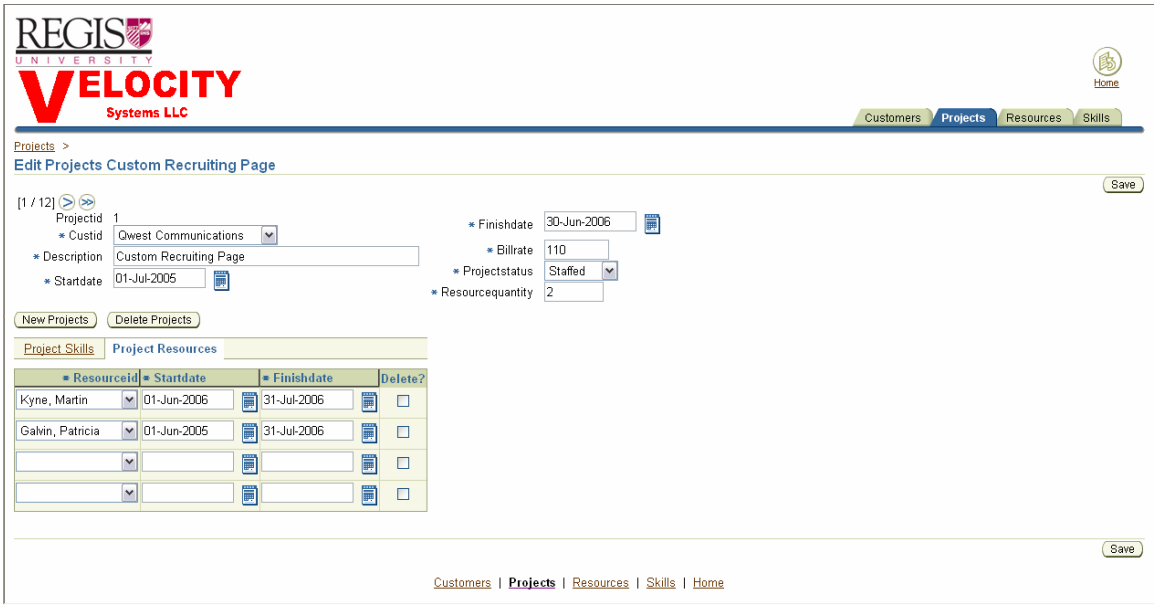
or alternatively we can click the Projects tab to see all tabs



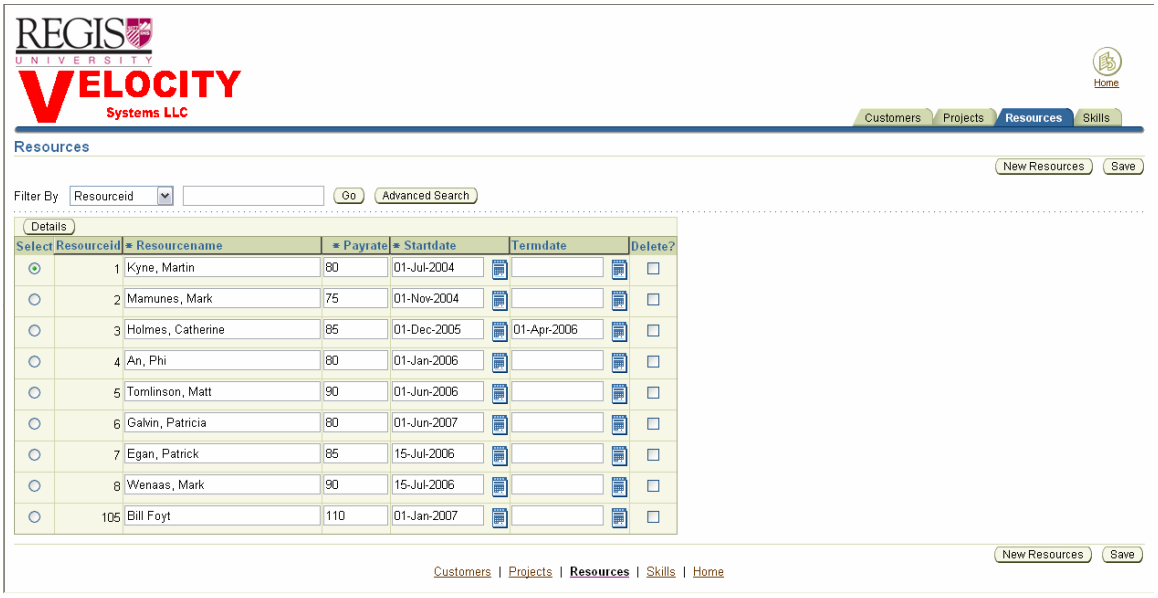
Select a project and click details to see the project details page



Click the Project Resources Link to see the Resources assigned to the Project



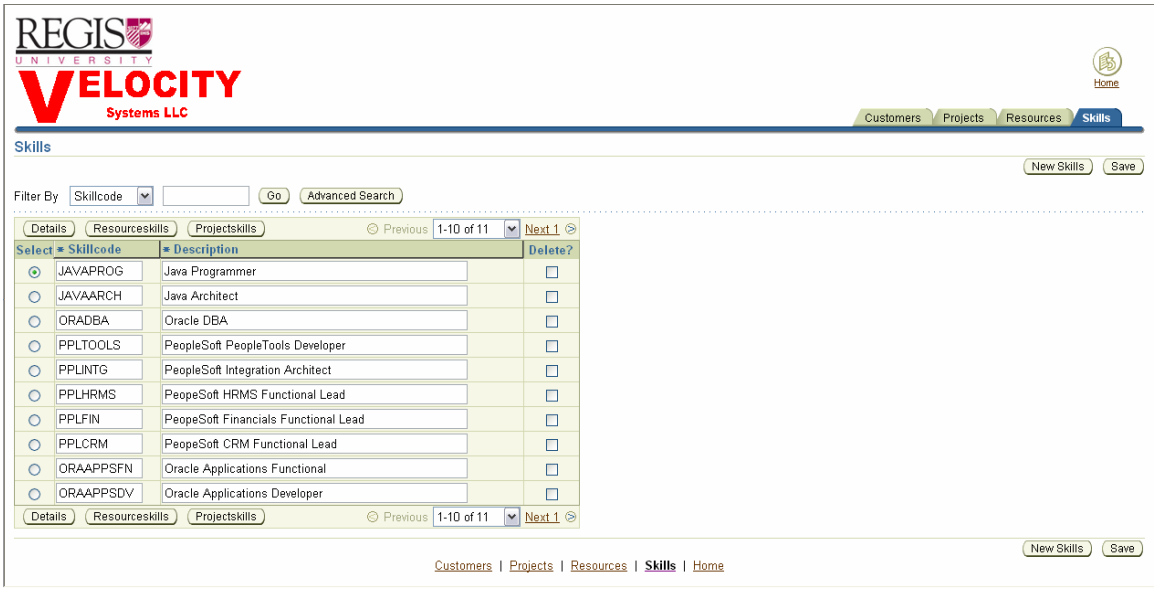
Click the Resources Tab to see a list of Resources



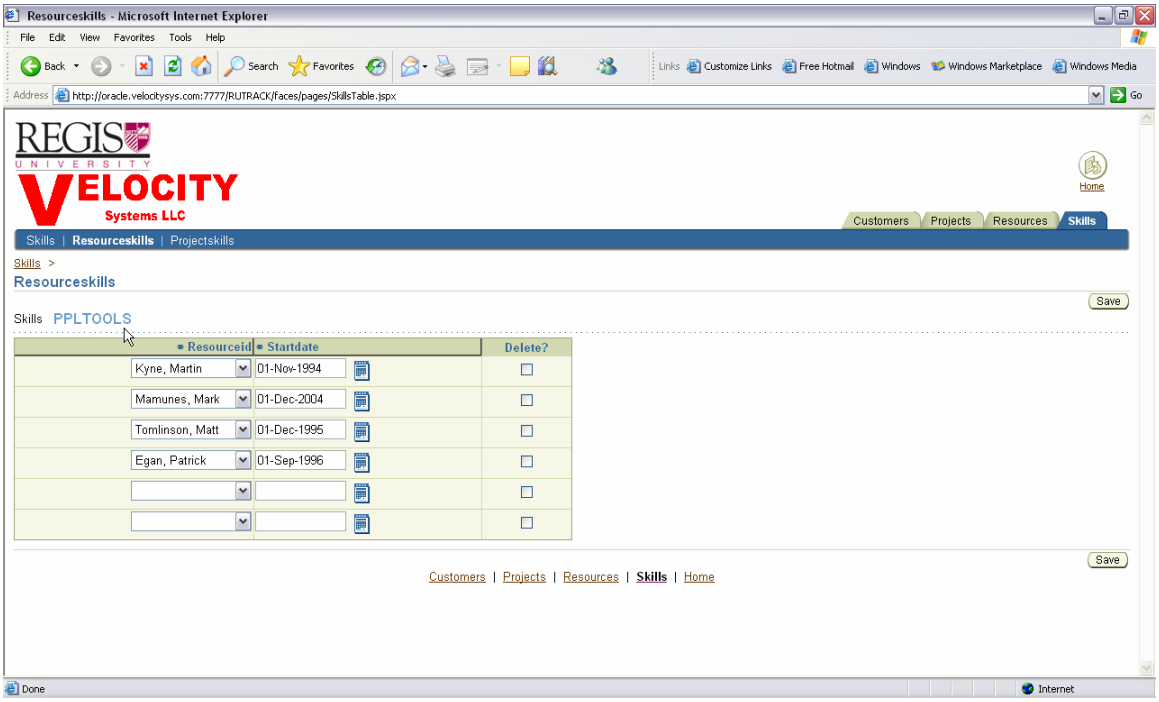
Select a Resource and click the Details button



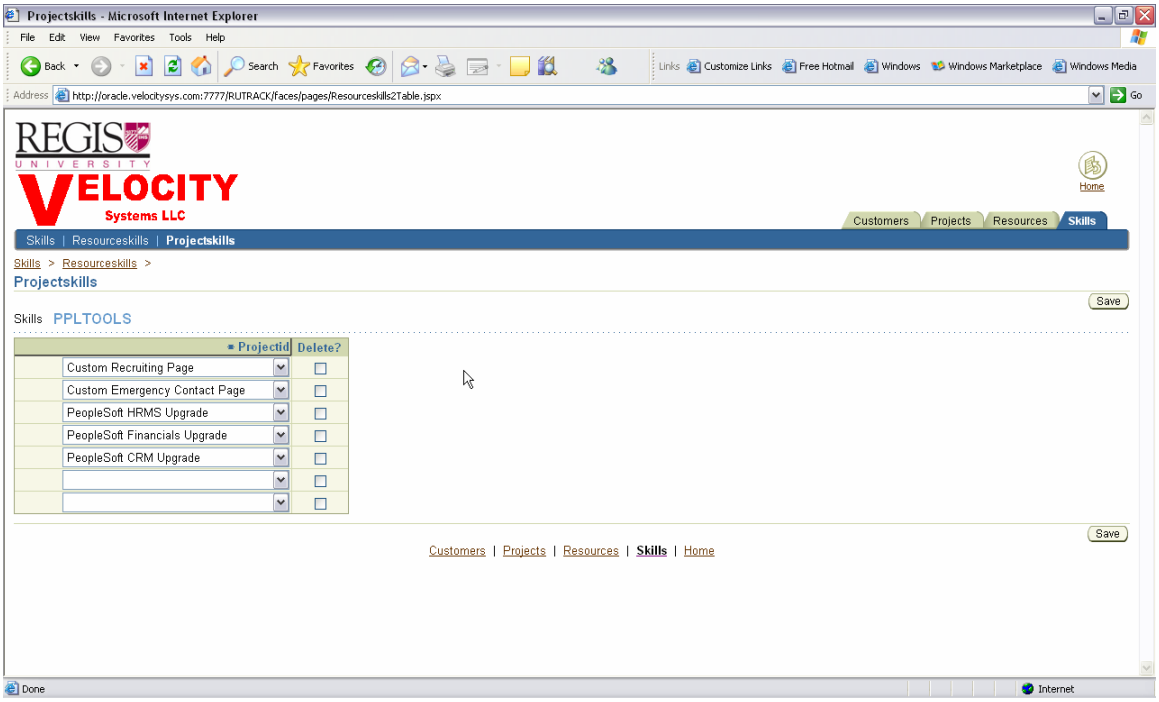
Click the Skills Tab shows the Skills catalog for Velocity Systems



Select a Skill and Click the Resourceskills button to see a list of resources with that particular skill.



Clicking the ProjectSkills link provides a list of Projects that require the select skill.



Appendix B provides samples of the reports generated from the application via Oracle's XML Publisher.

Chapter 6. Project History

What went well

The Agile Methods systems development lifecycle and prototyping approach worked very well for the project. We had no previous experience with the Oracle Fusion Applications components and the Agile approach allowed us to produce proof of concepts / prototypes that worked before completely committing to particular technology.

Users participated in the application prototyping process which provided immediate "buy-in" and support and ownership for the application. They can clearly see how the application will help organize their business goals and efforts.

JDeveloper was a great development tool, everything was nicely linked and integrated and the process of deploying the application to Oracle Application Server was quite easy.

Oracle XML Publisher (despite some patch support requirements) was one of the best reporting tools that I have worked with recently. The capability of defining templates in RTF format produced high quality formatted reports in a variety of formats from XML, thru RTF, excel and PDF.

JHeadStart provided a huge jumpstart on the development of the user interface and help ensure a consistent look and feel for the various functions of the product.

Lessons Learned

There were many lessons learned during the process of completing this project.

The Oracle Fusion technologies are new and subject to frequent changes and improvements. Blogs were a huge source of important information, it was comforting to see that others were facing the same issues that I had and that we could all work together to distribute solutions and workarounds – I had not seen this same sense of openness during development efforts on previous proprietary technologies.

Even with Blogs and white-paper support there were times when being on the bleeding edge felt very uncomfortable and there are a limited set of references where the appropriate information can be found.

The development environment was under powered; Oracle Application Server, Oracle Database and Oracle JDeveloper are all huge memory consumers. A development environment with less than 2GB of RAM results in delays in starting up individual components.

Summary of the Project

The final product deployed at Velocity gives Velocity's resource and sales managers the ability to track resources and opportunities. It provides the ability to forecast utilization and quickly match resources with opportunities.

The implementation of RUTRACK using Oracle's most advanced Application Development Framework components provides a terrific marketing opportunity for Velocity to build upon as it strives to make the pending transition from PeopleSoft consulting services to Oracle Fusion Applications.

Future Plans

Reports are currently deployed via XML Publisher Enterprise; a future version of the application should embed Oracle XML Publisher functionality directly in the application via API's that are available in Oracle XML Publisher.

RUTRACK should be integrated with Salesforce.com (Velocity's current CRM solution) to synchronize Customer, Resource and Project details.

Oracle Internet Directory and Oracle Single Sign-On should be deployed to streamline authentication and security management.

Explore the use of Oracle Text search functionality to achieve “Google style” search capabilities for answering adhoc questions like e.g. “show me resources coming available in the next 30 days with 2 years of Java and 3 years of Oracle Database experience, who live in Parker and have a rate less than $100/hr and have worked at Qwest before”

Chapter 7. Conclusion

This project provided an excellent opportunity to produce a “proof of concept” that validates the Oracle Fusion Architecture and produces a product that solves a critical need at Velocity Systems.

Oracle Database server has a long history and proven pedigree in supporting Enterprise Applications. Oracle 10G database enables 24 * 7 availability and much higher volume concurrent user activity than Velocity will probably ever need.

Oracle Application Server is establishing itself among the leaders in Application Middleware, its implementation of OC4J and OPMN provide a robust, scalable solution for managing transactions and user sessions and will provide scalability for growth and remote access as Velocity grows.

Oracle ADF is a robust implementation of Java Server Faces (JSF) and adds an ever increasing layer of sophistication to HTML based user-interface. The crisp UI, advanced components and Partial Page Rendering makes RUTRACK a pleasing application for users.

Oracle JHeadStart provides and additional layer of functionality above and beyond that of the JSF standard. Oracle JHeadStart provides advanced features such as advanced search, save verification, hierarchical tree navigation which significantly reduces the

development effort required to develop similar features via Oracle ADF. JHeadstart was a huge productivity gain for this project.

Oracle XML Publisher provides advanced report development features through the use of user definable RTF templates. Oracle XML Publisher produces “Pixel Perfect” reporting that can be used to produce forms or high quality reports. The user can choose from outputs including HTML, PDF, Word and Excel, and distribution mediums including email or printer.

Oracle JDeveloper is an advanced IDE that facilitates the development and deployment of all the Oracle Fusion application elements. The ability to develop the JHeadStart, ADF/JSF elements and pages from one central tool and then to be able to deploy those elements directly to the Oracle Application Server was a huge asset. It highlights the benefits of working with a solution that is integrated all levels from database through development environment and deployment server.

The Agile Methods methodology provided the ability to work closely with the users, to prototype the solution, refine our vision for the product and to achieve user buy-in for the final solution. Oracle Fusion application development involves a considerable amount of configuration which enables the ability to produce a prototype and to rapidly re-configure that prototype based on user feedback.

The final RUTRACK application provides Velocity with the capability to implement more efficient business processes, to be more pro-active in identifying resources coming available and to better identify the best resource match for a particular project. Velocity is also better positioned to work with clients as they desire to become more aware of the Oracle Fusion Applications and opt to make the transition from their current applications

From a personal perspective I have learned a huge amount about J2EE applications in general and specifically about the Oracle Applications Development Framework (ADF). I gained a lot of confidence in my abilities and the capabilities of Oracle ADF to deploy an Enterprise level application with advanced capabilities in a rapid timeframe.

I look forward to seeing the upcoming Fusion Applications from Oracle and am now better prepared to assist clients in converting to and deploying these applications.

Appendix A: Database Development

SQL DDL Scripts

```
DROP TABLE projectskills;
DROP TABLE projectresources;
DROP TABLE projects;
DROP TABLE resources;
DROP TABLE resourceskills;
DROP TABLE customers;
DROP TABLE skills;

CREATE TABLE skills
(
  skillcode    VARCHAR2(10) NOT NULL,
  description  VARCHAR2(50) NOT NULL,
  CONSTRAINT skills_skillcode_pk
  PRIMARY KEY (skillcode)
) ;

CREATE TABLE resources
(
  resourceid   NUMERIC (6,0)  NOT NULL,
  resourcename        VARCHAR2(30)   NOT NULL,
  payrate             NUMERIC (6,2)  NOT NULL,
  startdate           DATE           NOT NULL,
  termdate            DATE           ,
  CONSTRAINT resources_resourceid_pk
  PRIMARY KEY (resourceid)
) ;

CREATE TABLE resourceskills
(
  resourceid   NUMERIC (6,0)  NOT NULL,
  skillcode    VARCHAR2(10)   NOT NULL,
  startdate           DATE           NOT NULL,
  CONSTRAINT resourceskills_residsklcd_pk
  PRIMARY KEY (resourceid, skillcode),
  CONSTRAINT resourceskills_skillcode_fk
  FOREIGN KEY (skillcode) REFERENCES SKILLS (skillcode)
) ;

CREATE TABLE CUSTOMERS
(
  custid              NUMERIC (6,0)  NOT NULL,
  custname     VARCHAR2(30)   NOT NULL,
  caddress            VARCHAR2(100)  NOT NULL,
  cphone              VARCHAR2(15)   NOT NULL,
  CONSTRAINT customers_custid_pk
  PRIMARY KEY (custid)
) ;

CREATE TABLE projects
(
  projectid    NUMERIC (6,0)  NOT NULL,
  custid              NUMERIC (6,0)  NOT NULL,
  description  VARCHAR2(50)   NOT NULL,
  startdate           DATE           NOT NULL,
  finishdate          DATE           NOT NULL,
  billrate            NUMERIC (6,2)  NOT NULL,
  projectstatus       CHAR(1)               NOT NULL,
  resourcequantity     NUMERIC (5,2)  NOT NULL,
  CONSTRAINT projects_projectid_pk
  PRIMARY KEY (projectid),
```

```
  CONSTRAINT projects_custid_fk
  FOREIGN KEY (custid) REFERENCES customers (custid),
  CONSTRAINT projects_projectstatus_cc
  CHECK ( projectstatus in ('N', 'T', 'L', 'A', 'S', 'U', 'F') )
) ;

CREATE TABLE projectskillls
(
  projectid    NUMERIC (6,0)  NOT NULL,
  skillcode    VARCHAR2(10)   NOT NULL,
  CONSTRAINT projskills_projidskillcode_pk
  PRIMARY KEY (projectid, skillcode),
  CONSTRAINT projskills_projectid_fk
  FOREIGN KEY (projectid) REFERENCES projects (projectid),
  CONSTRAINT projskills_skillcode_fk
  FOREIGN KEY (skillcode) REFERENCES skills (skillcode)
) ;

CREATE TABLE projectresources
(
  projectid    NUMERIC (6,0)  NOT NULL,
  resourceid   NUMERIC (6,0)  NOT NULL,
  startdate           DATE           NOT NULL,
  finishdate          DATE           NOT NULL,
  CONSTRAINT prjres_projidresourceid_pk
  PRIMARY KEY (projectid, resourceid),
  CONSTRAINT prjres_resourceid_fk
  FOREIGN KEY (resourceid) REFERENCES resources (resourceid)
) ;


CREATE SEQUENCE rutrack_seq
    MINVALUE 1
    MAXVALUE 999999
    START WITH 100
    INCREMENT BY 1;

CREATE TRIGGER customers_newpk BEFORE INSERT on customers
FOR EACH ROW
BEGIN
       SELECT RUTRACK_SEQ.nextval
       INTO :new.custid
       FROM dual;
END;

CREATE TRIGGER projects_newpk BEFORE INSERT on projects
FOR EACH ROW
BEGIN
       SELECT RUTRACK_SEQ.nextval
       INTO :new.projectid
       FROM dual;
END;

CREATE TRIGGER resources_newpk BEFORE INSERT on resources
FOR EACH ROW
BEGIN
       SELECT RUTRACK_SEQ.nextval
       INTO :new.resourceid
       FROM dual;
END;


CREATE view rutadm.project_status_vw
(
PROJECT_STATUS,
DESCR
)
AS
SELECT
'A', 'Awaiting'
FROM DUAL
```

```
UNION
SELECT
       'N','New'
FROM DUAL
UNION
SELECT
       'T','Stopped'
FROM DUAL
UNION
SELECT
       'S','Staffed'
FROM DUAL
UNION
SELECT
       'U','Unstaffed'
FROM DUAL
UNION
SELECT
       'F','Finished'
FROM DUAL
UNION
SELECT
       'L','Lost'
FROM DUAL;
```

Sample Data Scripts (Insert Statements)

```
-- Skills
INSERT INTO skills VALUES (
'JAVAPROG', 'Java Programmer');
INSERT INTO skills VALUES (
'JAVAARCH', 'Java Architect');
INSERT INTO skills VALUES (
'ORADBA', 'Oracle DBA');
INSERT INTO skills VALUES (
'PPLTOOLS', 'PeopleSoft PeopleTools Developer');
INSERT INTO skills VALUES (
'PPLINTG', 'PeopleSoft Integration Architect');
INSERT INTO skills VALUES (
'PPLHRMS', 'PeopeSoft HRMS Functional Lead');
INSERT INTO skills VALUES (
'PPLFIN', 'PeopeSoft Financials Functional Lead');
INSERT INTO skills VALUES (
'PPLCRM', 'PeopeSoft CRM Functional Lead');
INSERT INTO skills VALUES (
'ORAAPPSFN', 'Oracle Applications Functional');
INSERT INTO skills VALUES (
'ORAAPPSDV', 'Oracle Applications Developer');
INSERT INTO skills VALUES (
'CPROG', 'C Programmer');
Commit;

-- Customers
INSERT INTO customers VALUES (
1,'Qwest Communications','1234 California St, Denver, CO 80111','303/840-5678');
INSERT INTO customers VALUES (
2,'Echostar Communications','1114 Brooke Blvd, Littleton, CO 80121','303/661-2278');
INSERT INTO customers VALUES (
3,'Time Warner Telecom','1233 Lincoln Ave, Englewood CO 80131','303/335-5978');
INSERT INTO customers VALUES (
4,'Level 3 Communications','1444 Mountain View, Broomfield CO 80414','303/440-5448');
INSERT INTO customers VALUES (
5,'ICG Communications','1554 Blake St, Centennial CO 85011','303/855-5655');
Commit;
```

```
--Resources
INSERT INTO resources VALUES (
1, 'Kyne, Martin', 80, '01-JUL-2004', NULL);
INSERT INTO resources VALUES (
2, 'Mamunes, Mark', 75, '01-NOV-2004', NULL);
INSERT INTO resources VALUES (
3, 'Holmes, Catherine', 85, '01-DEC-2005', '01-APR-2006');
INSERT INTO resources VALUES (
4, 'An, Phi', 80, '01-JAN-2006', NULL);
INSERT INTO resources VALUES (
5, 'Tomlinson, Matt', 90, '01-JUN-2006', NULL);
INSERT INTO resources VALUES (
6, 'Galvin, Patricia', 80, '01-JUN-2007', NULL);
INSERT INTO resources VALUES (
7, 'Egan, Patrick', 85, '15-JUL-2006', NULL);
INSERT INTO resources VALUES (
8, 'Wenaas, Mark', 90, '15-JUL-2006', NULL);
Commit;



--resourceskillskills
INSERT INTO resourceskills VALUES (
1, 'PPLTOOLS', '01-NOV-1994');
INSERT INTO resourceskills VALUES (
1, 'PPLHRMS', '01-JUL-1998');
INSERT INTO resourceskills VALUES (
1, 'PPLINTG', '01-JUL-1998');
INSERT INTO resourceskills VALUES (
1, 'PPLCRM', '01-DEC-2004');
INSERT INTO resourceskills VALUES (
1, 'PPLFIN', '01-JUL-1997');
INSERT INTO resourceskills VALUES (
2, 'ORADBA', '01-SEP-2004');
INSERT INTO resourceskills VALUES (
2, 'PPLTOOLS', '01-DEC-2004');
INSERT INTO resourceskills VALUES (
3, 'ORADBA', '01-SEP-2000');
INSERT INTO resourceskills VALUES (
4, 'JAVAPROG', '01-DEC-2000');
INSERT INTO resourceskills VALUES (
4, 'JAVAARCH', '01-SEP-2004');
INSERT INTO resourceskills VALUES (
5, 'PPLTOOLS', '01-DEC-1995');
INSERT INTO resourceskills VALUES (
5, 'ORADBA', '01-MAR-1995');
INSERT INTO resourceskills VALUES (
5, 'PPLHRMS', '01-SEP-1998');
INSERT INTO resourceskills VALUES (
6, 'PPLHRMS', '01-SEP-1995');
INSERT INTO resourceskills VALUES (
7, 'PPLTOOLS', '01-SEP-1996');
INSERT INTO resourceskills VALUES (
7, 'PPLHRMS', '01-SEP-1997');
INSERT INTO resourceskills VALUES (
7, 'PPLFIN', '01-JUL-2000');
INSERT INTO resourceskills VALUES (
8, 'PPLFIN', '01-JUL-1996');


Commit;

-- Projects
INSERT INTO projects VALUES
(1,1,'Custom Recruiting Page', '01-JUL-2005', '30-JUN-2006', 110, 'S', 2);
INSERT INTO projects VALUES
(2,1,'Custom Emergency Contact Page', '01-OCT-2006', '31-DEC-2006', 100, 'N', 2);
INSERT INTO projects VALUES
(3,1,'PeopleSoft HRMS Upgrade', '01-AUG-2006', '31-DEC-2006', 100, 'A', 5);
INSERT INTO projects VALUES
```

```
(4,2,'PeopleSoft Financials Upgrade', '01-SEP-2006', '31-DEC-2006', 100, 'A', 2);
INSERT INTO projects VALUES
(5,3,'PeopleSoft CRM Upgrade', '15-SEP-2006', '31-DEC-2006', 100, 'A', 2);
INSERT INTO projects VALUES
(6,4,'Oracle Applications Upgrade', '01-JUL-2006', '30-JUN-2007', 90, 'U', 1);
INSERT INTO projects VALUES
(7,5,'Oracle Applications GL Batch Interface', '01-AUG-2006', '30-SEP-2006', 95, 'L', 1);
INSERT INTO projects VALUES
(8,5,'Oracle Database Tuning', '01-DEC-2005', '01-MAR-2006', 95, 'F', 1);
INSERT INTO projects VALUES
(9,3,'Java Time Entry Module', '01-JUN-2006', '01-JUN-2007', 95, 'T', 1);

Commit;


INSERT INTO projectskills VALUES
(1,'PPLTOOLS');
INSERT INTO projectskills VALUES
(1,'PPLHRMS');
INSERT INTO projectskills VALUES
(1,'JAVAPROG');
INSERT INTO projectskills VALUES
(2,'PPLTOOLS');
INSERT INTO projectskills VALUES
(2,'JAVAPROG');
INSERT INTO projectskills VALUES
(3,'PPLTOOLS');
INSERT INTO projectskills VALUES
(3,'PPLHRMS');
INSERT INTO projectskills VALUES
(3,'ORADBA');
INSERT INTO projectskills VALUES
(4,'PPLTOOLS');
INSERT INTO projectskills VALUES
(4,'ORADBA');
INSERT INTO projectskills VALUES
(4,'PPLFIN');
INSERT INTO projectskills VALUES
(5,'PPLCRM');
INSERT INTO projectskills VALUES
(5,'PPLTOOLS');
INSERT INTO projectskills VALUES
(5,'ORADBA');
INSERT INTO projectskills VALUES
(6,'ORAAPPSFN');
INSERT INTO projectskills VALUES
(6,'ORAAPPSDV');
INSERT INTO projectskills VALUES
(7,'ORAAPPSDV');
INSERT INTO projectskills VALUES
(8,'ORADBA');
INSERT INTO projectskills VALUES
(9,'JAVAPROG');

Commit;


INSERT INTO projectresources VALUES (
1,1,'01-JUN-2006', '31-JUL-2006');
INSERT INTO projectresources VALUES (
1,6,'01-JUN-2005', '31-JUL-2006');
INSERT INTO projectresources VALUES (
8,3,'01-DEC-2005', '01-MAR-2006');
INSERT INTO projectresources VALUES (
3,7,'01-AUG-2006', '31-DEC-2006');
INSERT INTO projectresources VALUES (
3,5,'01-AUG-2006', '31-DEC-2006');
INSERT INTO projectresources VALUES (
7,5,'01-AUG-2006', '30-SEP-2006');

commit;
```

Table Definitions

```
SQL> DESC skills;
 Name                                      Null?    Type
 ----------------------------------------- -------- ----------------------------
 SKILLCODE                                 NOT NULL VARCHAR2(10)
 DESCRIPTION                               NOT NULL VARCHAR2(50)

SQL> DESC resources;
 Name                                      Null?    Type
 ----------------------------------------- -------- ----------------------------
 RESOURCEID                                NOT NULL NUMBER(6)
 RESOURCENAME                              NOT NULL VARCHAR2(30)
 PAYRATE                                   NOT NULL NUMBER(6,2)
 STARTDATE                                 NOT NULL DATE
 TERMDATE                                           DATE

SQL> DESC resourceskills;
 Name                                      Null?    Type
 ----------------------------------------- -------- ----------------------------
 RESOURCEID                                NOT NULL NUMBER(6)
 SKILLCODE                                 NOT NULL VARCHAR2(10)
 STARTDATE                                 NOT NULL DATE

SQL> DESC customers;
 Name                                      Null?    Type
 ----------------------------------------- -------- ----------------------------
 CUSTID                                    NOT NULL NUMBER(6)
 CUSTNAME                                  NOT NULL VARCHAR2(30)
 CADDRESS                                  NOT NULL VARCHAR2(100)
 CPHONE                                    NOT NULL VARCHAR2(15)

SQL> DESC projects;
 Name                                      Null?    Type
 ----------------------------------------- -------- ----------------------------
 PROJECTID                                 NOT NULL NUMBER(6)
 CUSTID                                    NOT NULL NUMBER(6)
 DESCRIPTION                               NOT NULL VARCHAR2(50)
 STARTDATE                                 NOT NULL DATE
 FINISHDATE                                NOT NULL DATE
 BILLRATE                                  NOT NULL NUMBER(6,2)
 PROJECTSTATUS                             NOT NULL CHAR(1)
 RESOURCEQUANTITY                          NOT NULL NUMBER(5,2)

SQL> DESC projectskills;
 Name                                      Null?    Type
 ----------------------------------------- -------- ----------------------------
 PROJECTID                                 NOT NULL NUMBER(6)
 SKILLCODE                                 NOT NULL VARCHAR2(10)

SQL> DESC projectresources;
 Name                                      Null?    Type
 ----------------------------------------- -------- ----------------------------
 PROJECTID                                 NOT NULL NUMBER(6)
 RESOURCEID                                NOT NULL NUMBER(6)
 STARTDATE                                 NOT NULL DATE
 FINISHDATE                                NOT NULL DATE
```

Index Definitions

```
SQL> SET LINESIZE 80
SQL> SET PAGESIZE 25
SQL> TTITLE 'INDEX LISTING' SKIP 2
SQL> BREAK ON "TABLE NAME" SKIP 1
SQL> SELECT SUBSTR(TABLE_NAME,1,25) AS "TABLE NAME", SUBSTR(COLUMN_NAME,1,25) AS
"COLUMN_NAME",
  2    SUBSTR(INDEX_NAME,1,25) AS "INDEX NAME"
  3  FROM USER_IND_COLUMNS
  4  GROUP BY TABLE_NAME, COLUMN_NAME, INDEX_NAME
  5  ORDER BY TABLE_NAME, COLUMN_NAME, INDEX_NAME;

INDEX LISTING

TABLE NAME                COLUMN_NAME               INDEX NAME
------------------------- ------------------------- -------------------------
ACCTMANAGER               AMID                      SYS_C00149622

ACCTMANAGER2              AMID                      ACCTMANAGER2_AMID_PK

BOOKS                     ISBN                      SYS_C00149618

CUSTOMERS                 CUSTID                    CUSTOMERS_CUSTID_PK

HOMEWORK                  COLA                      HOMEWORK_PK
                          COLF                      HOMEWORK_COLF_UK

PROJECTRESOURCES          PROJECTID                 PRJRES_PROJIDRESOURCEID_P
                          RESOURCEID                PRJRES_PROJIDRESOURCEID_P

PROJECTS                  PROJECTID                 PROJECTS_PROJECTID_PK

PROJECTSKILLS             PROJECTID                 PROJSKILLS_PROJIDSKILLCOD
                          SKILLCODE                 PROJSKILLS_PROJIDSKILLCOD

PUBLISHER                 PUBID                     SYS_C00149617

INDEX LISTING

TABLE NAME                COLUMN_NAME               INDEX NAME
------------------------- ------------------------- -------------------------

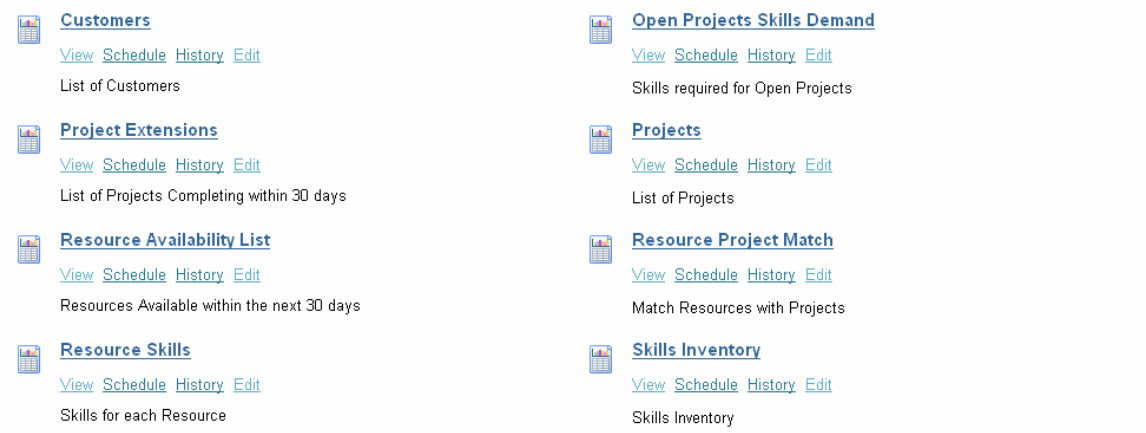
RESOURCES                 RESOURCEID                RESOURCES_RESOURCEID_PK

RESOURCESKILLS            RESOURCEID                RESOURCESKILLS_RESIDSKLCD
                          SKILLCODE                 RESOURCESKILLS_RESIDSKLCD

SKILLS                    SKILLCODE                 SKILLS_SKILLCODE_PK
```

Appendix B: REPORTS

Portal View



Customer List

```
SELECT
c.custname,
c.custid,
p.projectid,
p.description,
DECODE(p.projectstatus, 'A', 'Awaiting',
'N','New','T','Stopped','S','Staffed','U','Unstaffed','F','Finished', 'L','Lost')
projstatus,
p.resourcequantity,
p.startdate,
p.finishdate,
p.billrate
FROM (rutadm.customers c LEFT OUTER JOIN rutadm.projects p ON p.custid = c.custid)
ORDER BY c.custname, p.startdate
```

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Customer Listing

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Page 1

Echostar Communications

Project Id	Description	Start Date	Finish Date	Status	Quantity	Bill Rate
4	PeopleSoft Financials Upgrade	Sep 1, 2006	Dec 31, 2006	Awaiting	2	100.00

ICG Communications

Project Id	Description	Start Date	Finish Date	Status	Quantity	Bill Rate
8	Oracle Database Tuning	Dec 1, 2005	Mar 1, 2006	Finished	1	95.00
7	Oracle Applications GL Batch Interface	Aug 1, 2006	Sep 30, 2006	Lost	1	95.00

Level 3 Communications

Project Id	Description	Start Date	Finish Date	Status	Quantity	Bill Rate
6	Oracle Applications Upgrade	Jul 1, 2006	Jun 30, 2007	Unstaffed	1	90.00

Qwest Communications

Project Id	Description	Start Date	Finish Date	Status	Quantity	Bill Rate
1	Custom Recruiting Page	Jul 1, 2005	Jun 30, 2006	Staffed	2	110.00
3	PeopleSoft HRMS Upgrade	Aug 1, 2006	Dec 31, 2006	Awaiting	5	100.00
2	Custom Emergency Contact Page	Oct 1, 2006	Dec 31, 2006	New	2	100.00

Time Warner Telecom

Project Id	Description	Start Date	Finish Date	Status	Quantity	Bill Rate
9	Java Time Entry Module	Jun 1, 2006	Jun 1, 2007	Stopped	1	95.00
5	PeopleSoft CRM Upgrade	Sep 15, 2006	Dec 31, 2006	Awaiting	2	100.00

Project List

```
SELECT
p.projectid,
p.description,
p.startdate,
p.finishdate,
p.billrate,
DECODE(p.projectstatus,
       'A', 'Awaiting',
       'N','New',
       'T','Stopped',
       'S','Staffed',
       'U','Unstaffed',
       'F','Finished',
       'L','Lost')
       proj_stat,
p.resourcequantity
FROM RUTADM.projects p
ORDER BY proj_stat
```

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Project Listing

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Page 1

Project Id	Description	Start Date	Finish Date	Bill Rate	Status	Quantity
5	PeopleSoft CRM Upgrade	Sep 15, 2006	Dec 31, 2006	100.00	Awaiting	2
4	PeopleSoft Financials Upgrade	Sep 1, 2006	Dec 31, 2006	100.00	Awaiting	2
3	PeopleSoft HRMS Upgrade	Aug 1, 2006	Dec 31, 2006	100.00	Awaiting	5
8	Oracle Database Tuning	Dec 1, 2005	Mar 1, 2006	95.00	Finished	1
7	Oracle Applications GL Batch Interface	Aug 1, 2006	Sep 30, 2006	95.00	Lost	1
11	Order Capture Upgrade	Dec 26, 2006	Apr 28, 2007	150.00	New	10
2	Custom Emergency Contact Page	Oct 1, 2006	Dec 31, 2006	100.00	New	2
1	Custom Recruiting Page	Jul 1, 2005	Jun 30, 2006	110.00	Staffed	2
9	Java Time Entry Module	Jun 1, 2006	Jun 1, 2007	95.00	Stopped	1
6	Oracle Applications Upgrade	Jul 1, 2006	Jun 30, 2007	90.00	Unstaffed	1

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Resource Skills

```
SELECT
r.resourceid,
r.resourcename,
r.payrate,
s.description skillname,
rs.startdate skillstart
FROM rutadm.resources r
       JOIN rutadm.resourceskills rs ON r.resourceid = rs.resourceid
       JOIN rutadm.skills s ON s.skillcode = rs.skillcode
```

VELOCITY Systems LLC

Resource Skills List

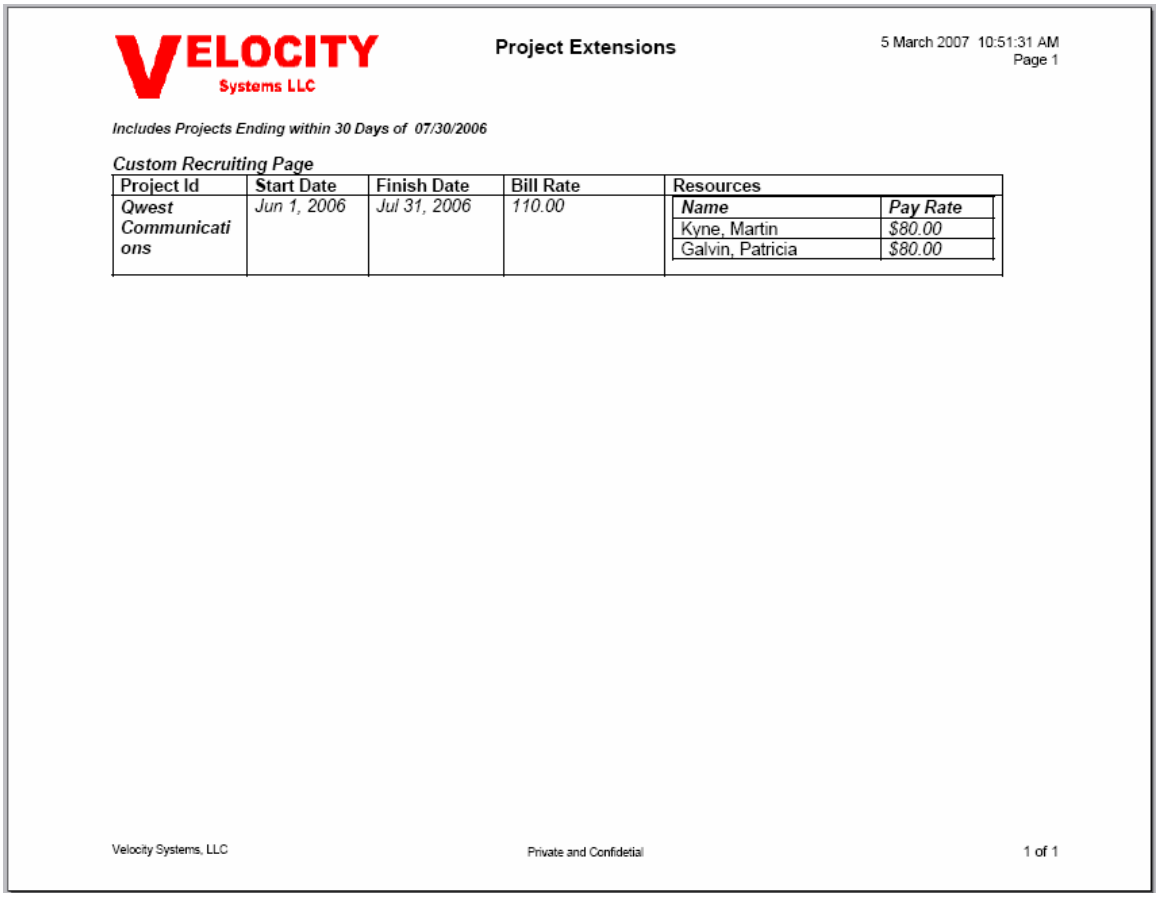
5 March 2007 10:48:33 AM
Page 1

Resource Name	Pay Rate	Skill	Start Date
Kyne, Martin	*$80.00*	PeopleSoft PeopleTools Developer	Nov 1, 1994
		PeopeSoft HRMS Functional Lead	Jul 1, 1998
		PeopleSoft Integration Architect	Jul 1, 1998
		PeopeSoft CRM Functional Lead	Dec 1, 2004
		PeopeSoft Financials Functional Lead	Jul 1, 1997
Mamunes, Mark	*$75.00*	Oracle DBA	Sep 1, 2004
		PeopleSoft PeopleTools Developer	Dec 1, 2004
Holmes, Catherine	*$85.00*	Oracle DBA	Sep 1, 2000
An, Phi	*$80.00*	Java Programmer	Dec 1, 2000
		Java Architect	Sep 1, 2004
		Oracle DBA	Dec 26, 2006
Tomlinson, Matt	*$90.00*	PeopleSoft PeopleTools Developer	Dec 1, 1995
		Oracle DBA	Mar 1, 1995
		PeopeSoft HRMS Functional Lead	Sep 1, 1998
Galvin, Patricia	*$80.00*	PeopeSoft HRMS Functional Lead	Sep 1, 1995
Egan, Patrick	*$85.00*	PeopleSoft PeopleTools Developer	Sep 1, 1996
		PeopeSoft HRMS Functional Lead	Sep 1, 1997
		PeopeSoft Financials Functional Lead	Jul 1, 2000
Wenaas, Mark	*$90.00*	PeopeSoft Financials Functional Lead	Jul 1, 1996

Velocity Systems, LLC Private and Confidetial 1 of 2

Project Extension Report

```
SELECT
:P_DATE AS PDATE,
to_date(:P_DATE,'MM/DD/YYYY') AS PORADATE,
c.custname,
p.projectid,
p.description,
r.resourceid,
r.resourcename,
p.billrate,
r.payrate,
pr.startdate,
pr.finishdate
FROM
        rutadm.customers c
        JOIN rutadm.projects p ON c.custid = p.projectid
        JOIN rutadm.projectresources pr ON pr.projectid = p.projectid
        JOIN rutadm.resources r ON r.resourceid = pr.resourceid
WHERE
        pr.finishdate >=  to_date(:P_DATE,'MM/DD/YYYY')
AND     pr.finishdate <= to_date(:P_DATE,'MM/DD/YYYY') + 30
AND     p.projectstatus = 'S'
```



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Project Extensions

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Includes Projects Ending within 30 Days of 07/30/2006

Custom Recruiting Page

Project Id	Start Date	Finish Date	Bill Rate	Resources	
Qwest Communications	*Jun 1, 2006*	*Jul 31, 2006*	*110.00*	***Name***	***Pay Rate***
				Kyne, Martin	*$80.00*
				Galvin, Patricia	*$80.00*

Velocity Systems, LLC Private and Confidetial 1 of 1

Open Project Skills Demand List

```
SELECT
p.projectid,
p.description,
p.startdate,
p.finishdate,
ps.skillcode,
s.description skilldescr
FROM rutadm.projects p
       JOIN rutadm.projectskills ps ON ps.projectid = p.projectid
       JOIN rutadm.skills s ON s.skillcode = ps.skillcode
where
       p.projectstatus in ('A','N')
ORDER BY  p.startdate
```

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Open Projects Skills Demand

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Project Id	Description	Start Date	Finish Date	
3	***PeopleSoft HRMS Upgrade***	*Aug 1, 2006*	*Dec 31, 2006*	**Skills** PeopleSoft PeopleTools Developer PeopeSoft HRMS Functional Lead Oracle DBA Java Programmer
4	***PeopleSoft Financials Upgrade***	*Sep 1, 2006*	*Dec 31, 2006*	**Skills** PeopeSoft Financials Functional Lead PeopleSoft PeopleTools Developer Oracle DBA
5	***PeopleSoft CRM Upgrade***	*Sep 15, 2006*	*Dec 31, 2006*	**Skills** PeopleSoft PeopleTools Developer PeopeSoft CRM Functional Lead Oracle DBA
2	***Custom Emergency Contact Page***	*Oct 1, 2006*	*Dec 31, 2006*	**Skills** PeopleSoft PeopleTools Developer Java Programmer PeopeSoft HRMS Functional Lead

Velocity Systems, LLC Private and Confidetial 1 of 1

30 Day Resource Availability List

```
SELECT
:P_AVAILABLE_DATE AS AVAILABLE_DATE_IN,
r.resourceid,
r.resourcename,
pr.finishdate,
rs.skillcode,
s.description
FROM
       rutadm.resources r
       JOIN rutadm.projectresources pr ON pr.resourceid = r.resourceid
       JOIN rutadm.resourceskills rs ON rs.resourceid = r.resourceid
       JOIN rutadm.skills s ON s.skillcode = rs.skillcode
Where
     pr.finishdate <=  (to_date(:P_AVAILABLE_DATE,'MM/DD/YYYY') + 30)
and not exists (SELECT 1 FROM rutadm.projectresources
                      where resourceid = r.resourceid
                      and startdate > pr.startdate)
and (r.termdate > (to_date(:P_AVAILABLE_DATE,'MM/DD/YYYY') + 30) or r.termdate is null)
and r.startdate < (to_date(:P_AVAILABLE_DATE,'MM/DD/YYYY') + 30)
UNION
SELECT
:P_AVAILABLE_DATE AS AVAILABLE_DATE_IN,
r.resourceid,
r.resourcename,
r.startdate,
rs.skillcode,
s.description
FROM
       rutadm.resources r
       JOIN rutadm.resourceskills rs ON rs.resourceid = r.resourceid
       JOIN rutadm.skills s ON s.skillcode = rs.skillcode
WHERE
       r.resourceid = rs.resourceid
and not exists (SELECT 1 FROM rutadm.projectresources
                      where resourceid = r.resourceid)
and (r.termdate > (to_date(:P_AVAILABLE_DATE,'MM/DD/YYYY') + 30) or r.termdate is null)
and r.startdate < (to_date(:P_AVAILABLE_DATE,'MM/DD/YYYY') + 30)
```

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Resource Available List

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Includes Resources Available within 30 Days of 07/30/2006

Resource Name	Finish Date	Skill
Kyne, Martin	*Jul 31, 2006*	PeopeSoft CRM Functional Lead PeopeSoft Financials Functional Lead PeopeSoft HRMS Functional Lead PeopleSoft Integration Architect PeopleSoft PeopleTools Developer
Mamunes, Mark	*Nov 1, 2004*	Oracle DBA PeopleSoft PeopleTools Developer
Wenaas, Mark	*Jul 15, 2006*	PeopeSoft Financials Functional Lead

Resource Project Match

```
SELECT
p.projectid ,
p.description,
r.resourceid,
r.resourcename,
sum(rs.score) score
FROM rutadm.projects p,
-- This SELECT acts like a table and returns
     --  Resources scored with eligibility
(
SELECT rs.projectid, rs.resourceid, sum(rs.score) score, sum(rs.dateeligible),
sum(rs.skillseligible),
sum(rs.payeligible)
From
-- Resources available for the project
(SELECT projectid,resourceid, 'Available' Category, 1000 score , 1 dateeligible, 0
skillseligible, 0 payeligible
 FROM rutadm.resources r,
  rutadm.projects p
where (termdate is null
 or termdate > p.finishdate)
 and p.projectstatus in ('A','N')
 and not exists
 (SELECT 1 FROM rutadm.projectresources
 where finishdate > p.startdate
 and resourceid = r.resourceid)
Union
-- Resources with any of the Skills for the project
(SELECT projectid, resourceid, 'Skills', 100 score , 0, 1, 0
  FROM rutadm.resourceskills rs,
 rutadm.projects p
 where p.projectstatus in ('A','N')
 and rs.skillcode in
  (SELECT skillcode
   FROM rutadm.projectskills
  where projectid = p.projectid))
Union
-- Resources with Payrate < Bill Rate
(SELECT projectid, resourceid, 'Rate', (billrate-payrate) * 10 score , 0, 0, 1
  FROM rutadm.resources r,
  rutadm.projects p
 where r.payrate < p.billrate
 and p.projectstatus in ('A','N'))
) rs
group by rs.projectid, rs.resourceid
having sum(rs.dateeligible) > 0 and
       sum(rs.skillseligible) > 0 and
       sum(rs.payeligible) > 0
) rs,
rutadm.resources r
where r.resourceid = rs.resourceid
and p.projectid = rs.projectid
group by p.projectid ,
p.description,
r.resourceid,
r.resourcename
ORDER BY 1, 5 desc, 3
```

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Resource Project Match

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Project Id	Project Name	Resource Name	Score
2	*Custom Emergency Contact Page*	Mamunes, Mark	1,350
		Kyne, Martin	1,300
		Galvin, Patricia	1,300
3	*PeopleSoft HRMS Upgrade*	Resource Name	Score
		Mamunes, Mark	1,350
		Kyne, Martin	1,300
		Galvin, Patricia	1,300
4	*PeopleSoft Financials Upgrade*	Resource Name	Score
		Mamunes, Mark	1,350
		Kyne, Martin	1,300
		Wenaas, Mark	1,200
5	*PeopleSoft CRM Upgrade*	Resource Name	Score
		Mamunes, Mark	1,350
		Kyne, Martin	1,300

Skills Inventory

```
SELECT
s.skillcode,
s.description,
DECODE (r.resourcename,null,'No Resources have this skill', r.resourcename) resourcename
FROM rutadm.skills s
       LEFT OUTER JOIN resourceskills rs ON rs.skillcode = s.skillcode
       LEFT OUTER JOIN resources r ON rs.resourceid= r.resourceid
ORDER BY skillcode
```

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Skills Inventory

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Skill Code	Description	
CPROG	*C Programmer*	**Resource Name** No Resources have this skill
JAVAARCH	*Java Architect*	**Resource Name** An, Phi
JAVAPROG	*Java Programmer*	**Resource Name** An, Phi
ORAAPPSDV	*Oracle Applications Developer*	**Resource Name** No Resources have this skill
ORAAPPSFN	*Oracle Applications Functional*	**Resource Name** No Resources have this skill
ORADBA	*Oracle DBA*	**Resource Name** Holmes, Catherine Tomlinson, Matt An, Phi Mamunes, Mark
PPLCRM	*PeopeSoft CRM Functional Lead*	**Resource Name** Kyne, Martin

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