

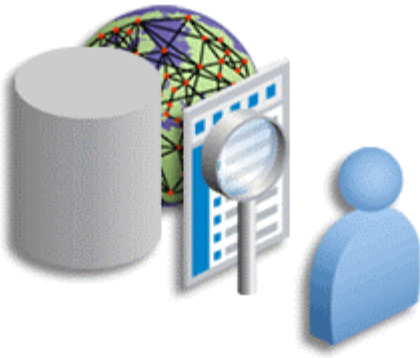
Reporting Against the Warehouse Builder Repository

*An Oracle White Paper
June 2006*

Reporting Against the Warehouse Builder Repository

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Reporting Against the Warehouse Builder Repository



EXECUTIVE OVERVIEW

The typical focus during a data warehouse project is providing information to the business community. However, during the development of a data warehouse solution a large number of people need to have access to key information regarding the metadata within the warehouse repository. This need for information continues even after the data warehouse has moved into production.

There are many teams involved in the development and maintenance of a data warehouse, from database administrators through to business users. The difficulty for many projects is ensuring effective communication of data and metadata related information across all these disparate groups of people. This communication process is usually complicated, as each group wants to access the information they need using their own preferred tools.

A typical data warehouse project collects and maintains an enormous amount of information as the proposed schema is developed and deployed. In an ideal world all the information, relating to the whole project and the data warehouse life cycle, would be stored in a centralized repository. This centralization repository should support open APIs to allow query tools and desktop applications to query and report on the information and metadata contained within the repository.

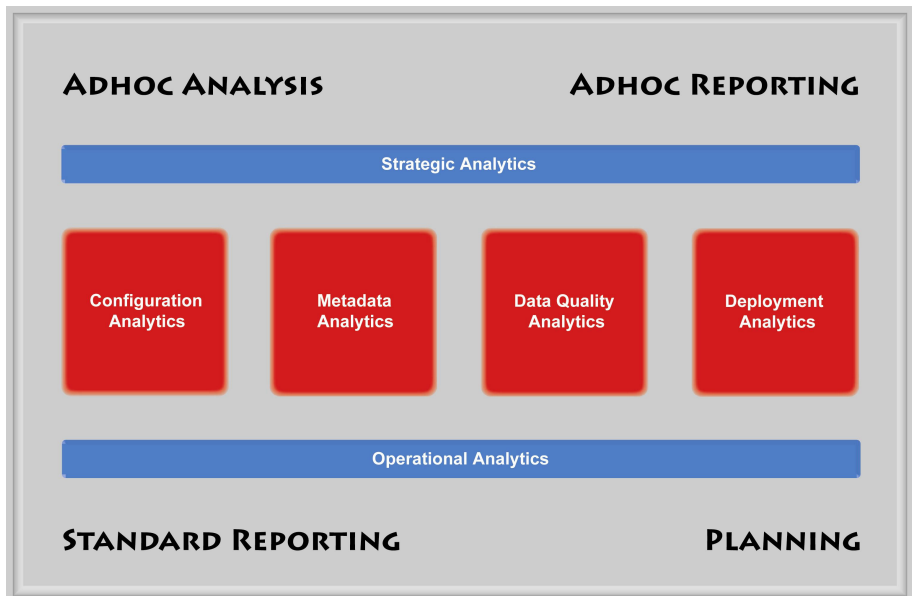
Only Oracle Warehouse Builder 10g Release 2 is able to provide a comprehensive set of public views that allow all aspects of a data warehouse project to be monitored at both operational and strategic levels. This provides everyone within a data warehouse project, access to all key information relating to the status of objects within the repository in a controlled, secure and timely manner using their reporting tool of choice.

INTRODUCTION

Within a data warehouse project an enormous amount of information is collected and stored within the Warehouse Builder repository. With Warehouse Builder 10g Release 2 and the new features associated with this release, the amount of information recorded within the repository has increased further. Warehouse Builder 10g Release 2 provides public views that expose key parts of the design repository and the run time deployment environments as well as more basic information relating to installation and configuration details. These public views can be divided into four basic categories:

- Configuration Analytics
- Metadata Analytics
- Data Quality and Rules Analytics
- Deployment and Execution Analytics.

The Analysis and reporting across these four categories can be divided into either static point in time analysis (operational analytics) or more sophisticated time based reporting (strategic analytics). The Warehouse Builder public views are able to support both types of analysis.



WAREHOUSE BUILDER OPERATIONAL ANALYTICS

Operational Analytics refers to reports that are typically run and used by the technical people within a data warehouse project, such as DBAs and ETL Developers. The information contained within these reports is normally static and focused on a single or fixed point in time.

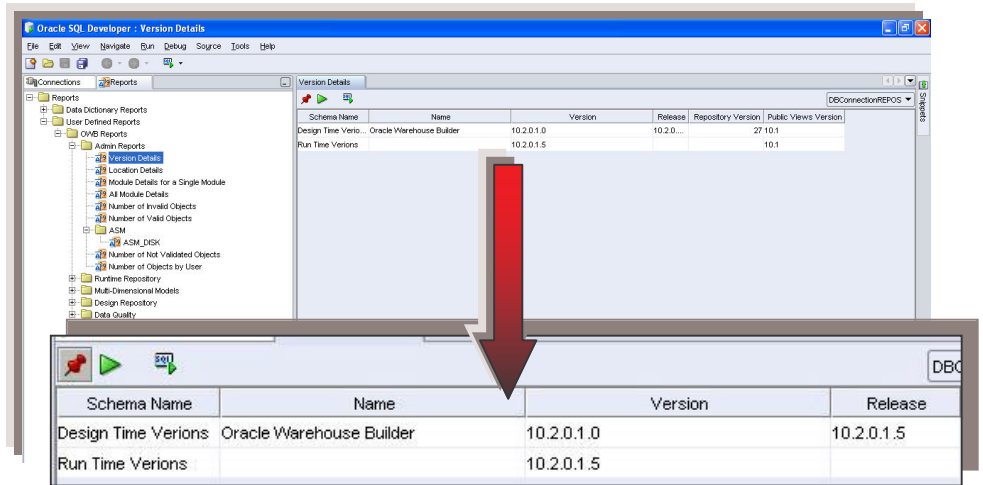
The public views that support operational analytics also provide details relating to installation and configuration information for the design and deployment environments. These views can be used to provide standard reporting as well as simple adhoc query and reporting.

Standard Reporting

Standard reporting is focused on the environment supporting the design and deployment of the data warehouse including the Warehouse Builder software. Each report is static in nature and provides data as of a specific point in time, normally when the report was run. Typically, these types of reports would have a more DBA focus and provide information on topics such as:

- Version details
- List of registered locations
- Number of invalid objects in the repository
- Number of valid objects in the repository
- Size of the target repository
- Control Center details
- Execution results

SQL Developer is ideally suited to creating and delivering standard operational reports that monitor both design and deployment environments. SQL Developer users can quickly and easily create reports against the Warehouse Builder public views and store these in a report library. For example a DBA might need to check the version details relating to a specific Warehouse Builder installation. This can be done very easily as shown below:



This report was created using the following SQL query:

```

SELECT 'Design Time Verions' AS "Schema Name"
, installation_name AS "Name"
, installed_version AS "Version"
, release AS "Release"
, repository_model_version AS "Repository_Version"
, public_view_version AS "Public Views Version"
FROM all_iv_installations
UNION
SELECT 'Run Time Verions' AS "Schema Name"
, installation_name AS "Name"
, installed_version AS "Version"
, release AS "Release"
, null AS "RepositoryVersion"
, public_view_version AS "Public Views Version"
FROM all_rt_installations
ORDER BY "Schema Name", "Name", "Version"

```

These queries can be collected and managed within folders to provide a structured overview of the design repository and the status of deployment and executions within the various target schemas.

Adhoc Reporting

Operational adhoc reporting is usually provided by reports that allow users to drill through layers of data in a “master-detail” approach. However, these types of reports are still typically focused on a specific point in time. This type of reporting against the Warehouse Builder public views can easily be provided using the Repository Browser, which is installed as part of the normal Warehouse Builder 10g Release 2 installation process.

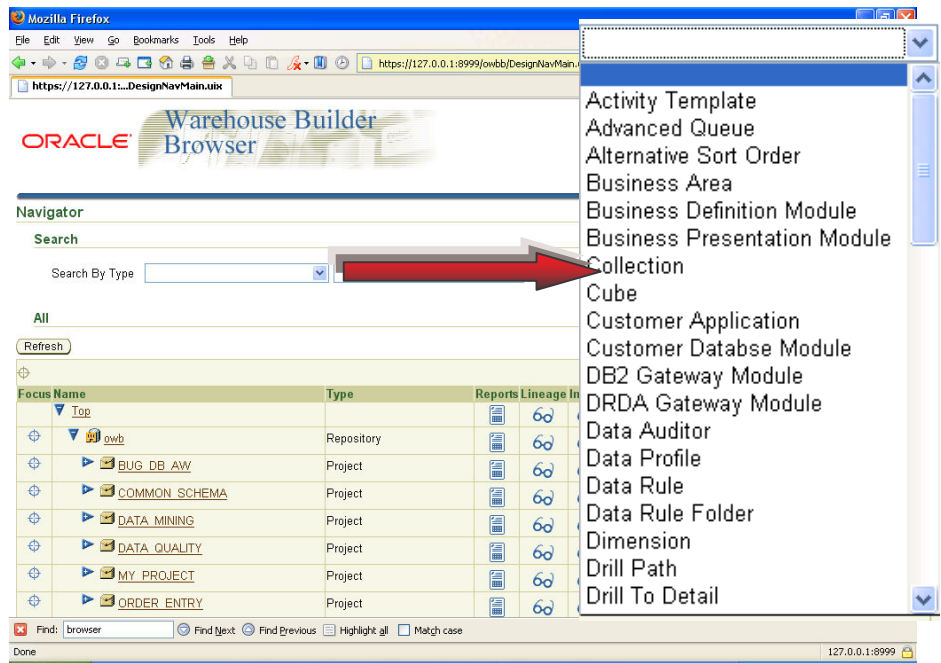
The Warehouse Builder Repository Browser allows users to select a report type:

- Design Repository Reports
 - Provides a list of reports on the metadata stored in the design repository with drill-to-detail links embedded within many reports
- Control Center Reports
 - Provides reports on deployment and execution metadata with the ability to drill into detailed reports to show execution errors and/or warnings.

The startup login page allows users to select the report type via a simple radio button at the bottom of the page as shown below.

Username:
 Password:
 Specify the host address, port number, and service name
 Host Address:
 Host Port Number:
 Host Service Name:
 Specify the net service name
 Net Service Name:
Reports Design Repository Control Center

Design Center reports provide access to all project related metadata. Information can be viewed within the context of a specific a project, or alternatively it is possible to view a specific type of object across all projects. A search facility is provided to allow quick access to a specific piece of metadata as shown below.



Each report provides drillable links that provide more focused information about the selected object. For each project the following reports are provided:

- Detailed Project Report
- Advanced Queue Summary Report
- Collection Summary Report
- Cube Summary Report
- Data Profile Summary Report
- Dimension Summary Report
- External Table Summary Report
- File Summary Report
- Package Summary Report
- Function Summary Report
- Materialized View Summary Report
- Nested Table Summary Report
- Object Type Summary Report
- Pluggable Mapping Summary Report
- Procedure Summary Report
- Process Flow Summary Report

- Sequence Summary Report
- Table Function Summary Report
- Table Summary Report
- Mapping Summary Report
- Varray Summary Report
- View Summary Report

Each report provides drillable links that navigate to greater detail related to the selected object as shown below.

The screenshot displays the Oracle Warehouse Builder Browser interface. On the left, a 'Navigator' pane shows a tree view of objects under 'COMMON_SCHEMA'. A red arrow points from the 'SALE_ANALYSIS' object in this list to the 'Properties' pane on the right. The 'Properties' pane shows details for 'SALE_ANALYSIS : Properties', including Module, Business Name, Application Type, System Type, Version Label, Vendor, Integrator to access the data source, Status, Validation Status, Created Date, Updated Date, and Created By. A second red arrow points from the 'Properties' pane to a 'Detailed Project Report' table below.

Objects List:

Object Name	Type	Reports	Lineage	Impact
COMMON_SCHEMA	Project			
SALE_ANALYSIS	Business Definition Module			
CHANNELS	Data Profile Module			
COMMON_SCHEMA_PF	Data Profile Module			
CUSTOMERS	Data Profile Module			
DERIVED_DATA_RULES	Data Rule Folder			
CS_SOURCE	Oracle Module			
CS_TARGET	Oracle Module			
COMMON_SCHEMA_PF	Process Flow Module			
DIMENSION_BUILDS	Schedule Module			

SALE_ANALYSIS : Properties

- Module: SALE_ANALYSIS
- Business Name: SALE_ANALYSIS
- Application Type: Oracle Discoverer Application
- System Type: Oracle Discoverer SI
- Version Label: 23856
- Vendor: Oracle
- Integrator to access the data source: Oracle OWB Integrator for Discoverer 3.0
- Status: Development
- Validation Status: Not Validated
- Created Date: 2006-03-28 14:34:28.0
- Updated Date: 2006-03-28 14:34:29.0
- Created By: OWB

Detailed Project Report

Business Name	Physical Name	Validity	Description	Created On	Updated On
COMMON_SCHEMA	COMMON_SCHEMA	Unknown	New 10gR2 Common Schema	2006-03-28 14:32:19	2006-03-28 14:32:19

Module Name	Module Type	Module Id	Database Link	Description	Created On
CHANNELS	DataProfile	237501			2006-04-19 15:00
COMMON_SCHEMA_PF	DataProfile	40980			2006-03-28 14:34
COMMON_SCHEMA_PF	ProcessModule	57727		Common Schema Process Flow	2006-03-28 14:34
CS_SOURCE	DataWarehouse	20141	owb_202	Source data for Common Schema	2006-03-28 14:34
CS_TARGET	DataWarehouse	20992		Common Schema Target	2006-03-28 14:34
CUSTOMERS	DataProfile	232000			2006-04-19 14:00
DERIVED_DATA_RULES	DataRuleModule	57636			2006-03-28 14:34
DIMENSION_BUILDS	ScheduleModule	20127			2006-03-28 14:34
SALE_ANALYSIS	BusinessDefinitionModule	57715		Sales Analysis	2006-03-28 14:34

The Control Center reports provide detailed information about deployment and execution of scripts and data loaded during execution. A complete library of reports is provided that can be used to quickly and easily monitor all information relating to a specific Control Center.

ORACLE Warehouse Builder Browser

Reports

Deployment

- [Deployment Schedule Report](#) - to display details of all deployments in time order
- [Object Summary Report](#) - to list all objects with details of their latest deployment
- [Locations Report](#) - to show all locations into which objects have been deployed


Execution

- [Execution Schedule Report](#) - to display details of all execution jobs in time order
- [Execution Summary Report](#) - to list all executable objects with details of their latest execution job

Management

- [Service Node Report](#) - to display and manage service node information for the RAC system

Related Links

-  [Design Repository : Navigator](#)

Operational Data Quality Analytics with Application Express Sample

In addition to the generic Design and Control Center reports, Oracle Warehouse Builder 10g Release 2 also provides an Application Express sample application that is focused exclusively on Data Quality analytics. This application makes Oracle Warehouse Builder Data Profiling functionalities available to users who can not have, or do not want to have, the Warehouse Builder Client installed. Instead, such users can view the data profiling statistics using an Oracle Application Express application that run from a web browser. The user interface of this application and the overall user experience resembles Warehouse Builder's Data Profiling Manager as closely as possible.

Data Warehouse Developers can use this sample to work directly with business users and focus specifically on issues relating to data quality. In fact this application can be used by Business Users to continually monitor the quality of the data being fed into their data warehouse and take ownership for resolving quality related issues.

The screenshot displays the Oracle Warehouse Builder 10g Data Type analysis results for the CHANNELS table. The interface includes a navigation menu at the top with options like Data Profile, Profile Object, Aggregation, Data Type, Pattern, Domain, Unique Key, Functional Dependency, Referential, and Data Rule. The main area shows the Profile Results Canvas for CHANNELS, which has 6 columns and 5 rows. Below this is the Data Drill Panel, which shows drill results for the CHANNEL_CLASS column, with a table of distinct values.

Columns	Documented Datatype	Dominant Datatype	% Dominant Datatype	Documented Length	Minimum Length	Maximum Length	Dominant Length	% Dominant Length	Documented Precision	Minimum Precision
CHANNEL_CLASS	VARCHAR2	VARCHAR2	100%	20	6	8	6	60%	0	0
CHANNEL_CLASS	VARCHAR2	VARCHAR2	100%	20	6	8	6	60%	0	0
CHANNEL_CLASS	VARCHAR2	VARCHAR2	100%	20	6	8	6	60%	0	0

CHANNEL_CLASS	# Rows	% of rows
1 Direct	2	40%
2 Others	1	20%
3 Indirect	2	40%

WAREHOUSE BUILDER STRATEGIC ANALYTICS

The next step is move from basic operational reporting to more strategic reporting that allows the data warehouse team to create and manage more sophisticated analytics. By using the public repository views that are provided with the Warehouse Builder repository, it is possible to create a strategic OWB data warehouse that includes both predictive analytics and multi-dimensional models to enhance the metadata and related information contained within the repository. The project data warehouse allows a number of key questions to be asked, such as:

- Which mapping is taking the most time to run
- Which mapping has the fastest growing execution time
- What table has the fastest growing number of new records
- In six months time, how long will it take update table 'X'
- Which table/column has the lowest six sigma compliance
- How has six sigma compliance changed over time

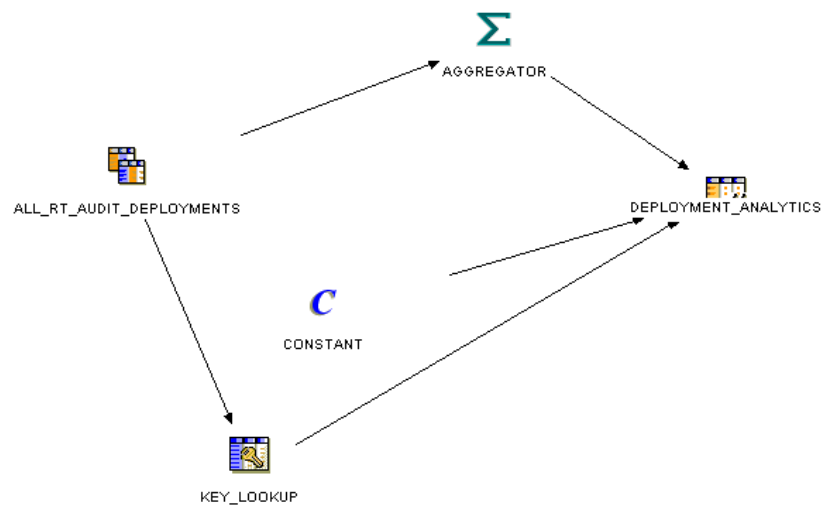
Reporting against the public views can be based on direct access to the views and using the aggregation and summary capabilities of the selected query tool. Alternatively, these types of questions could be easily be answer by using the multi-dimensional modeling features of Warehouse Builder 10g Release 2. The metadata information from the public views could be loaded on a regular basis into multi-

dimensional subject specific cubes. These could be grouped into the following subject areas:

- Metadata
- Data Quality
- Deployments and Executions

For each of these subject areas a number of facts could be collected at specific points in time and aggregated over a conformant time dimension. For example for Deployments and Executions the following measures could be recorded:

- Number of records selected
- Number of records inserted
- Number of records merged
- Number of records updated
- Number of records deleted
- Number of records discarded
- Number of records corrected
- Number of task errors
- Number of task warnings
- Start Time
- End Time
- Duration

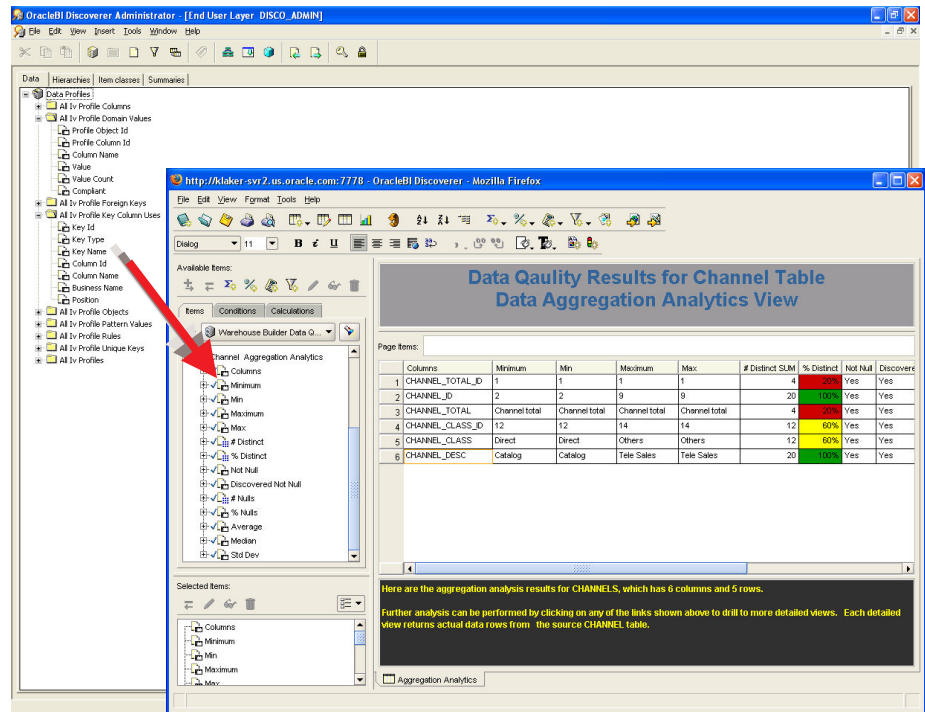


As part of the data loading process Warehouse Builder 10g Release 2 allows ETL modelers to automatically add additional supporting features such as forecasting and time based analytics. Once the data has been loaded, the OWB data warehouse could be queried using Oracle Business Intelligence 10g.

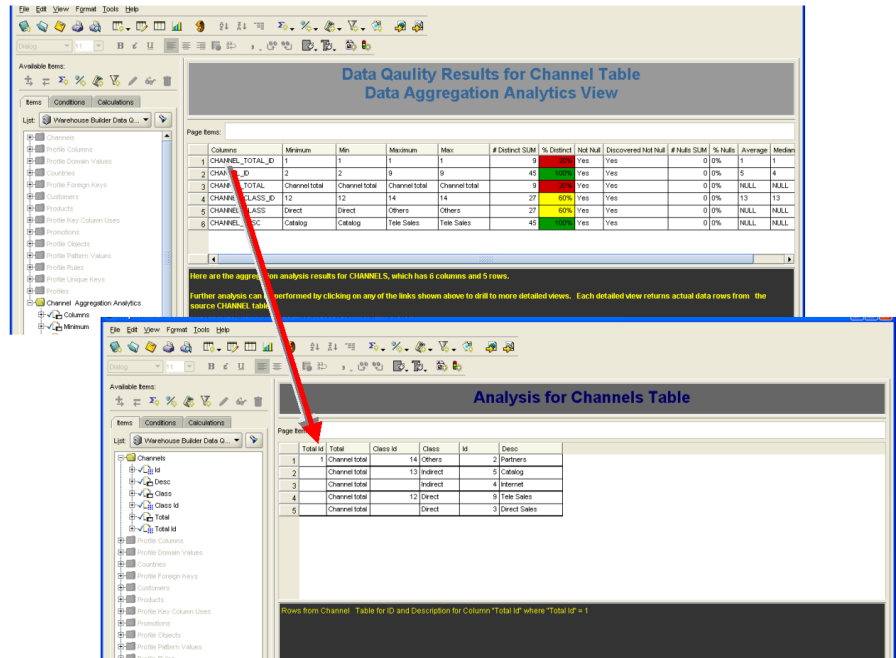
Adhoc Query and Analysis

Oracle Business Intelligence Discoverer 10g provides an intuitive ad-hoc query, reporting, analysis, and Web-publishing environment that can provide the data warehouse project team, including business users, with the power to gain immediate access to information.

Discoverer can be connected directly to the Warehouse Builder 10g Release 2 public views using the Discoverer Administrator. This allows report developers to create specific reports for their project and business users.



Using Discoverer Plus to create reports allows more powerful project related reporting by using features such as color-coding to highlight important facts within a report.



Using Discoverer 10g it is possible to use the public views to create a similar set of reports that power the Data Quality Application Express sample application as an alternative view of this data. Using Discoverer's drill-to detail capabilities within the BI reports users can directly access detailed reports that explain the quality of data within a report.

Planning and Analysis

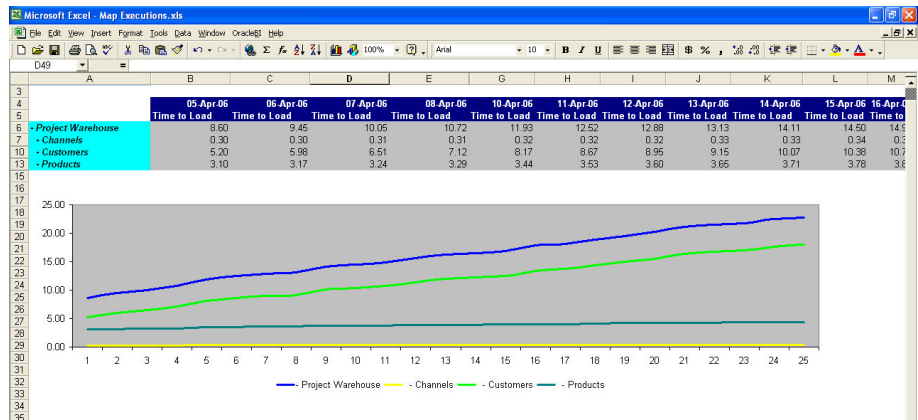
Planning and analysis takes adhoc query and reporting to the next level by allowing for more complex analytics. By extending the normal relational query model based directly against the public views and adding multi-dimensional models, sophisticated questions can be phrased. For example by loading data into a multi-dimensional model the following measures could be added using Warehouse Builder:

- Forecast
 - Best Fit
 - Exponential
 - Linear
 - Non-Linear
 - Seasonal
 - Trend
- Share
- Rank
- Prior Period Growth
- Prior Period % Growth

- Prior Year Growth
- Prior Year % Growth
- Year to Date

The latest release of Oracle Business Intelligence Discoverer 10g offers exciting new functionality, including an integrated reporting and analysis interface for relational and multi-dimensional (OLAP) data.

Oracle Business Intelligence 10g provides direct access to OLAP dimensional cubes using a number of tools such as the Oracle OLAP Spreadsheet Addin. By using OLAP in conjunction with Microsoft Excel, business users and technical developers CAN perform what-if analysis relating to areas such as deployment and execution information. Using the OLAP features such as forecasting, estimates can be made of the amount of time needed to refresh the data warehouse based on expected/predicted growth in data volumes and corresponding load times. This type of analysis can help with planning future capacity requirements and highlight possible conflicts with exiting load windows.



CONCLUSION

The typical focus during a data warehouse project is providing information to the business community. However, during the development of a data warehouse solution a large number of people need to have access to key information regarding the metadata within the warehouse repository. This need for information continues even after the data warehouse has moved into production.

The public views that support the Warehouse Builder 10g Release 2 provide access to the key metadata subject areas such as:

- Configuration and Installation
- Metadata
- Data Quality
- Deployment and Execution

Probably the most important subject area is data quality and Warehouse Builder ships with a sample Oracle Application Express application sample that shows the power behind the public views.

By using the same methodologies and data modeling techniques data warehouse teams can quickly and easily create a project data warehouse that supports the subject areas listed above and allows both technical and business users to answer typical project related questions:

- Which mapping is taking the most time to run
- Which mapping has the fastest growing execution time
- What table has the fastest growing number of new records
- In six months time, how long will it take update table 'X'
- Which table/column has the lowest six sigma compliance
- How has six sigma compliance changed over time

Only Oracle Warehouse Builder 10g Release 2 is able to provide a comprehensive set of public views that allow all aspects of a data warehouse project to be monitored at both the operational and strategic levels. This provides everyone within a data warehouse project to access information relating to the status of objects within the repository in a controlled and secure manner using their reporting tool of choice.

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BUSINESS INTELLIGENCE