

Quick answers to common problems

# Oracle Business Intelligence 11g R1 Cookbook

Make complex analytical reports simple and deliver valuable business data using OBIEE 11*g* with this comprehensive and practical guide

**Cuneyt Yilmaz** 



# Oracle Business Intelligence 11*g* R1 Cookbook

Make complex analytical reports simple and deliver valuable business data using OBIEE 11g with this comprehensive and practical guide

**Cuneyt Yilmaz** 



BIRMINGHAM - MUMBAI

# Oracle Business Intelligence 11g R1 Cookbook

Copyright © 2013 Packt Publishing

All rights reserved. No part of this book may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, without the prior written permission of the publisher, except in the case of brief quotations embedded in critical articles or reviews.

Every effort has been made in the preparation of this book to ensure the accuracy of the information presented. However, the information contained in this book is sold without warranty, either express or implied. Neither the author, nor Packt Publishing, and its dealers and distributors will be held liable for any damages caused or alleged to be caused directly or indirectly by this book.

Packt Publishing has endeavored to provide trademark information about all of the companies and products mentioned in this book by the appropriate use of capitals. However, Packt Publishing cannot guarantee the accuracy of this information.

First published: June 2013

Production Reference: 1110613

Published by Packt Publishing Ltd. Livery Place 35 Livery Street Birmingham B3 2PB, UK.

ISBN 978-1-84968-600-6

www.packtpub.com

Cover Image by Artie Ng (artherng@yahoo.com.au)

# **Credits**

Author Cuneyt Yilmaz Project Coordinator Joel Goveya

Reviewers Vikas Agrawal Paul S. Bere Raunak T. Jhawar

Acquisition Editor Martin Bell

Lead Technical Editor Neeshma Ramakrishnan

Technical Editor Jeeten Handu

Copy Editor Laxmi Subramanian Proofreaders Lawrence A. Herman Ting Baker

Indexer Rekha Nair

Graphics Ronak Dhruv

Production Coordinator Arvindkumar Gupta

Cover Work Arvindkumar Gupta

# **About the Author**

**Cuneyt Yilmaz** has been working for Bilginc IT Academy since 2001 as a Senior Consultant and Instructor in Turkey and he's passionate about Oracle technologies. He's delivering training for Oracle and Siebel technologies in around 25 countries in the EMEA region. He mostly specializes in Business Intelligence projects.

He is also a regular speaker in Oracle User Group events in Europe; he delivers presentations about Business Intelligence.

I'd like to express my appreciation to my family, my friends, and my colleagues for their great support in writing this book. I'm also grateful to all who gave me the opportunity to write this book.

I hope you enjoy the book and find it a satisfying source.

# **About the Reviewers**

**Vikas Agrawal** is a Business Intelligence evangelist with over 15 years of experience working in multiple industries with clients that include Fortune 500 companies. He has deep expertise and knowledge in the areas of Security, Performance, Enterprise BI Architectures, Oracle BI Applications, OBIEE, Informatica, Oracle Data Integrator, Enterprise Data Warehousing, Master Data Management, and Big Data related technologies.

He has been involved with OBIEE from its early days since Siebel's acquisition of nQuire and now as part of Oracle's line of BI tools. He currently leads the BI practice for a prime Oracle partner and has led implementations that have won the prestigious Titan Award for deployment of OBIEE and Oracle BI Applications. He is also responsible for developing product offerings and building the Oracle BI Applications deployment methodology.

In his spare time, he enjoys learning new technologies, ever-changing social media, and marketing use cases, writing new software that helps customers leverage the most out of their investments, travelling, and spending time with his family.

I would like to thank my wife Padma and son Kunal for their patience and support. Also, Packt Publishing and the author for the opportunity to review their fantastic book.

**Paul S. Bere** is an Oracle Certified Implementation Specialist with over 6 years of experience in OBIEE providing end-to-end business intelligence solutions. His expertise involves working with Business Users, Controllers, Directors, Senior Managers, Executives, Department Heads, and Project Stake Holders. He holds a Bachelor's Degree in Computer Information Technology from Northern Kentucky University.

He is a versatile OBIEE consultant and a computer expert with a myriad of other skills and talents, which include being a soccer referee, a radio host, and a poet. His versatility stems from the development of self-confidence and determination coupled with the grooming of character, constantly refined by good manners, patience, and self-control. He not only believes in intellectual power but also in abiding by the fundamental morals and values of life. He values the discipline to reason sensibly and judge impartially while understanding and respecting others.

Paul is a published author of a poetry book, The Chronicles of Benevolent Affection: A Declaration of Love, Tribulation and Hope.

I would like to thank the author for giving me an opportunity to review this great OBIEE recipe book. I also extend my gratitude and my appreciation to Apollo IT Partners, family, and friends, for their encouragement and support and above all I thank the Almighty Lord for his guidance.

**Raunak T. Jhawar** graduated as a computer science engineer from the University of Pune (Class of 2009). He has over 3 years of working experience with different organizations and clients small, medium, and large. He works as a data warehouse engineer and specializes in BI solutions for ETL, Data reporting, OLAP, and data mining.

Raunak has reviewed two books that were already published by Packt Publications (Microsoft SQL Server 2012 Professional Tips and Tricks, Microsoft SQL Server 2012 Security Cookbook). He often blogs at www.sqlservercentral.com and www.sqlservergeeks.com.

# www.PacktPub.com

## Support files, eBooks, discount offers and more

You might want to visit www.PacktPub.com for support files and downloads related to your book.

Did you know that Packt offers eBook versions of every book published, with PDF and ePub files available? You can upgrade to the eBook version at www.PacktPub.com and as a print book customer, you are entitled to a discount on the eBook copy. Get in touch with us at service@ packtpub.com for more details.

At www.PacktPub.com, you can also read a collection of free technical articles, sign up for a range of free newsletters and receive exclusive discounts and offers on Packt books and eBooks.



http://PacktLib.PacktPub.com

Do you need instant solutions to your IT questions? PacktLib is Packt's online digital book library. Here, you can access, read and search across Packt's entire library of books.

#### Why Subscribe?

- ▶ Fully searchable across every book published by Packt
- Copy and paste, print and bookmark content
- On demand and accessible via web browser

#### **Free Access for Packt account holders**

If you have an account with Packt at www.PacktPub.com, you can use this to access PacktLib today and view nine entirely free books. Simply use your login credentials for immediate access.

#### Instant Updates on New Packt Books

Get notified! Find out when new books are published by following @PacktEnterprise on Twitter, or the *Packt*.

# **Table of Contents**

Preface	1
Chapter 1: Exploring and Building the Repository	7
Introduction	7
Building the Physical layer in the repository	9
Building the Business Model and Mapping layer	15
Adding multiple sources to the logical table source	20
Adding calculations to the fact table	24
Creating variables	30
Building the Presentation layer	35
Validating the repository using Consistency Check Manager	38
Uploading the repository	41
Chapter 2: Working with Logical Dimensions	47
Introduction	47
Creating level-based hierarchies	49
Creating parent-child hierarchies	64
Creating level-based measures	71
Creating shared measures	79
Creating presentation hierarchies	82
Chapter 3: Using Aggregates and the Time Series Functions	91
Introduction	91
Creating aggregate tables	92
Implementing aggregate tables	95
Using the Aggregate Persistence Wizard	108
Creating calculations by using the time series functions	118
Chapter 4: Working with Multidimensional Data Sources	129
Introduction	129
Importing the multidimensional data source	130

Accessing members and member counts	133
Creating the multidimensional Business Model	135
Implementing Horizontal Federation	141
Implementing Vertical Federation	146
Chapter 5: Security in Oracle Bl	153
Introduction	153
Configuring security settings	154
Creating users	157
Creating groups	160
Creating application roles	163
Setting up permissions on repository objects	167
Configuring query limits	172
Specifying the time restrictions	175
Creating data filters	176
Chapter 6: Managing Usage Tracking and Enabling the Cache	181
Introduction	181
Enabling Usage Tracking	182
Creating the Business Model for Usage Tracking	191
Creating dashboards for Usage Statistics	197
Enabling the cache	201
Gathering cache statistics	203
Managing the cache	206
Chapter 7: Creating Simple Oracle Business Intelligence Analyses	209
Introduction	209
Constructing the analysis	210
Exploring the table view properties	216
Formatting the table view	221
Filter types and creating the filters	226
Using the selections	231
Adding column prompts	235
Chapter 8: Adding Views to Analyses and Advanced Features	<u>239</u>
Introduction	239
Adding the pivot table view	240
Adding the graph view	245
Adding the gauge view	249
Adding the legend view	253
Adding the column selector view	257
Adding the view selector view	261
Configuring the master-detail view settings	264

Table of Contents \_\_\_\_\_

—**ii**—

Table of Co	ontents
Chapter 9: Measuring Performance with Key Performance Indicators	<b>269</b>
Introduction	269
Creating the KPIs and the KPI watchlists	270
Creating the scorecards	278
Creating the objectives	281
Creating the initiatives	284
Adding the perspectives	285
Building the strategy trees and maps	287
Chapter 10: Creating and Configuring Dashboards	291
Introduction	291
Creating the dashboards	292
Using the Dashboard Builder	295
Exploring the properties of dashboard objects	300
Adding catalog objects to the dashboards	304
Creating the dashboard prompts	309
Chapter 11: Oracle BI Best Practices	317
Introduction	317
Best practices of the Physical layer	318
Best practices of the Business Model and Mapping layer	322
Best practices of the Presentation layer	326
Best practices of the analyses and the dashboards	328
Performance and security tips	330
Appendix: The Major Components of OBIEE 11g	<u>335</u>
Introduction	335
The major components of OBIEE 11g	336
Sample processing of an analysis	339
Index	343

-[111]---

# Preface

Organizations store their business-related transactional data in databases or in other various data sources. These data sources are often called Online Transactional Databases (OLTP) and they are designed to improve the performance of business applications such as Enterprise Resource Planning applications and Customer Relationship Manager applications.

This raw data is very important for daily operations, but on the other hand, there is a need for valuable information and knowledge. Obviously, the raw data that is stored in transactional databases needs to be converted to valuable information and knowledge. Business users need analytical reports to make effective decisions.

**Business intelligence** is a group of processes and technologies that transform the transactional data into valuable knowledge. This enables business users to make correct decisions and thus improves the productivity of their enterprises, especially in the markets where there is huge competition.

Business intelligence is evolving as the time passes and new business challenges emerge every now and then. In past days, business intelligence was related to only historical data. But now, real-time reporting is one of the most important requirements. Before, there were many reporting tools that were part of transactional applications. They were used to generate operational reports. But now, as you will imagine, there are many applications that are based on different technologies in an enterprise and a unified reporting solution is an important requirement.

Oracle had acquired Siebel Systems in 2005. After the acquisition, Oracle introduced a new product named Oracle Business Intelligence 10g that was formerly known as Siebel Analytics. The latest version of this product is Oracle Business Intelligence Enterprise Edition 11g. OBIEE 11g provides every solution to all business requirements. We're going to discuss the features of this product in this book.

Preface -

### What this book covers

Chapter 1, Exploring and Building the Repository, discusses the major components of Oracle Business Intelligence Enterprise Edition 11g and the basics of the repository. This chapter covers how to create a blank repository and set up the three layers of the repository from the beginning. At the end of this chapter, we're going to upload the new repository and make tests by running sample analyses.

*Chapter 2, Working with Logical Dimensions,* covers the different types of dimension hierarchies in depth. Both the level-based and the parent-child hierarchies will be discussed and you're going to learn how to create them. We will also create the level-based measures and presentation hierarchies.

Chapter 3, Using Aggregates and the Time Series Functions, covers the creation and usage of aggregate tables in order to improve query performance. There are two methods of implementing the aggregate tables and both of them will be covered. Also, we will discuss the advantages of the time series functions in this chapter. You're going to learn how to create the measure columns that include these functions in their formula.

*Chapter 4, Working with Multidimensional Data Sources,* offers an overview of the multidimensional sources, which are definitely important in business intelligence projects. We will discuss the implementation of the cubes in the repository. Essbase cubes are going to be used in our sample scenario.

*Chapter 5*, Security in Oracle BI, discusses security concepts. Authentication and authorization methods are also covered. Setting up the permissions on the repository objects, configuring the query limits, and creating the data filters are the other subjects that you'll find in this chapter.

Chapter 6, Managing Usage Tracking and Enabling the Cache, covers how to enable usage tracking, as monitoring the users' behaviors is very important in BI projects. Also, we will discuss the advantages of the cache mechanism in the BI server and you will learn how to maintain the cache.

*Chapter 7, Creating Simple Oracle Business Intelligence Analyses, tells you about the basics of analyses. We're going to construct a simple analysis and discuss the properties of the views that are used in the analyses. You will learn how to change the formatting options of table views and discover the usage of filter types. Also, we will use selections in this chapter.* 

*Chapter 8, Adding Views to Analyses and Advanced Features,* offers the usage of additional views other than the table view. Pivot table views, gauge views, graph views, column selector views, and the other view types are going to be covered. You will also learn how to configure the master-detail setting in this chapter.

Chapter 9, Measuring Performance with Key Performance Indicators, discusses the need for Key Performance Indicators. You will learn how to create KPIs and how to publish them in the dashboards. KPIs are the building blocks of Enterprise Performance Management so scorecards are also going to be covered in this chapter.



*Chapter 10, Creating and Configuring Dashboards*, covers the creation and the configuration of the dashboards in Presentation Services. You will explore the object types that you can publish in the dashboards. You will also discover the dashboard prompts and learn how to create them with all the details.

Chapter 11, Oracle BI Best Practices, offers the best practices of the implementation steps in Oracle BI projects. You will find recommendations about the repository including all three layers. Then we will discuss the design of the analyses and the dashboards. Also you will find important tips about performance and security.

Appendix, The Major Components of OBIEE 11g, explores the major components of OBIEE 11g and discusses the role of each component. Also, processing steps of an analysis will be covered.

# What you need for this book

You need to have the following:

- ▶ Oracle Database 11g R2.
- Oracle Sample Schemas (HR and SH): Sample schemas can be installed during database creation or can be installed manually after the database is created. SH Schema could be used for the activities.
- Oracle Business Intelligence Foundation Suite 11g.
- Oracle Business Intelligence Enterprise Edition 11g.
- Oracle BI Publisher 11g.
- Oracle Essbase.
- Oracle Scorecard and Strategy Management.
- ▶ A web browser (Internet Explorer 8.0 or above / Mozilla Firefox 3.6 or above).

### Who this book is for

This book is designed for the following audience:

- Business analysts
- Technical consultants
- ► Business Intelligence developers
- Business Intelligence administrators

It is recommended to know the basics of data warehouses before starting to read this book. Although you don't need to write SQL statements while constructing analyses, it is recommended to know the structure of the SQL statements that will be generated automatically.



Preface -

### Conventions

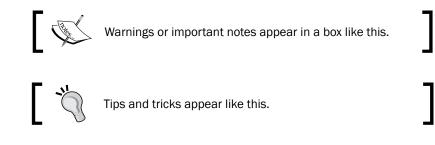
In this book, you will find a number of styles of text that distinguish between different kinds of information. Here are some examples of these styles, and an explanation of their meaning.

Code words in text, database table names, folder names, filenames, file extensions, pathnames, dummy URLs, user input, and Twitter handles are shown as follows: "In order to access the variables from the repository, we'll have to use the VALUEOF function."

A block of code is set as follows:

```
select distinct 0 as c1,
D1.c2 as c2,
D1.c1 as c3
from
SAWITH0 D1
Order by c2
```

**New terms** and **important words** are shown in bold. Words that you see on the screen, in menus or dialog boxes for example, appear in the text like this: "You can easily set the allowed or disallowed periods by clicking on the **Allow** and **Disallow** buttons."



### **Reader feedback**

Feedback from our readers is always welcome. Let us know what you think about this book—what you liked or may have disliked. Reader feedback is important for us to develop titles that you really get the most out of.

To send us general feedback, simply send an e-mail to feedback@packtpub.com, and mention the book title via the subject of your message.

If there is a topic that you have expertise in and you are interested in either writing or contributing to a book, see our author guide on www.packtpub.com/authors.



## **Customer support**

Now that you are the proud owner of a Packt book, we have a number of things to help you to get the most from your purchase.

### Errata

Although we have taken every care to ensure the accuracy of our content, mistakes do happen. If you find a mistake in one of our books—maybe a mistake in the text or the code—we would be grateful if you would report this to us. By doing so, you can save other readers from frustration and help us improve subsequent versions of this book. If you find any errata, please report them by visiting http://www.packtpub.com/submit-errata, selecting your book, clicking on the **errata submission form** link, and entering the details of your errata. Once your errata are verified, your submission will be accepted and the errata will be uploaded on our website, or added to any list of existing errata, under the Errata section of that title. Any existing errata can be viewed by selecting your title from http://www.packtpub.com/support.

### Piracy

Piracy of copyright material on the Internet is an ongoing problem across all media. At Packt, we take the protection of our copyright and licenses very seriously. If you come across any illegal copies of our works, in any form, on the Internet, please provide us with the location address or website name immediately so that we can pursue a remedy.

Please contact us at copyright@packtpub.com with a link to the suspected pirated material.

We appreciate your help in protecting our authors, and our ability to bring you valuable content.

### Questions

You can contact us at questions@packtpub.com if you are having a problem with any aspect of the book, and we will do our best to address it.

5

# 1 Exploring and Building the Repository

In this chapter, we will cover:

- Building the Physical layer in the repository
- Building the Business Model and Mapping layer
- Adding multiple sources to the logical table source
- Adding calculations to the fact table
- Creating variables
- Building the Presentation layer
- Validating the repository using Consistency Check Manager
- Uploading the repository

# Introduction

Oracle Business Intelligence Enterprise Edition Suite is a comprehensive reporting tool. The components of the suite are as follows:

Exploring and Building the Repository -

#### **Presentation Services**

This comprises the presentation of the business intelligence data to the clients through web browsers. This process communicates with the Bl server component directly and consists of query clients such as Analysis Editor and dashboards. End users will be able to create and modify analyses or just access business data. According to the business requirements, customized analyses can be created and saved into the Presentation Catalog, which is a repository of Presentation Services. Then we can easily publish these reports using a dashboard.

#### **Oracle BI Server**

Oracle BI Server is the main component in the suite. The BI server is simply a query engine that converts the logical requests to a physical SQL statement in order to execute it in the data sources. These optimized queries are generated based on the business rules that are defined in the BI server repository. These logical requests can be triggered from various applications. Obviously the most common one is Presentation Services, which belongs to the OBIEE components group. End users will be able to easily execute the logical requests from the dashboards. One single logical request can be used to query multiple physical data sources. Oracle BI Server and its metadata are transparent to the end users or to the person who executes a logical request. This conversion will be done based on metadata that should be configured by the BI developer. All of the business rules should be created as metadata.

#### **BI Scheduler**

This component manages the scheduled tasks. We are going to use either the Presentation Services or the **Job Manager** tool for creating scheduled tasks.

The metadata of the BI server is stored in the repository file on the server where the BI server service is running. A tool named **BI Administration Tool** that is installed with the default installation of OBIEE manages this repository.

In this chapter we're going to create this repository file from the beginning. Having a well-designed repository is crucial in business intelligence projects. We're going to use the Oracle database as a sample data warehouse.

The following are some samples of the data sources we'll also be using:

- Relational databases
- Multidimensional sources
- Flat, XML, and CSV files



Chapter 1

The repository is divided into three layers of metadata and are referred to as the following layers:

- Physical layer
- Business Model and Mapping layer
- Presentation layer

We're going to start with the Physical layer.

# **Building the Physical layer in the repository**

The Physical layer defines the physical data sources and the Oracle BI Server uses these definitions in order to submit queries. The Physical layer is the first layer that we have to create. There could be many data sources based on different technologies and their metadata may exist in this layer.

#### How to do it...

1. We're going to use **BI Administration Tool** to create the repository and specify the business rules and object definitions. After we open **BI Administration Tool**, we are going to create a new repository from the **File** menu and save this new repository to its default location.

😑 Oracle BI Administratio	n Tool
File Tools Help	
New Repository Ctrl+N	
Open	•
Multiuser	•
Recent Fie	
Exit	



Exploring and Building the Repository —

2. We'll have to specify the name of the new repository and its path. We can easily import the metadata with the wizard or skip importing the metadata at this moment. We're going to start the import process later on. So entering the password in **Repository Password** will be enough.

Create New Repository - Repository I	formation	
Repository Information	Name: SalesRepository	
2 Select Data Source	Location: c:\oracle\obi\instances\instance1\bifoundation\OracleBIServerComponent\coreapplicat	Browse
3 Select Metadata Types	Import Metadata: C Yes 🕫 No	
4 Select Metadata Objects	Rgpository Password:	
5 Map to Logical Model	Retype Password:	
6 Publish to Warehouse		
Help	Back	Cancel

3. Clicking on **No** in the **Import Metadata** option will prompt the wizard to finish. Then it's going to show the content of the repository. We're going to see only three layers without any object definition.

Cracle BI Administration Tool - SalesRepository.rpd File Edt View Manage Iools Actions Window Help 口 译译 译			
Presentation	Business Model and Mapping	Physical	



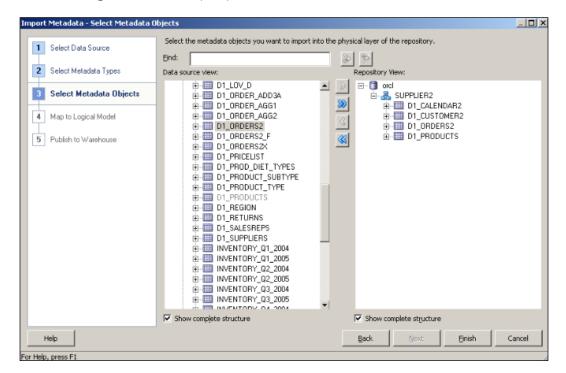
- 4. These values should be entered in the Import Metadata Select Data Source window:
  - Connection Type: The type of the data source should be defined in this field. One of the technologies should be selected from the drop-down list. We're going to use Oracle Database 11g R2 Version in our scenario, so the type is OCI 10g/11g for Oracle.
  - Data Source Name: This is the name that is configured in the tnsnames. ora file. By default, this file is located in the \$ORACLE\_HOME/network/ admin directory.
  - **User Name** and **Password**: The last parameters are the username and the password of the user who has access to the tables.

mport Metadata - Select Data Sourc	e				
1 Select Data Source	Import Type:	Local Machine			V
2 Select Metadata Types	Connection Type:	OCI 10g/11g			-
I	Data Source Name:	ord			
3 Select Metadata Objects	User Name:	supplier2			
4 Map to Logical Model	Password:	•••••			
5 Publish to Warehouse					
Help			Back	<u>N</u> ext	Einish Cancel

11 -

Exploring and Building the Repository -

5. The type of the metadata objects should be selected in the Select Metadata Types window. Then we're going to select the tables that we're interested in, in our BI project. So only four tables from Supplier2 schema are selected. We can easily import new tables when needed. Additionally, constraint definitions are also retrieved during the metadata import process.

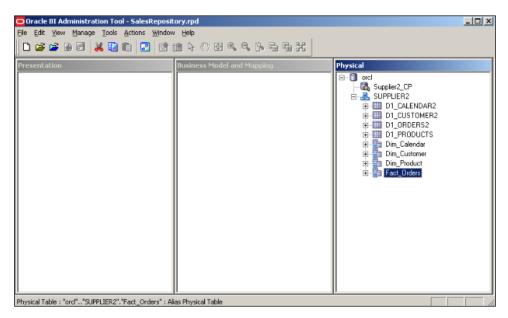


6. After the wizard ends, we'll see that the database object definition is created and one Connection Pool object is created as well. It's the definition of the connection to the physical data source. We'll also notice that four of the table definitions are imported under the schema of Supplier2. Now alias object definitions are going to be created. They are the objects representing the physical tables. Referencing to the same table twice in the same SQL statement causes circularity, and this situation is not allowed in the OBI repository. In order to avoid circular joins, alias object definitions should be created by the developer manually. We'll right-click on the table and navigate to New Object | Alias from the menu list.

**12** 

#### Chapter 1

13 -



7. Actually, there are not any foreign key constraints defined on the tables in the database. In these kinds of cases, the primary key and foreign key relationship should be defined in the BI repository by creating joins. In order to create joins, select all aliases and right-click on them to open the **Physical Diagram**. Right after it, we'll use the **New Join** button to create the joins between the tables. It's going to ask about the columns that will be used in the join definition.

										×
m Dim_Ca	alendar				E Dim_Cust	tomer				
Columns	🛆 Types	Length	Nulla		Columns 🗹	Types	Length	Nulla		
CHINESE_YEAR	DOUBLE	10	True		ADDRESS	VARCHAR	32	True		
CHN_JAPN_MON	ITH VARCHAR	12	True		CITY	VARCHAR	24	True		
CHN_JAPN_MON	IT DOUBLE	10	True		DISTRICT	VARCHAR	16	True		
CHN_JAPN_YEAR	VARCHAR	12	True	-	FACTOR	DOUBLE	126	True	-	
	oduct				Fact Ord	ers				
疆 Dim_Pr	υααιτ									
Columns		Length	Nulla		Columns ∠	Types	Length	Nulla		
1000	_	Length 5	Nulla True				Length 126	Nulla True		
Columns	Types INT				Columns 🖉	Types	-			
Columns	Types INT	5	True		Columns /	DOUBLE	126	True		

Exploring and Building the Repository -

8. The definition of each join object looks like the one in the following screenshot. There's no information about the type of join in the Physical layer. So the join type will be set in the Business Model and Mapping layer. We should only specify the column mappings from the fact table to the dimension tables one by one. The foreign key columns in the fact tables will be referencing to the primary key columns in the dimension tables.

Physical Foreign Key - Fact_Orders_FKey#1		_ 🗆 🗵
Name: Fact_Orders_FKey#1		
Iable:	T <u>a</u> ble:	
Dim_Customer	Fact_Orders	
<u>⊂</u> olumn:	C <u>o</u> lumn:	
Name Type A Operator:	Name	Type 🔺
MEWKEY INT	ACTLEXTND	DOUB-
ADDRESS VARCI	CMDOLRS	DOUB
CITY VARCI	CUSTKEY	INT
DISTRICT VARC	DWACOSTEXTND	DOUB
	Inner	Ľ
Cardinality		
CN C0,1 © 1 C Unknown	C1 C0,1 © N	C Unknown
Hint:		
Expression:		
"orcl".""."SUPPLIER2"."Dim_Customer"."NEWKEY" =		<u> </u>
"orcl".""."SUPPLIER2"."Fact_Orders"."CUSTKEY"		_
		-1
		<u> </u>
	OK Cancel	Help

#### How it works...

Now we've finished the basic tasks of the Physical layer. Physical tables and their aliases are created and also all the relationships between the tables are defined. We can say that creating the Physical layer is easier than the BMM layer. Most of the tasks are done by using wizards that take less time. The objects that are in the Business Model and Mapping layer are going to reference to the Physical layer objects. Obviously, having a well-designed Physical layer will make the other tasks in the BMM layer easier. When any report is executed at Presentation Services, the logical SQL statement is going to be generated based on the definitions in the BMM layer. Then this logical SQL statement is going to be converted to a physical SQL statement that is going to be executed at the database.



#### There's more...

We only used some tables in our sample scenario. Actually, the Physical layer objects are dependent on the data sources. Let's imagine that if multiple databases, Excel spreadsheets, XML files, or multidimensional data sources exist, then all of them should be defined in the Physical layer. We're going to focus on multidimensional data sources in *Chapter 4*, *Working with Multidimensional Data Sources*.

# Building the Business Model and Mapping layer

The Business Model and Mapping layer defines the logical model of the data that maps the business rules to the Physical layer objects. There can be many business models that can be mapped with different kinds of data sources based on different technologies. Also dimensional modeling should be done in this layer. This can be achieved by creating dimension objects and their hierarchies. Also all about the calculation and aggregation rules will be defined in this layer.

As a summary, all the business rules are going to be created in this layer. It's probably the most important layer in the repository, and it'll definitely take longer to create the objects in this layer.

Creating business models can be done by two methods, manually or by drag-and-drop. If the manual object creation method is preferred, we'll have to create objects in the following order:

- 1. Create the business model.
- 2. Create the logical tables and map them to the physical tables.
- 3. Create the logical columns.
- 4. Define the logical joins.

#### How to do it...

1. Create the business model manually by right-clicking on the BMM layer and selecting **New Business Model**. (Give it a name, in this case Sales.)

15

Exploring and Building the Repository \_\_\_\_\_

2. Ensure that the **Disabled** option is checked because there's no other object in this business model. We're going to change this setting later.

Business Model - Sales		_ 🗆 🗵
General Display Folders		
Name: Sales		
Disabled		
Description:		
		~
		-
0	K Cancel	Help

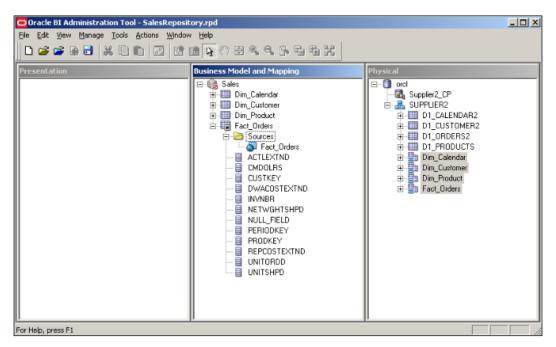
3. After creating a blank and disabled business model, drag-and-drop the physical objects from the Physical layer onto the business model named Sales.

Automatically created objects are:

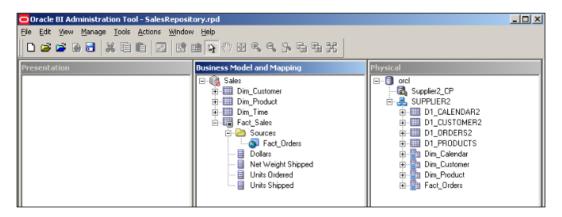
- Logical dimension and fact tables
- Logical columns and their mappings to Physical layer
- Logical table sources for the dimension and fact tables
- Logical keys and joins (can be accessed from the Business Model Diagram window)
- 4. Now it'll be good to make a clean-up because with this automated process all of the columns from the Physical layer are created as logical columns. Most probably we won't need all of the logical columns; we can easily delete the logical columns that are not required by right-clicking on the columns. Another task is renaming the logical tables and columns with meaningful names.

- 16 -

#### Chapter 1



5. After making the clean-up, we'll see that some columns are deleted and some are renamed.



17 —

Exploring and Building the Repository -

6. When we open the properties of the logical table source named Fact\_Orders, we'll find mappings from the **Logical Column** to the **Physical column**. Also if you need to access other details of the logical table source, you'll have to extend the logical table sources folder, so you'll find the logical table source definition.

Show mapped columns		🔽 Sho	w ynmapped colu	mns
ogical column to physical o	olumn mapping:		Ξ.	P
Logical Column	Expression		Physical Ta	able
Dollars	CMDOLRS	×	Fact_Orders	
Net Weight Shipped	NETWGHTSHPD	×	Fact_Orders	
Units Ordered	UNITORDD	×	Fact_Orders	
Units Shipped	UNITSHPD	X	Fact_Orders	

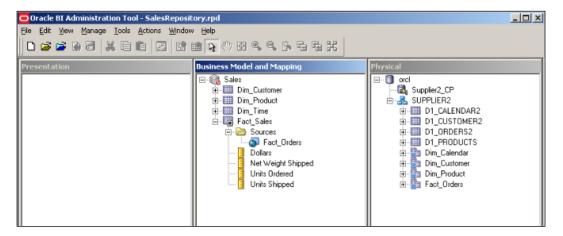
- 7. The new business model is almost ready but still there is a missing step that is the aggregation rule for the columns in the fact table. By default, it's not set. The following are the options for the aggregation rule, so depending on the requirement you can use one of them:
  - Sum and Avg
  - Count and Count Distinct
  - Max and Min
  - StdDev and so on

- 18

8. In order to set the aggregation rule for one logical column in the BMM layer, you'll have to open the properties window of that column and go to the **Aggregation** tab. You'll find the rules in the drop-down list and select one of them. The most common one will be Sum. So we'll use Sum as the aggregation rule in this demonstration. In the case of business requirements, we can use different aggregation rules. If you need to display the number of the rows, we can use Count as the aggregation rule.

Logical Column - Dollars		_ O ×
General Column Source	Aggregation Levels	
<u>B</u> ased on dimensions		
Default <u>agg</u> regation rule:	None None Sum Avg Count Count Distinct Max Min First Last Median	-
	StdDev StdDevPop Evaluate_Aggr	

9. So we've configured all of the measures in the fact table with the Sum aggregation rule.



19 —

Exploring and Building the Repository -

#### How it works...

We created a simple business model in this section. Each logical table should have at least one logical table source. We might create multiple logical table sources as well, just in order to use summary tables or horizontal/vertical data federation. The important point in this layer is creating the logical joins. The Oracle BI Server will recognize the logical fact and dimension tables by checking the logical joins. Obviously, the logical joins are dependent on the physical joins, but we may have only one table in the Physical layer. So there won't be any physical join. Even in a single table scenario, we'll need to create fact and dimension tables in the BMM layer and create logical joins between them. At the end, all the objects will be referencing to only one single table. After working on the Business Model Diagram, we selected the aggregation rules that will be applied on the measure columns such as Sum, Count, and Avg. Is this a required step? Actually, it's not required. If you don't set the aggregation rule of the measures, you won't be able to see aggregated data in the reports. Let's assume that if the fact table contains one million rows, you'll see one million rows in the report. Although setting the aggregation rule is not a must, it's highly recommended to do it.

#### There's more...

Regarding the business model, there is one more object type called logical dimensions. The Drill Down feature and aggregate (summary) tables can be used after dimensions are created. As you see, two important features are dependent on dimensions. We're going to focus on logical dimensions and their types in *Chapter 2, Working with Logical Dimensions*.

# Adding multiple sources to the logical table source

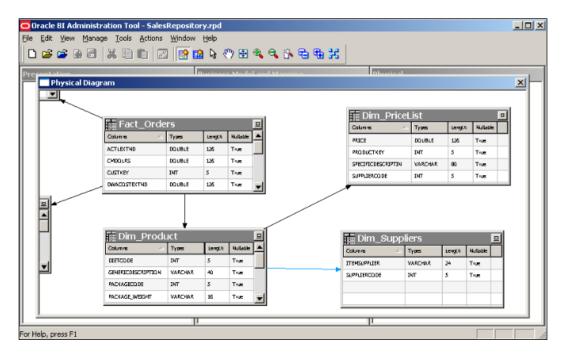
Because of the data warehouse design, data may be stored in the physical tables in the normalized way. That means some columns are stored in different tables. This kind of design is called as the **snowflake** schema. For example, let's assume that the product data is spread into different physical tables, for example, the price information doesn't exist in the product table and it's stored in the price list table. Another example is that supplier data can be stored in another table such as the suppliers table.

When this is the case, there's a business solution in Oracle Business Intelligence. We can add multiple sources to existing logical table sources.

20

#### How to do it...

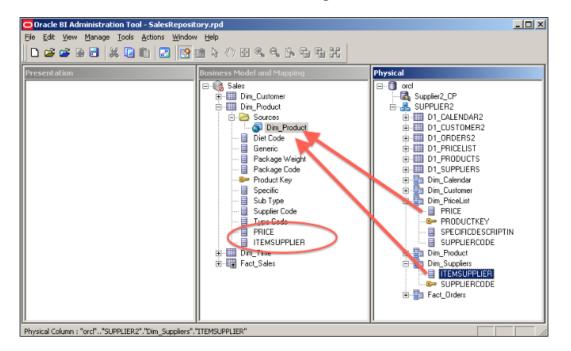
1. In order to add multiple sources, we'll need to extend the existing repository and import these additional tables to the Physical layer. We're going to avoid using the physical tables directly, so we will create aliases for these new tables. You can see that they are already imported and aliases are created. Additionally, physical joins should be created.



Now we have to reflect these changes to the BMM layer. Although the new physical table definitions are created, the BMM layer is not aware of this information. Again there are two methods of making logical changes in the **Business Model and** Mapping layer, manually or drag-and-drop. We're going to drag-and-drop the new physical columns on to the logical table source (not on to the logical table).

21 —

Exploring and Building the Repository -



When you drag the two columns named PRICE and ITEMSUPPLIER from the **Physical** layer on to the logical table source, you'll see that two new logical columns are added into the Dim-Product logical table.

3. After this action, there will be a modification in the logical table source. Normally, the logical table sources are mapped to a single physical table. But now you'll notice at the end of this action that the Dim\_PriceList and Dim\_Supplier physical tables are also mapped with that logical table source. By default, it uses the **Inner** join type and we can change it based on the requirement analysis.

- 22

			- Chapte
ical Table Source - D	im_Product		
eneral Column Mappin	g Content Parent-Child Settings		
ame: Dim_Product			
Disabled	Dimension Browse		
ap to these tables:		🕂 💥	
a "ord""SUPPLIER	2"."Dim_Suppliers"		
Table 1	Table 2 Type Dim_PriceList Inner		
Table 1 Dim_Product			
Table 1 Dim_Product Dim_Product	Dim_PriceList		
Table 1 Dim_Product Dim_Product Wew Details	Dim_PriceList Dim_Suppliers		
Table 1       Important       Important	Dim_PriceList Dim_Suppliers		
Table 1       Important       Important	Dim_PriceList Dim_Suppliers		
Table 1       Important       Important	Dim_PriceList Dim_Suppliers		
Dim_Product ■ Dim_Product ⊻iew Details	Dim_PriceList Dim_Suppliers		

4. Another change in **Logical Table Source** is **Column Mapping.** It also automatically maps the new logical columns with the physical columns.

eneral Column Mapping	Content Parent-Child S	ettings	
Show mapped columns		🔽 Sh	ow ynmapped columns
ogical column to physical o	olumn mapping:		<b>.</b> 5
Logical Column	Expression		Physical Table
Diet Code	DIETCODE	×	Dim_Product
Generic	GENERICDESCRIP	X	Dim_Product
ITEMSUPPLIER	ITEMSUPPLIER	×	Dim_Suppliers
Package Code	PACKAGECODE	X	Dim Product
Package Weight	PACKAGE_WEIGH	X	Dim_Product
PRICE	PRICE	X	Dim PriceList
Product Key	PRODUCTKEY	X	Dim_Product
Specific	SPECIFICDESCRIP	X	Dim_Product
Sub Type	SUBTYPECODE	X	Dim_Product
Supplier Code	SUPPLIERCODE	X	Dim_Product



#### How it works...

We added multiple sources into the logical table sources in this recipe. We could use the manual method, which would cost more time and steps, so we used the drag-and-drop method. If the supplier and price columns are used in the report the BI server is going to retrieve the data from the two different tables. This processing relies on the settings of the column mappings. Whenever a report is executed, the BI server is going to check the logical table sources and the column mappings. All logical columns should be mapped with the physical columns, otherwise the consistency check tool will generate an error.

Designing of the business model is a crucial step. Any mistake at this layer will cause generation of inaccurate result sets. When we start to construct the reports at Presentation Services, the logical SQL statement is going to be generated, based on the business rules in the model. It'll check the logical relationships, column mappings, aggregation rules of the measures, and so on.

#### There's more...

We only created one business model in our scenario that doesn't contain any dimensions or multiple logical table sources. The business models are referenced by subject areas from the Presentation layer. They focus on a particular business view. We might create more business models according to the business requirements such as a sales business model and a finance business model.

Although we're going to focus on the Presentation layer in another chapter, we shouldn't forget a critical limitation in the tool. Subject areas in the Presentation layer cannot span multiple business models. They cannot be mapped to multiple business models. So if there's a logical table that is going to be needed in all of the business models, it should be copied to all business models.

## Adding calculations to the fact table

Business users are going to be interested in some calculations of the values in the measure to compare some values. So at the end, they will need valuable information from the existing fact tables that contain measures. For example, in our case they may be interested in comparing the units ordered with the units actually shipped. The business solution of this scenario is to add new calculations into the logical fact table. There can be another solution such as adding these calculations into the data warehouse and making the calculations at the database level. But this solution will take more time. So that's the reason that we're going to add new calculations into the BMM layer.



There are three types of methods that we can use:

- Creating calculations based on logical columns
- Creating calculations based on physical columns
- Creating calculations using the Calculation Wizard (based on logical columns)

Besides these calculations, we're going to cover time-based calculations in *Chapter 3*, *Using Aggregates and the Time Series Functions*.

#### How to do it...

 First, we're going to use the first method, which is about calculations based on logical column sources. We're going to expand the logical fact table and see the list of existing columns, then right-click on the table and navigate to New Object | Logical Column.... It's going to open the Logical Column properties.

Logical Column - Difference Units based o	n Logical	_ O ×
General Column Source Aggregation Lev	els	
Name: Difference Units based on Logical	(UNKNOWN)	
Belongs to Table: Sales"."Fact_Sales"		∏ <u>W</u> riteable
Sort order column:		
None	S <u>e</u> t	<u>C</u> lear
Descriptor ID column:		
None	Set	Clear
Description:		
		*



By default, this Logical Column is not mapped to any physical column. When you click on the Column Source tab in the same window, you can see that it's not mapped yet. We're going to select the Derived from existing columns using an expression option box from the Column Source Type section. You'll see the Edit Expression icon.

Logical Column - Difference Units based	on Logical 📃 🛛 🗙
General Column Source Aggregation Le	evels
Data Type: UNKNOWN	ngth:
Derives from	
Column Source Type C Derived from ghysical mappings Show all logical sources	
Logical Table Source	Mapped as
	Edt Urmep
<ul> <li>Derived from existing columns using a</li> </ul>	an expression
	-
OK	Cancel Help

3. When you click on the Edit Expression icon, it's going to open **Expression Builder** where we're going to write the formula and click on the **OK** button.

```
"Sales"."Fact_Sales"."Units Ordered" -
"Sales"."Fact_Sales"."Units Shipped"
```

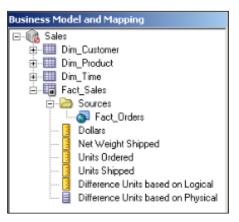
4. By using this method, we can see the differences between the two measures such as Units Ordered and Units Shipped. The most important point is how the calculations and aggregations are done in this method. When you use the logical columns in the calculations, it means that the aggregation rule is going to be applied before the calculation. So the formula is as follows:

SUM (UNITS ORDERED) - SUM (UNITS SHIPPED)



The formula will not be: SUM (UNITS ORDERED - UNITS SHIPPED)

5. When it comes to the second method, that is when the calculations will be based on physical columns, we're going to again create the Logical Column in the logical fact table. But this time we're not going to change anything in the Column Source tab, because we've already discussed that physical column mapping can be only accessed from Logical Table Source.



6. And when we open the **Logical Table Source** window, we'll see that the new column is not mapped yet.

eneral Column Mapping Content	Parent-Child Settings			
Show mapped columns				
ogical column to physical column m.	apping		<b>5</b> . P	
		_		
Logical Column	Expression		Physical Table	
Logical Column Difference Units based on Physical		×		
Logical Column Difference Units based on Physical Dollars	Expression		Physical Table Fact_Orders	
	Expression		Physical Table	

27 —

7. Again we're going to open **Expression Builder** and write the formula, but this time physical columns are going to be used in the formula.

Category: Physical Tables Operators Expressions Functions Constants Types Physical Tables: Fact_Orders End:	pression Builder - Expression
Fact_Orders	Physical Tables Operators Expressions Functions Constants
Columns: CUSTREY DWACOSTEXTND INVNBR NETWGHT3HPD NLL_FIELD PERIOOKEY PRODKEY REPCOSTEXTND LUNITORDD	Columns: CMDOLR5 CUSTKEY DWAC0STEXTND INWNBR NETWGHTSHPD NULL_FIELD PERIODKEY PRODKEY PRODKEY REPCOSTEXTND
UNITS:PO         Image: Content of the second s	INITSHED

8. As a result you'll have another measure that calculates the difference between the units ordered and the units shipped. Now the aggregation rule is going to be applied after the calculation as shown:

SUM (UNITS ORDERED - UNITS SHIPPED)

As an extra step, you'll need to configure the aggregation rule that will be used for this new Logical Column. Otherwise, the BI server is not going to be aware of the aggregation rule that is going to be applied.

- 28 -

9. In the previous method, we could also use the wizard. It's easier to use it. You just have to right-click on the logical column that you want to make a calculation in and go to the **Calculation Wizard** menu item; it'll ask you the other values for calculations.

Calculation Wizard - New Calculations		_ 🗆 X
1 Introduction	Compare "Units Ordered" with:	Generate Calculations:
2 Select Columns	Sales". "Fact_Sales". "Units Shipped"	Change 🗮
3 New Calculations		CurrentX - ComparisonX
4 Checkout		Chg Units Shipped
5 Finish	when Units Shipped Is NULL return O NULL Country	IfNull("Sales"."Fact_Sales"."Units Ordered",  O) - IfNull("Sales"."Fact_Sales"."Units Shipped", 0)
Help	Back	Next Enish Cancel
For Help, press F1		

At the end of the wizard you'll notice that the result is exactly the same as the first method, creating calculations based on logical columns, and the aggregation rule is going to be applied before the calculations.

#### How it works...

We learned how to create new calculations in this section and also covered how the aggregation rules are applied based on the columns. These calculation techniques may produce different results when it comes to the usage of multiplication or division.

29 —

#### There's more...

Although it's possible to add new calculation measures into the logical fact table easily, it's better to implement them in the **data warehouse**, because whenever a query is executed, these new measures are going to be calculated every time during runtime. This is going to negatively impact the query performance. The recommended way is implementing these measures at the database level and handling them in the **Extraction, Transformation, and Loading (ETL) process**. As a result, when the query is executed, the calculated values will be retrieved from the database itself instead of making any calculation during runtime. Adding new calculations to the business model should be a short-term solution. Obviously creating these calculated measures at the database level has a cost. Data warehouse design and the ETL process are all going to be affected, and it'll take some time to implement them.

## **Creating variables**

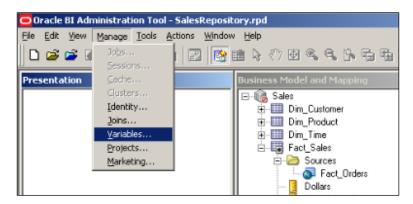
One of the important requirements for creating dynamic reports are variables. Variables can store values in the memory and can be accessed by name. We're going to create these variables by using the **Variable Manager** tool that is accessed from the **BI Administration Tool** window. There are two different types of variables:

- Repository variables: They persist in the memory when the BI server service is started and until it's shutdown. They have two forms, static and dynamic. Static variables are like constants. You cannot change their value. Dynamic repository variable values are set when the BI service is started. Then you can easily change their value. Only one instance is created for repository variables and their values can be set by creating an initialization block. These initialization blocks can also be scheduled in order to reset the values.
- Session variables: They persist during a user's session period. There are two types. One of them is called a system variable and the other is called a non-system variable. Unlike repository variables, session variables have many instances based on the number of the sessions. We can use initialization blocks in order to set their value in the beginning. But unlike repository initialization blocks, these blocks can be rescheduled.

30

### How to do it...

1. Open the Variable Manager block from the Manage menu.



2. When the **Variable Manager** is opened, you'll see that variables are grouped into two main categories, **Repository** and **Session**.

Yariable Manager			
Action Edit Help			
Repository Initialization Blocks (?) Variables (?) Static Session Initialization Blocks Variables System System Non-System	Туре	Name	Description



3. Create a repository variable as an example. We're going to click on the **Action** menu and go to **New** | **Repository variable**, and it's going to open a new variable window. As you'll see there are two options for the type of variable, static and dynamic. Let's assume that we need dynamic variables. So in this window we're going to click on the **New...** button.

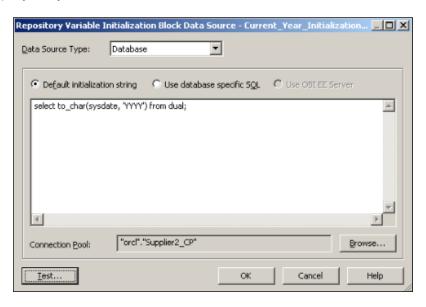
Dynamic R	epository Variable -	Current_Year	<u>- 🗆 ×</u>
Name:	Current_Year		
Type:			
C Static			
Operation Dynami	c		
Initialization	n Block:		
not as	signed	•	Ne <u>w</u>
Default Init	ializer:		
2012			
Description	n		
			*
			<b>*</b>
	ОК	Cancel	Help

4. This time a new **Initialization Block** window is going to open. First we will schedule this block regarding when it's going to be executed in order to set the variable's value. We're going to use 1 hour as the period.

Repository \	/ariable Initi	ialization Block	- Currer	nt_Year_J	nitialization_	Block	_ 🗆 ×
Name:	Current_Ye	ar_Initialization_B	lock				_
-	Disabled						
Sched <u>u</u> le							
Start on:		Monday ,	July 2	3, 2012 5	:43:54 PM		<u>·</u>
Refresh in	terval:	1			(hours)		•
Data Source No data so	e urce setting v	vas made				Edit Data Sou	rce
Variable Ta	arget						
Name Curre	nt_Year		2012	Initializer			
						Edit Data <u>T</u> ar	get
	Precedence on precedenc	e setting was mad	le		Edit E;	secution Preceden	ce
Description							



5. The second important configuration is editing the data source. When you click on the **Edit Data Source...** button, you'll have to specify the **Connection Pool** name and the query that you want to execute.



6. You can also test your query by clicking on the **Test...** button. The output will be similar to the following screenshot:

Variable	Value
Current_Year	2012
unon_rea	10.010



 At the end, you'll see that both the dynamic repository variable and the initialization block are created. It's also a good practice to create different connection pools for the initialization blocks.

Yariable Manager			_ 🗆 ×
Action Edit Help			
Personation Perso	Туре Wariable initialization Block	Name Current_Year Current_Year_Initialization_Block	Descri

#### How it works...

We covered the repository variables in this recipe. Variable object definitions are very important from both the end user's and the BI developer's perspectives. When it comes to dynamic reports, we'll need to use them. Business users can access these variables from the Presentation Services. BI developers should share these variables with the business users because we do not have a list of variables on the Presentation Service.

These variables are accessible either from the repository or from the Presentation Services. In order to access the variables from the repository, we'll have to use the VALUEOF function. Let's assume that there's a variable named Current\_Year. If you want it to have a dynamic design in the repository, you'll call the variable as follows:

```
VALUEOF("Current_Year")
```

This statement is going to return the value of the Current\_Year variable. The VALUEOF function is expecting one argument, that's the name of the variable. Let me remind you again that variable names are case sensitive. When it comes to accessing them in the Presentation Services, we'll just write the name of the variable and we won't use the VALUEOF function.

- 34

#### There's more...

Creation steps of the session variables are very similar. You can create the session variables and then the initialization blocks in the same way that we create the repository variables.

# **Building the Presentation layer**

Now in our basic repository the only missing part is the Presentation layer. The Presentation layer is the last layer that will be built and it exposes the customized view of the existing business models to business users. The Presentation layer provides meaningful data in a simple way. For example, all of the logical columns are not required to be published. Key columns can be removed from the Presentation layer to provide a simpler view. We can reorder the tables and rename the table names or the column names. So it's a representation of the existing business model in a well-designed and simple way.

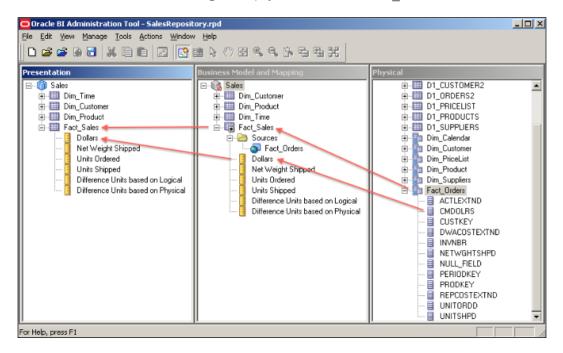
We're going to create **subject areas** in this layer in order to group the tables based on different views for different business requirements. A single subject area can be mapped to only one business model; it cannot access two business models. So this will be one of the limitations when it comes to designing our project.

#### How to do it...

1. We can create the object definitions manually or by the drag-and-drop option as in the previous layers. It'll take less time when you compare it with the Business Model and Mapping layer. Now we're going to drag-and-drop the business model from the BMM layer on to the **Presentation** layer. You'll see that one subject area with the same name as the business model is created automatically. Then we can change the order of the tables or order of the columns, or we may rename the table column names.

35

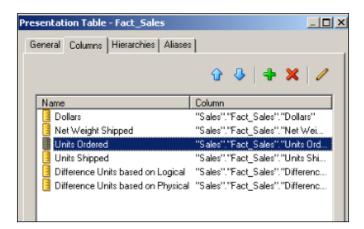
After creating the first subject area you'll see the relationship between the layers. A presentation table named Fact\_Sales is mapped with the logical table named Fact\_Sales and this logical table is mapped with the physical object named Fact\_Orders. The Fact\_Orders object, which is obviously not a table, is an alias that is referencing to the physical table named D1 ORDERS2.



2. When you open the properties of **Subject Area** named **Sales** in the **Presentation** layer, you'll see the **Presentation Tables** tab. You can change the order of the tables from this tab.

Subject A	irea - Sales 📃 🗆 🗙
General	Presentation Tables Aliases
	😧 🕹   💠 🗙   🥒
Nam	-
D D	im_Time
D 🛄 D	im_Customer
D 🛄 D	im_Product
F	act_Sales





3. In order to change the order of the columns, you'll have to open the properties of **Presentation Table** as shown in the following screenshot and use the arrow keys:

#### How it works...

Maybe the easiest part of the repository is the Presentation layer, but this doesn't mean that we should not take care of this layer. It's easy as much as it's important, because this is the layer that is published to the end users through the Presentation Services. The names should be meaningful and we'll also have to think about the order of the tables. The list of the presentation tables and presentation columns are going to be accessed by the end users as it is. So one golden rule is that the time table should be the first presentation table in the subject area. Fact tables can be the last tables in the list because mostly business users start to construct the reports by selecting the first column from the time table. Then they'll select the other attribute columns from the dimensions. At the end, they will select the measures.

#### There's more...

We can create multiple subject areas in the Presentation layer according to the business requirements, as in the following example:

- Sales for sales representatives
- Sales for sales managers
- Marketing subject area
- ► Finance subject area

The critical rule in this layer is that subject areas cannot include logical tables from different business models. Every business model should be referenced from a subject area, otherwise the consistency check tool is going to generate an error and change the state of the business model to Disabled.

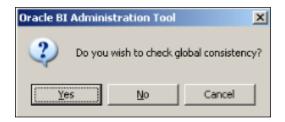


# Validating the repository using Consistency Check Manager

Before taking the new repository online, it's required to check the validity of the repository. There's a tool named **Consistency Check Manager** that is used to validate this repository.

#### How to do it...

1. Whenever you want to save your repository, it's going to ask you if you want to check global consistency or not.



2. We can also trigger this from the **File** menu.





3. The **Consistency Check Manager** tool is going to check the validity of the repository. For example, if the business model is still marked as Disabled, it may tell you that the business model is consistent.

Oracle BI Administration 1 Ele Edit View Manage Ico D 😂 🖆 🕼 闭 😽 🎚		
Presentation           Image: Constraint of the second sec	Business Model and Mapping	Physical
	Oracle BI Administration Tool Business model "Sales" is consistent. Do you want to m	PRICELIST PRODUCTS
		⊕ Fact_Orders

4. We have to be sure about the validity, otherwise when we try to upload it to the server, it's going to generate errors and we won't be able to start the BI server service. If you see a message as shown in the following screenshot, it means the repository is consistent.

Oracle BI	Administration Tool
⚠	Consistency check didn't find any errors, warnings or best practice violations.
	OK

39

5. We can easily simulate an error by deleting the entire subject area from the Presentation layer, starting the **Consistency Check Manager** tool and seeing the result. It'll give an error about the missing subject area. In this case, the rule that applies is that every business model should be mapped to at least one subject area. Otherwise that business model is not consistent.

Oracle BI Administration T							_ 🗆 X
Ele Edit View Manage Iools Actions Window Help							
	onsistency Ch						
Presentation         Consistency Check Planager           Display:         If Entry: (1)           If Entry: (1)         If Warnings (0)							
	Messages:	-			1		
	Message Type	Object Type	Object	Error No.	Error Description		
	Error	Business Model	Sales	38018	Business model Sales does not have corresponding subject area.		
	Show Qualifie	d Name Check	All Objects G	о То	Close	Help	
For Help, press F1	A Global Consiste	ncy Check was perfo	rmed. 1 Error(s) (1	shown), 0 Wa	rning(s) (0 shown), and 0 Best P	ractice violatic	

#### How it works...

The last step before loading the repository to the BI server is to check the server for consistency. Checking the consistency is a step that cannot be skipped. It's always recommended. It's going to check for missing or broken references. So, in every change, we'll have to start the **Consistency Check Manager** tool and see whether there's any inconsistency or not. If you don't check it and try to load the new repository to the BI server and if it's in an inconsistent state, the BI server is going to generate an error and will not start up.

40

# Uploading the repository

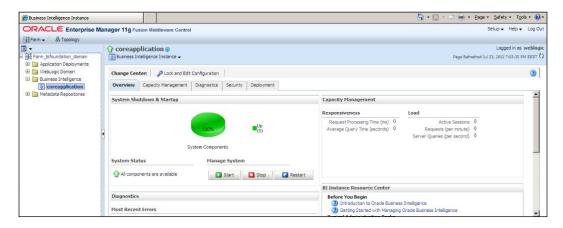
After the repository is validated, we upload the repository file to the BI server and start testing to see whether everything works fine or not. We're going to upload the repository by using Enterprise Manager. But before that we'll have to increase the logging level of the user account in order to check the logs that are generated by the end users.

## **Getting ready**

We'll open the Identity Manager tool that was formerly known as Security Manager. The users should be downloaded from the WebLogic Server. But downloading user-identity information can only be done in the online mode. So first we'll upload the repository.

#### How to do it...

1. Open the **Enterprise Manager 11g Fusion Middleware Control** tool from http://localhost:7001/em to upload the new repository.



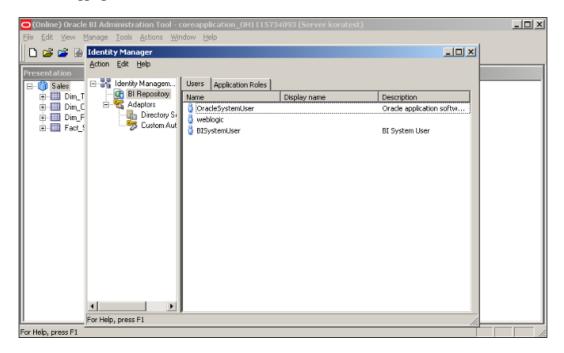


2. When you log in, you'll see the **Deployment** tab and the **Repository** link. This is the page that we're going to upload the repository to. You'll have to show the path of the existing repository and specify the password in **Repository Password**.

🟉 Business Intelligence Instance							
ORACLE Enterprise Manager 11g Fusion Middleware Control							
📑 Farm 🗸 🖓 Topology							
Farm_bifoundation_domain     Application Deployments	Coreapplication ③     Business Intelligence Instance →						
WebLogic Domain     Business Intelligence	Change Center: 🛛 🔚 Activate Changes 🔹 🍋 Release Configuration						
coreapplication	Overview Capacity Management Diagnostics Security Deployment						
🖲 🛅 Metadata Repositories	Presentation Repository Scheduler Marketing Mail						
	BI Server Repository This section shows the current installed RPD. You can use this section to configure a shared RPD location. Default RPD SampleAppLite_BI0001 Share Repository Shared Location						
	Upload BI Server Repository						
	Use this section to upload a new RPD and its password to your BI Server domain. You may also use this sec Repository File SalesRepository.rpd Update Repository Password Confirm Password						

-42-

3. Restart the service in order to use the new repository. Now we can run tests, but it's better to increase the logging level and also see the queries that are executed on the physical data sources. When you open **BI Administration Tool** in online mode, you'll be able to download the user information from the WebLogic Server and change the logging level.



43 -

4. Open the properties of the user account that you'll run tests on. In our scenario, we're going to use weblogic user account and change the value in **Logging level** to 2. This level is going to force the BI server to generate both the logical as well as the physical SQL statements.

User - weblogic			
User Logons			
User <u>n</u> ame: Displayname: Description: Logginglevet	weblogic		Permissions
Application Role m	embership:		
BIAdministrator BIAuthor BIConsumer			
	OK	Cancel	Help

5. Now we can run our tests easily. We're going to use the web browser to access Presentation Service at http://localhost:7001/analytics.

Sign In
Enter your user id and password.
User ID
weblogic
Password
•••••
Sign In
🖓 🕂 English 💽

44

6. After you log in and try to create an analysis, you'll see the subject area from the Presentation layer of the repository. Click on the **Subject Area** name.



7. It's going to open the Analysis Editor. You'll see that the order of the tables and columns are exactly the same as the order of the subject areas in the Presentation layer. You can easily click on the columns from the **Subject Areas** pane to add them to the **Selected Columns** section.

DRACLE Business In	telligence			
Untitled				
Criteria Results Prompts Adva	inced			
🗆 Subject Areas 🛛 🎲 🍓 🗸	₩ 1			
🗆 🔞 Sales	Selected Columns			
Dim_Time     Dim_Customer     Dim_Customer     Dim_Product     Fact Sales	Double dick on column names in the Subject Areas pane to add them to the analysis. dicking or hovering over the button next to its name.			
Pollars     Net Weight Shipped     Pollars     Pollars Ordered     Pollars Shipped     Polference Units based on Log     Difference Units based on Phy	4			
	🗆 Filters			
Catalog Catal	Add filters to the analysis criteria by clicking on Filter option for the specific column in t button after selecting its name in the catalog pane.			



8. Click on the **Results** tab on this page to see the results:

6 Oracle BI Answers	1			
ORACLE' Business Int	telligence	e		
Untitled				
Criteria Results Prompts Adva	nced			
🖻 Subject Areas 🌼 🚱 🗸	4. 1.	10 😡 🐴 🕅	9~ 89 9	9 🔜 🎭 🖻 🗟 😼 💵
🖂 🔞 Sales	Compound	Layout		
Comparing     Contract		₽a/ ₽a/		
	YEAR	Units Ordered	Units Shipped	
	1,998	2,120,280	and the second se	
	1,999	667,782	653,684	
Catalog Catal				

#### How it works...

After uploading the new repository to the BI server, we'll have to make many tests in order to make sure that everything is fine. Also, logs should be checked.

To make a test, we'll have to log in to Presentation Services and create analysis. After clicking the **Results** tab, we should see the result set as shown in the preceding example. The logical request is going to be constructed from the definition of the analysis at the Presentation Services and it'll be retrieved by the BI server component. The BI server is going to convert the logical SQL statement to a physical SQL statement and execute it against the database. After the result set is generated by the database, that result set is going to pass through the BI server and will be listed as a result at the Presentation Services.

#### There's more...

After changing the log level of the user that we're running the test on, we can find the execution statistics in the log file. The name of the log file is NQQuery.log. The content of the log file can be accessed from the **Administration** link in Presentation Services by navigating to **Administration** | **Manage Sessions** | **View Log**.



# **2** Working with Logical Dimensions

In this chapter, we will cover:

- Creating level-based hierarchies
- Creating parent-child hierarchies
- Creating level-based measures
- Creating shared measures
- Creating presentation hierarchies

# Introduction

**Logical Dimensions** consists of hierarchies and they are created in the Business Model and the Mapping layer. They enable end users to drill down to details, and measures that will be based on levels can also be created. Besides these functions, we can also gain the benefit of using aggregate tables in order to improve query performance.

Logical Dimensions are representations of hierarchical organization of logical columns. There are some common examples of dimensions: Time, Customer, Product, Channels, Employees, and so on. Setting up these levels of the dimensions is dependent on business requirements. Business users should decide about the granularity levels. Working with Logical Dimensions -

The Time dimension might have five levels starting from the GRAND TOTAL level to the DAY level, and we are going to use five-level dimension in our scenario. This can be changed based on the business requirements. After creating this dimension, users will drill down from YEAR to QUARTER, then to MONTH, and then to the DAY level, which is the lowest level in the hierarchy. GRAND TOTAL is the highest level for this dimension that represents the all time data.

GRAND TOTAL
YEAR
QUARTER
MONTH
DAY
DAT

The Customer dimension is another common example that contains different levels.





And our last example is about the Product dimension.



There are two logical-dimension types:

- **Logical dimensions with level-based hierarchies**: Members of these hierarchies have the same type at a single level. For example, Time, Product, and Customers.
- ► Logical dimensions with parent-child hierarchies: Members of these hierarchies have the same type at all levels. For example, the Employee and the Manager hierarchy. The members have all the same types at all levels.

Oracle BI Server also supports ragged, skipped level, and time hierarchies that are attributes of the level-based hierarchies.

- **Ragged hierarchies**: These are unbalanced hierarchies. They do not have the same depth.
- Skipped level: These are the ones that do not have a value for a particular ancestor level. The Customer dimension can be an example of this. There's not a State value for some countries so State level will be skipped.
- ► **Time hierarchy**: In order to gain the benefit of the time-series functions, one Time dimension should be specified with a chronological key.

## **Creating level-based hierarchies**

Before starting this task, logical dimension and fact tables should be created in the BMM layer. In addition to this, logical joins should exist including logical keys. If these are not ready, then you should create the logical tables, set the logical table sources, and complete all other tasks that are specified in *Chapter 1, Exploring and Building the Repository*.

49

Working with Logical Dimensions —

How to do it...

 First, we're going to create the logical dimension with a level-based hierarchy. Right-click on Business Model and select the New Object and Logical Dimension options. Then select the Dimension with Level-Based Hierarchy option.

5 B X			
	lodel and Mapping		Physical
	New Object Check Out Check Out Check Out Check Out Copy Paste Delete Duplicate Duplicate Duplicate with Subject Area Create Subject Areas for Logical Stars and Snowflakes Check Consistency Mark Set Icon Expand All Business Model Diagram Physical Diagram Query Related Objects Rename Wizard Rename Properties Estimate Levels	, Ctrl+X Ctrl+C Ctrl+Y Del	Logical Display Folder Logical Display Folder Logical Dimension          0       01_C0       Dimension with Level-Based Hierarchy         0       01_ORDERS2         0       01_PRIDUCTS         0       01_RODUCTS         0       Dim_Calendar         0       Dim_Product         0       Dim_Supplers         0       Fact_Orders

2. The **Logical Dimension – Customer** window will come up and we're going to set the name of the first dimension. We won't be able to select any root level because no level exists at the moment.

- 50 -



General Tables	
Name: Customer	[]
Educe Constants	
Default root level	•
Structure	
□ Ragged	
Skipped Levels	
Description:	
	<u>^</u>
	-1
OK Cancel	Help

3. After creating the Customer dimension, it's time to create the levels one by one. When we check the customer table, we'll find out that the following columns exist:

Region, State, City, and Customer

51

Working with Logical Dimensions -

**Business Model and Mapping** 🖃 🧭 Sales **-**--E-E Dim\_C New Object ы Logical Level... 🗄 🛄 Dim\_F vel as Root Level Check Out ⊡ Dim\_T -⊞ - ∎act\_S Cut Ctrl+X Copy Ctrl+C Paste Delete Del Check Consistency Mark Set Icon... Expand All Business Model Diagram ۲ Physical Diagram Query Related Objects ۲ Rename Wizard Rename Properties... Estimate Levels

There will be five levels including the GRAND TOTAL level. We're going to click on the **New Object** option on the dimension and select the **Logical Level...** option.

- 52

4. The first level will be the root level, which is also called the Grand Total level of the Customer dimension. Set the name of this level to Customer Total. We're going to select the **Grand total level** checkbox. At this moment the **Number of elements at this level** textbox will be disabled and its value will be set to 1 automatically.

Logical Level - Customer Total			_ 🗆 ×
General Keys Preferred Drill Path	1		
Name: Customer Total			
Number of elements at this level:		(1 for dimer	nsion total)
Grand total level			
Supports rollup to higher level of	aggregati	on	
Child Jevels:			+ ×
Description:			
			4
			~
	× 1	Canad	Hala
0	N	Cancel	Help
For Help, press F1			

53 —

Working with Logical Dimensions \_\_\_\_\_

5. The next level after the Customer Total level is going to be the Region level. This level will be the child level of the root level. That's the reason we're going to select the **New Object** option and the **Child Level...** option on the Customer Total level.

Business Model and Map	ping			Physical
E- Sales				⊟- 🗊 orcl 🛃 Supplie
E- ∰ Dim_Custome	New Object	•	Parent Level	
Dim_Product	Check Out		Child Level Shared Level as P	arent
i⊞ Dim_Time i⊞ III Fact_Sales	Cut	Ctrl+X	Insert Shared Le	vel As Parent
	Сору	Ctrl+C	Shared Level as (	ihid
	Paste	Ctrl≁∀		🗈 - 🛄 D1,
	Delete	Del		Dir
-	Dupicate		-	i ⊡≣a Din i ⊡≣a Din
	Check Consistency			Din Din
	Mark			📄 🗄 Din
	Set Icon Expand All			📔 😟 👘 Fac
-			-	
	Business Model Diagram	•		
	Physical Diagram			
	Query Related Objects	•		
	Rename Wizard			
	Rename			
	Properties			

- 54 -

6. When the **Logical Level** window appears on the screen, we're going to set the name of the level and set the number of elements. The number of elements at each level will be used if the aggregate tables are used. We're going to cover the aggregate tables in *Chapter 3*, *Using Aggregates and the Time Series Functions*.

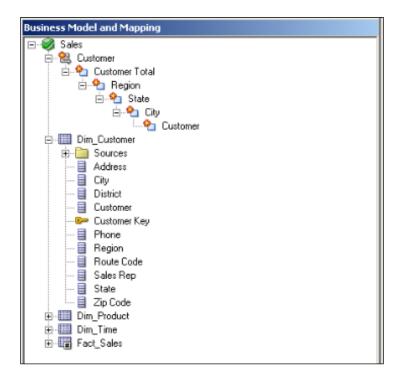
Logical Level - Region	_ 🗆 🗙
General Keys Preferred Drill Path	
	[
Name: Region	_
Number of elements at this level: 3 (1 for dimension	on total)
🗖 Grand total level	
Supports rollup to higher level of aggregation	
Child Jevels:	+ %
Description:	
	*
	-
OK Cancel	Help
For Help, press F1	

55 -

Working with Logical Dimensions -

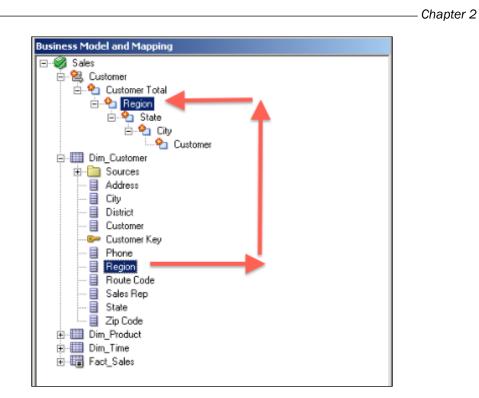
 Remaining levels will be created the same way we created the Region level. We're going to select the Region level and right-click on it and then select the New Object option. Obviously selecting the Child Level... option will bring up the new logical window again.

As a result, you'll see all the levels in the following screenshot:

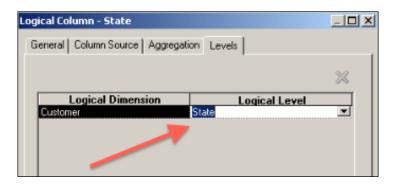


8. The Customer dimension is created with five levels including the Grand Total level. Now we'll have to define the Level and Logical Column mapping. This can be achieved in two ways. You're going to see the drag-and-drop method in the following screenshot. Drag the Region logical column on to the Region level.

- 56



9. The second method of the Level and Logical Column mapping is the manual method. You'll have to open the properties of the logical column. In our scenario it will be the State logical column. Then you're going to select the State level from the **Logical Level** drop-down list.



57 —

Working with Logical Dimensions -

10. After mapping the logical columns with the levels, there will be one more step. The keys and their mapping columns should be defined at each level one by one, except the GRAND TOTAL level, to ensure uniqueness. So you'll see the Keys tab when you double-click on the level. You'll see the Logical Level - Region properties in the following screenshot. We'll create a key definition by specifying the Key Name option and selecting the proper column from the Columns drop-down list. There's also one important setting that is called Use for Display. This checkbox should be selected if you want to drill down through this level. If there's no key selected for display, then the users won't be able to drill down.

Logical Level - Region	h		<u>_ 0 ×</u>
General Keys Pre	eferred Drill Path		
Primary key:			-
			× /
Key Name	Columns	Description	Use for Display
RegionKey	Dim_Customer.Region 🗵		
	SH	Y COLUMNS OULD BE DEFII R EACH LEVEL	
		ОК	Cancel Help
For Help, press F1			1

- 58 -

Business Model and Mapping 🖃 🔞 Sales 🗄 🖳 Customer E-L Customer Total Ė---Lo Region 🜮 Region 🖻 🖓 🔲 State --- 🞥 State 🗄 🗓 City --- 🕪 City E-L Customer 🖗 Customer Customer Key 🖻 🛄 Dim\_Customer Sources - 🗐 Address - 📄 City - 📃 District - 📃 Customer 🕪 Customer Key - 📄 Phone - 📄 Region - 📄 Route Code - 📄 Sales Rep - 📄 State --- 📃 🛛 Zip Code 😟 🛄 Dim\_Product 🗄 🛄 Dim\_Time E - E Fact\_Sales

At the end, the Customer dimension will look as in the following screenshot. All the levels and the logical mappings are defined and all the keys are created at each level.

59 -

Working with Logical Dimensions ———

11. Now we're going to create the Time dimension and all of the steps are going to be the same. The only difference is that we have to select the **Time** checkbox in the **General** tab of the Time dimension in order to gain benefit of the **time-series functions**.

Logical Dimension - Time	_ 🗆 🗙
General Tables	
Name: Time	_
Default goot level: Time Total	•
Structure	
Ime	
E Ragged	
Skipped Levels	
Description:	
	<u>^</u>
	×
OK Cancel	Help
For Help, press F1	

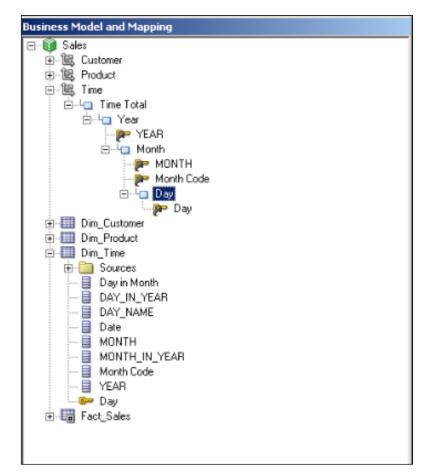


12. Once it's selected, you'll double-click on the **Logical Level** option and notice that the **Keys** tab content is changed. The new column name is called **Chronological Key**. This key is again needed by the time-series functions. We're going to select this checkbox to make the dimension ready for the time-series functions. These functions will be covered in *Chapter 3*, *Using Aggregates and the Time Series Functions*.

Logical Level - Mo	nth			_	
General Keys	Preferred Drill Path				
<u>P</u> rimary key:					<b>T</b>
_may noy.	1				
				× 2	/
Key Name		Description	Use for Display	Chronological Key	
M1Key	MONTH		V		
M2Key	Month Code				
			OK	Cancel He	əlp
Logical Key : "Sales'	"."Time"."Month"."M2Key	": Level Key			

Working with Logical Dimensions -

The Time dimension will be as it is in the following screenshot. It'll have four levels: Grand Total | Year | Month | Day



Business Model and Mapping 🖃 🔞 Sales 🗉 🖳 Customer ⊡. 1 Product Product Total 🖻 - 🕒 Type 🐲 Type Code 🖻 - Loo SubType 🔎 Sub Type 🖻 🗓 Generic - 🔎 Generic È--La Specific 🐲 Product Key 🗩 Specific 🖲 🗟 Time 🗄 🛄 Dim\_Customer Dim\_Product 🖻 🔁 Sources --- 🔄 Dim\_Product Diet Code 📒 Generic Package Weight 📄 Package Code Product Key Specific 📄 Sub Type 📃 Supplier Code 📄 Type Code PRICE ITEMSUPPLIER 😟 🛄 Dim\_Time 🗄 🔚 Fact\_Sales

The Product dimension hierarchy has five levels and it is specified as follows: Grand Total | Type | Sub Type | Generic | Specific

## How it works...

Logical dimensions with level-based hierarchies are going to enable end users to drill down to the analysis in Presentation Services. When you create any analysis and use a logical column that is mapped to a logical level, you'll see that the value is going to be displayed with a hyperlink. So when the user clicks on the hyperlink, it's going to drill down to a lower level. The default action of the columns is set as **Drill Down** if a dimension object exists. Of course this default behavior can be changed from the Analysis Editor in Presentation Services.

Working with Logical Dimensions -

#### There's more...

Another benefit of dimension objects is the use of level-based measures. This will bring a new feature to the analysis in order to create comparison reports. You'll easily create new calculation measures. Additionally, if you want to improve the query performance by using the Aggregate tables, dimension objects will be needed. These subjects also will be covered in *Chapter 3*, *Using Aggregates and the Time Series Functions*.

# **Creating parent-child hierarchies**

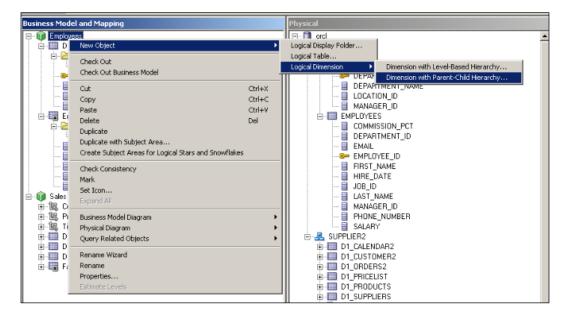
In order to demonstrate the creation of the logical dimension with parent-child hierarchies, we're going to use another data source and another business model. So three new tables are imported into the Physical layer. And all the physical joins and keys are defined. Additionally, a new business model is created and the logical joins are also created in the Business Model diagram. So all the prerequisite steps are done before creating the parent-child hierarchy. You'll notice that there's a logical table called EmployeeManagers and there're 2 columns that will be used in the example. These columns are EMPLOYEE ID and MANAGER ID.

The new business model can be found in the following screenshot:

Business Model and Mapping	Physical
Employees	⊡- 🗊 orcl
DEPARTMENTS	- 🔂 Supplier2_CP
🗄 🖽 Employee	🖻 🛃 HB
EmployeesManagers	DEPARTMENTS
E- Sources	EMPLOYEES
- COMMISSION_PCT	EmployeesManagers
DEPARTMENT_ID	COMMISSION_PCT
EMAIL	DEPARTMENT_ID
- Imployee_id	EMAIL
FIRST_NAME	EMPLOYEE_ID
HIRE_DATE	FIRST_NAME
JOB_ID	📒 HIRE_DATE
🗎 LAST_NAME	JOB_ID
MANAGER_ID	📒 LAST_NAME
PHONE_NUMBER	MANAGER_ID
SALARY	E PHONE_NUMBER
i in the second	SALARY SALARY

## How to do it...

1. Again we're going to right-click on the Business Model and select the **Dimension with Parent-Child Hierarchy...** option.



The new Logical Dimension window will appear on the screen.

- First of all, we're going to set the name of the new dimension. Then it's going to ask to select the parent (**Parent Column**) and child key (**Member Key**) columns. In our scenario, we're going to set the EMPLOYEE\_ID key column as the Member Key and MANAGER\_ID column as the Parent Column.
- 3. Now Oracle BI Server will need a parent-child relationship table. This table will have four columns:
  - Member Key
  - Ancestor Key
  - Distance
  - Is Leaf

Working with Logical Dimensions ——

If you have already created this table manually, then we'll have to select it. Or OBI Server can create it and load the data into it with a wizard. We're going to use the second way. We'll click on the **Parent-Child Settings...** button.

Logical Dimension - Employees	_O×
General Tables	
Name: Employees	
Member Key: esManagers"."EmployeeDim_Key" Brow	ise
Parent Column: ["Employees"."EmployeesManager	(se)
Parent-Dhild Settings	
Description:	
	<u> </u>
OK Cancel	Help
For Help, press F1	

4. The **Parent-Child Relationship Table Settings** window will come up in order to make a selection or just to create this relationship table. You'll see the **Create Parent-Child Relationship Table** button. This button is going to trigger the wizard.

Pare	ent-Child Relat	tionship Ta	ble Setting	5			_ 🗆 🗵
0	n order to enabl object in addition association is neo	to direct pa	arent and chile	dren, a p	arent-child	relationship	table
9	Select a relation	al parent-ch	ild table sour	ce to vie	w its column	details.	
- E	Logical Table	Logical Ta	ble Source	Pa	rent-Child		
E	EmployeesMana	Employees№	lanagers				
						2	1
					1		
Г	Parent-Child Re	elationship T	able Column I	Details -			
	Member Key:						~
	Parent Key:						Ŧ
	<u>R</u> elationship D	istance:					Ŧ
	Leaf Node Ide	ntifier:					Y
			0	к	Cance		Help

Working with Logical Dimensions ————

5. This 3-step wizard is going to ask to specify the path for the scripts. You'll notice that there will be two scripts. One of them is the **DDL** script for creating the relationship table. The other is for loading the data from the EmployeesManager table.

Generate Parent-Child Relationship Table - Script	Location	<u>- 0 ×</u>
Script Location     Parent-Child Relationship Table Details     Preview Script	This wizard will generate SQL scripts for creating and populating parent-child relationship table for logical table sources associated with dimensions supportir parent-child hierarchies to enable ancestor-descendant querying. These script need to be executed manually upon finishing this wizard to create the parent-or relationship table.	s wil
	DDL Script to Create Parent-Child Relationship Table	
	Name: EmployeesParentChild_DL Location: c:\oracle\obi\instances\instance1\bifoundation' Brows	e
	DDL Script to Populate Parent-Child Relationship Table Name: EmployeesParentChildLoadData	
	Location: c:\oracle\obi\instances\instance1\bifoundation' Brows	e
Help	Back. Next Enish Ca	ncel

6. You'll select the physical database and the schema where the scripts are going to be executed in the second step of the wizard.

Generate Parent-Child Relationship Table - Parent	-Child Relationship Table Details	
1 Script Location	Provide details for the parent-child relationship table that will be created/populate executing the scripts generated in this wizard.	d on
2 Parent-Child Relationship Table Details	Name: EmpManagerPC	
3 Preview Script	Description	
		×
	Physical Location	
	Data Source: orcl	
	Catalog/Schema: HR	]
	Logical Associations	
	Dimension: Logical Dimension	
	Logical Table: EmployeesManagers	
	Logical Table Source: EmployeesManagers	
Help	Back Next Enish Can	cel



7. The last step of the wizard contains the script content. You can easily preview the scripts.

Generate Parent-Child Relationship Table - Previe	w Script	
1 Script Location	The following SQL (DDL Script) will need to be executed manually upo wizard to create the parent-child relationship table.	n finishing this
2 Parent-Child Relationship Table Details		View Script
3 Preview Script	CREATE TABLE EmpManagerPC ( MEMBER_KEY NUMBER(10,0), ANO NUMBER(10,0), DISTANCE NUMBER(10,0), IS_LEAF NUMBER(10,0)	
	J The following SQL will need to be executed manually upon finishing th populate the parent-child relationship table.	his wizard to
	declare v_max_depth integer; v_stmt varchar2(32000);	L L L
Help	Back Mext Einish	Cancel

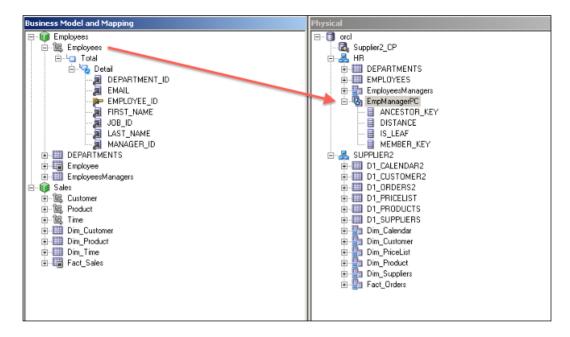
8. Clicking on **Finish** is going to bring the **Parent-Child Relationship Table Settings** window back, and you'll find out that all the column mappings are done automatically.

Parent-Child Relationship Ta	ble Settings	_ 🗆 🗵			
In order to enable querying of all ancestors and descendants of a given repository object in addition to direct parent and children, a parent-child relationship table association is necessary with the relational logical table source of the hierarchy.					
Select a relational parent-chi	ld table source to view its column details.				
Logical Table Logical Ta					
EmployeesMana EmployeesM	lanagers EmpManagerPC 🛛 🧱	) 🔝 🗙			
Parent-Child Relationship Ta Member Key:	MEMBER KEY				
Parent Key:	ANCESTOR_KEY	-			
Relationship Distance:	DISTANCE	•			
Leaf Node Identifier:	IS_LEAF	•			
	OK Cancel	Help			



Working with Logical Dimensions

9. When the creation of the Employee dimension is completed, you can check if the parent-child relationship table exists in the physical layer or not. Actually, the wizard creates this table and loads the data into it. And then it also imports this table to the physical layer and creates the physical joins as well. You can see the details in the following screenshot:



## How it works...

Dimension with the parent-child hierarchy is very similar to the dimensions with level-based hierarchies. The only difference is that all the members at all levels are the same type in the parent-child hierarchy. The benefits are also same.

#### There's more...

Logical Dimension Hierarchies can be added to the Subject Area in the Presentation layer. So the users can see the hierarchies before they drill down. This is a new feature that is introduced in the OBI 11g Server.



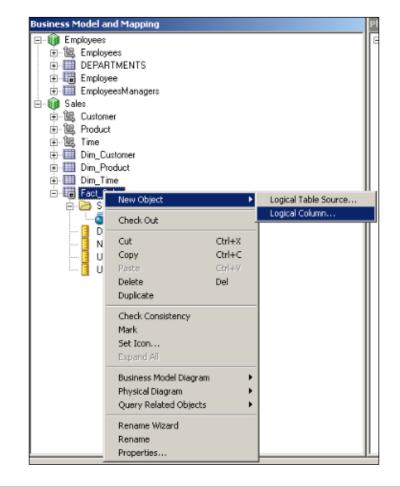
# **Creating level-based measures**

A **level-based** measure is a column whose values are calculated to a specific level aggregation such as YearRevenue or StateRevenue. For example, if the business users want to calculate the total revenue for the GRAND TOTAL level of the Customer dimension, we're going to create a level-based measure, which will be mapped to GRAND TOTAL level of the Customer dimension and this will calculate total revenue across all regions.

In order to create the level-based measure, dimensions and hierarchies should be created before. Then we're going to create a new logical measure column and map it to a specific level.

#### How to do it...

1. First step will be creation of a logical measure column. So we're going to right-click on the fact table and select the new **Logical Column** option.





Working with Logical Dimensions \_\_\_\_\_

2. When the **Logical Column** window comes up, we're going to write the name of the measure column. Region Total Dollars is used in the example.

Logical Column - Region Total Dollars	
General Column Source Aggregation Levels	
Name: Region Total Dollars Belongs to Table: ["Sales"."Fact_Sales''	(UNKNOWN)
Sort order column:	
None Set	⊈lear
Descriptor ID column:	
None Set	Cjear
Desc <u>iption:</u>	×
OK Cano	el Help



3. Instead of mapping this logical column with a physical column, we're going to just map it to another existing logical column. In our case it'll be the Dollars logical column. So we're going to check the **Column Source** tab and select the **Derived from existing columns using an expression** option. After that, logical column Dollars is going to be the source for the Region Total Dollars **column**. At this moment, this logical column will definitely be the same as Dollars.

Logical Column - Region Total Dollars		<u>_ 0 ×</u>
General Column Source Apprepation Leve	els	
Data Type: DOUBLE Length: Derives from: Dollars:[DAggr(Fact_Sales.Dollars)]	F F	▼ Naliable
Column Source Type C Derived from physical mappings		
Logical Table Source	Mapped as	
		▶
	Edt	Unmap
Derived from existing golumns using an existing golumns using an existing golumns using an exist of the ex	expression	
"Sales"."Fact_Sales"."Dollars"		×
OK	Cancel	Help

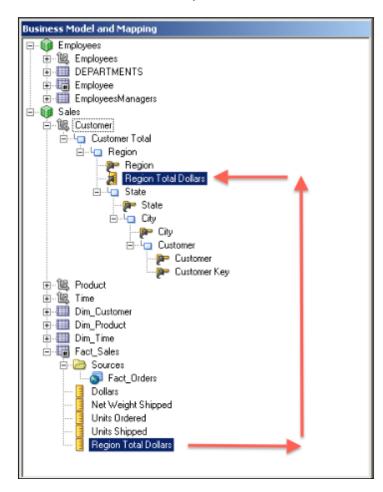
Working with Logical Dimensions \_\_\_\_\_

4. But when we clicked on the **Levels** tab, we'll see all the dimensions. We're going to select a level in one dimension. In our case the **Region** level is selected for the Customer dimension.

ogical Column - Region Total Dollars	<u>_ D ×</u>
General Column Source Apprepation Levels	
	*
Logical Dimension Logical Level	
Customer Region	▾
Product Time	
0K Cancel	Help

- 74 -

5. Clicking on **OK** will take you to the Business Model layer again. You'll notice that the Region Total Dollars logical column is mapped with the logical level, **Region**, in the **Customer** dimension automatically.



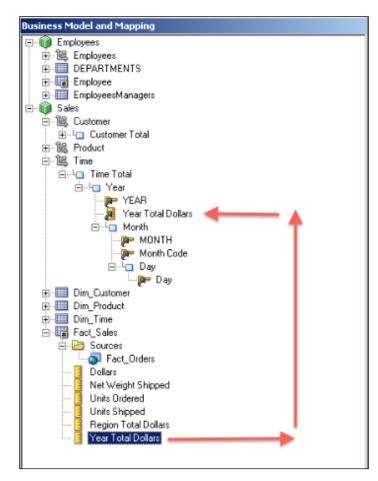
Working with Logical Dimensions ——

6. Just to have one more example, we can easily create one more logical column which is referencing the Dollar logical column. But this time we're going to map this to another level in another dimension. The last example is the Year Total Dollars column.

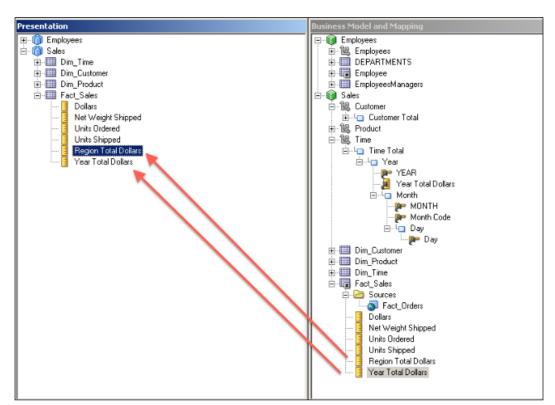
Logical Dimension Logical Level Customer Product Time Year	ıl Column - Year To	tal Dollars			
Logical Dimension         Logical Level           Customer         Product           Time         Year	eral Column Source	Aggregation	Levels	1	
Logical Dimension Logical Level Customer Product Time Year				,	
Customer Product Time Year					$\times$
Product Time Year	Logical Dimen	sion	1	Logical Leve	el
Time Year					
	ne	: Te	31		
OK Cancel Help					



7. And again the measure is automatically mapped to the corresponding level.



Working with Logical Dimensions -



8. We're going to add the new logical columns to the subject area. So end users will access these two new measures from Presentation Services.

## How it works...

After creating new measures, we'll be easily accessing these two measures from the Analysis Editor. Here's an example that contains the new measure. Four columns are already selected:

- ► YEAR
- ► MONTH
- ▶ Dollars
- ▶ Year Total Dollars

- 78

The new measure shows the total value that is aggregated at the YEAR level. You'll see that the total amount of dollars for January is 3,568,665 and the total value for the year is 47,748,591.

Criteria Results Prompts Adv	anced				
🗆 Subject Areas 🛛 🏟 🖓 🗸	🗟 🗸 🖻 🗸 🗷	6 🐴	🖻   🗳 - 6	🔒 😭   🔛 🏡	😭 😥
<sup>(1)</sup> Sales <sup>(2)</sup> Sales <sup>(2)</sup> Dim_Time	Compound La	yout			
Dim_Customer     Dim_Product     Fact_Sales	Table			<b>D</b>	× ×
	YEAR	MONTH	Dollars	Year Total Dollars	
	1,998	January	3,568,665	47,748,591	
	1,998	February	3,884,407	47,748,591	
	1,998	March	3,975,734	47,748,591	
	1,998	April	3,907,255	47,748,591	
	1,998	May	4,061,557	47,748,591	
Catalog 🐁 😓 🥒 🚱	1,998	June	3,994,531	47,748,591	
ist Al	1,998	July	4,054,411	47,748,591	
	1,998	August	4,242,611	47,748,591	
My Folders	1,998	September	3,810,263	47,748,591	
Shared Folders	1,998	October	4,596,372	47,748,591	
	1,998	November	3,655,169	47,748,591	
	1,998	December	3,997,616	47,748,591	
Views 🛛 🐁 🕒 🗸 🐙 🗙	Grand		47,748,591	47,748,591	

## There's more...

When it comes to creating reports in Presentation Services, we'll have to think about how to measure the sales or productivity in an organization. We should not only show the values or amounts. These values should be comparable and measurable.

## **Creating shared measures**

Shared measure is a measure that is calculated by using a level-based measure. There's no difference when you compare it with other logical measures.

79 –

Working with Logical Dimensions -

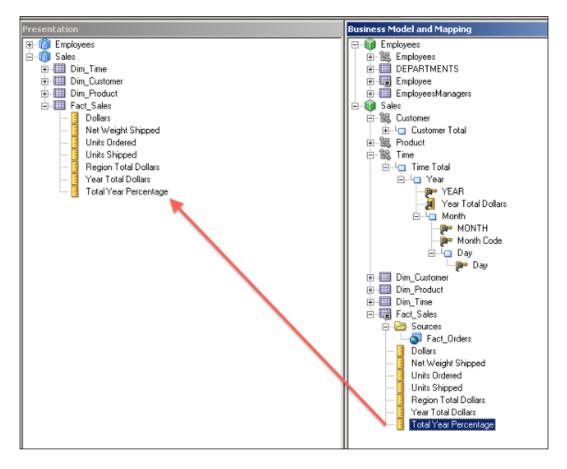
How to do it...

1. We're going to create a new logical column in the fact table and again we're going to define a formula. In the formula, we're going to use a level-based measure as well. The formula I used in my demonstration is as follows. It's going to calculate the percentage of a month level sales amount with the total year level sales.

(Sales.Fact\_Sales.Dollars / Sales.Fact\_Sales.Year Total Dollars )
\* 100

This time we're not going to change anything in the **Levels** tab. We're going to leave the settings as it is.

Logical Column - Total Year Percentage
General Column Source Aggregation Levels
Data Type: DOUBLE Length: IV Nullable
Derives from:
sum(Fact_Orders.ACTLEXTND) / nullif( sum(Fact_Orders.ACTLEXTND)
Derived from physical mappings     Show all logical sources     Logical Table Source Mapped as
▲▶
Edit Unmap
Derived from existing columns using an expression
("Sales"."Fact_Sales"."Dollars" / "Sales"."Fact_Sales"."Year 🔺 Total Dollars" ) * 100
OK Cancel Help



2. As usual, the new logical column should be added to the **Presentation layer**. So we're going to drag it onto the corresponding fact table.

Working with Logical Dimensions

### How it works...

After starting to create a new analysis, we're going to see the new measures and use them in the analysis. As you see in the following example, there are five different columns:

- ► YEAR
- ► MONTH
- ▶ Dollars
- Year Total Dollars
- Total Year Percentage

Untitled						
Criteria Results Prompts Advance	ed					
🗆 Subject Areas 🛛 🍓 🖓 🗸	- A. 10	6 4	8 3~ 6	8 😵 🔛 🖌	🗃 🗟 😼 👪	
	ompound La					-
E Dim Time	compound cu	your				-
E Dim_Customer	Table					×
Dim_Product	10.770751111111111111					77
E Fact Sales						
	LUT LD	MONTH		Year Total	Total Year	
	YEAR	MONTH	Dollars	Dollars	Percentage	
	1,998	January	3,568,665	47,748,591	7%	
	1,998	February	3,884,407	47,748,591	8%	
	1,998	March	3,975,734	47,748,591	8%	
	1,998	April	3,907,255	47,748,591	8%	
	1,998	May	4,061,557	47,748,591	9%	
Catalog 😤 🐻 🖉 🚱	1,998	June	3,994,531	47,748,591	8%	
List Al	1,998	July	4,054,411	47,748,591	8%	
	1,998	August	4,242,611	47,748,591	9%	
E My Folders	1,998	September	3,810,263	47,748,591	8%	
E Shared Folders	1,998	October	4,596,372	47,748,591	10%	
	1,998	November	3,655,169	47,748,591	8%	
	1,998	December	3,997,616	47,748,591	8%	
	Grand		47,748,591	47,748,591	100%	

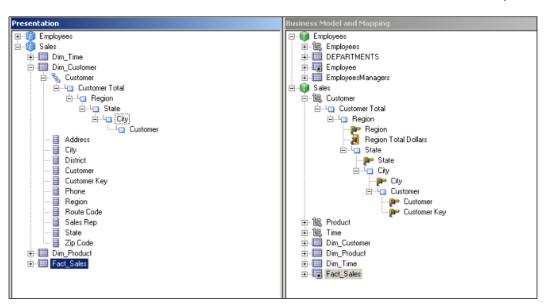
# **Creating presentation hierarchies**

In the OBIEE 10g, this feature was not supported. Exposing the hierarchies enables end users to learn about the levels of the dimensions without drilling down. This feature is introduced with OBI 11g.

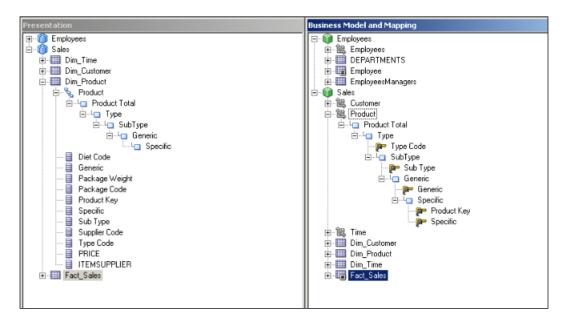
#### How to do it...

1. We're going to just drag the Customer dimension on to the Customer Presentation table. You'll see that the hierarchy is exactly the same as it is on the BMM layer.

#### Chapter 2



2. We'll repeat the same task for the Product dimension as well. After that we'll have all the hierarchies at the Presentation layer. Now users will be able to use the hierarchies in their analyses.



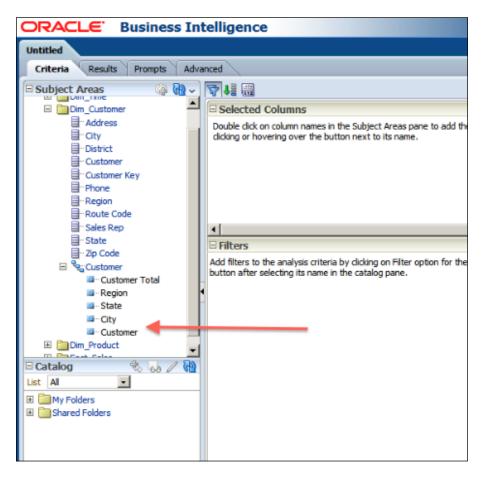
Working with Logical Dimensions

## How it works...

- Now it's time to check these hierarchies at Presentation Services. After logging in to Presentation Services, we're going to start creating a new analysis. You'll see the new hierarchies in the Subject Area pane. The following are the two dimensions in our sample scenario:
  - You can see the Product dimension in the following screenshot:

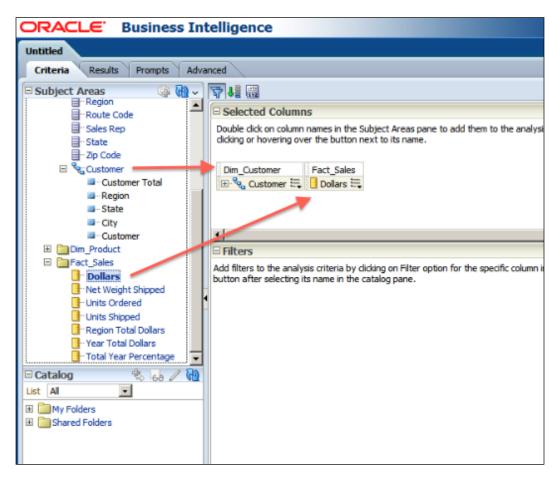


 You can see the Customer dimension and its levels in the following screenshot:



Working with Logical Dimensions -

2. Now, instead of dragging any presentation column to the **Selected Columns** section, we'll drag the entire hierarchy. We're going to add a measure column as well. We're going to use the Customer hierarchy. So both objects are added to the **Selected Columns** area.



3. When you click on the **Results** tab, you'll see **that Pivot Table** view is added to the analysis because of the hierarchy. If you have used a presentation column, a **Table** view was going to be added to the hierarchy. This is the default behavior in the **OBI 11**g version. End users will expand and collapse the levels easily with this **Pivot Table** view.

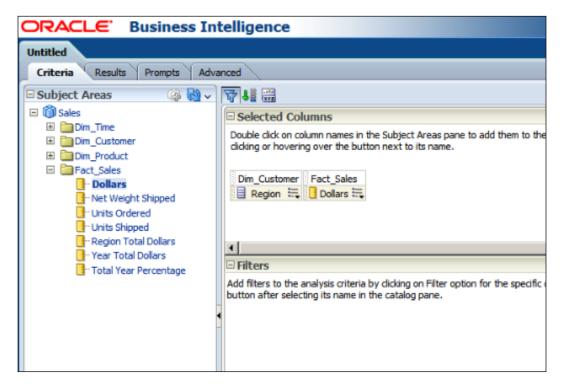
ced Compound Layout Pivot Table Customer Customer Total Customer Total			
Compound Layout Pivot Table Customer Customer Customer Total Central East	Dollars 63,036,793 12,919,162	8	
Pivot Table Customer Customer Total Customer Total E Central E East	Dollars 63,036,793 12,919,162		
Customer Customer Total Central East	Dollars 63,036,793 12,919,162		
Customer Total Central East	63,036,793 12,919,162		
Customer Total Central East	12,919,162		
E Central East	12,919,162		
ElEast			
	24,977,381		
H CT			
	5,437,124		
	2,508,609		
ΞFL	1,385,242		
🗄 GA	240,347		
ΞKY	992,645		
⊞ MA	3,043,479		
E MD	115,710		
	38,236		
⊞ NC	3,950,813		
E NH	4,161,812		
ENY	704,506		
Rochester	704,506		
Billy's Hickory-Pit Bar-B-Q	663,654		
Cafe At The Pfister	17,942		
Ray's Original Buffalo Wings	22,910		
⊞PA	438,956		
⊞RI	658,569		
1 TN	1,289,598		
⊞ VA	11,550		
II VT	185		
		Image: Big Stress of the second s	

Working with Logical Dimensions -

There's more...

If you don't want to use hierarchies in the **Criteria** tab in the Analysis Editor, then the **Table** view is going to be added. And this time, users are going to gain the benefit of the drill-down feature.

You'll see that only the **Region** presentation column and the **Dollars** measure are added to the analysis.



Now the users may drill down by clicking on the hyperlink easily.

ORACLE' Business Inf	lligence	
Untitled		
Criteria Results Prompts Adva	ed	
🕒 Subject Areas 🛛 🎲 🏹	≟-	-
🗆 🔞 Sales	Compound Layout	
	Title 🔽 🗶	
	Region Dollars	
	Central 12,919,162	
	East 24,977,381	
HYPERLINK	West 25,140,251	

Clicking on the hyperlink will navigate you to one lower detail. In our case, the **West** value is clicked and it drills down to details.

Concession Challens
Region State Dollars
West AZ 499,906
CA 16,066,427
ID 570,769
NM 2,255,651
NV 1,486,924
OR 1,469,798
UT 2,669,280
WA 121,496

# **3** Using Aggregates and the Time Series Functions

In this chapter, we will cover:

- Creating aggregate tables
- Implementing aggregate tables
- Using the Aggregate Persistence Wizard
- Creating calculations by using the time series functions

# Introduction

As a general practice, the data warehouse is maintained at the lowest granular level. Data warehouse performance bottlenecks are often due to **measure aggregation**. For example, to have some amount of dollars at different levels of dimension hierarchy, a calculation will be needed at runtime. This will impact the performance. Business users should wait for the result set until the calculation regarding the required aggregation is done. Based on the amount of data, the calculations at runtime will be very resource intensive.

So in order to improve the performance of the queries, we're going to use aggregate tables (summary tables). Aggregate tables store precomputed measure values that have been aggregated at different levels of hierarchies. These tables will make the queries run faster. After having aggregate tables, the queries won't consume as much hardware resources as before.

Using Aggregates and the Time Series Functions -

## **Creating aggregate tables**

Aggregate tables should be designed according to business requirements. We should monitor the usage statistics of the analysis and then we'll make a decision about the levels of hierarchies that will be stored in the aggregate tables.

### How to do it...

- 1. Let's assume that the most frequently accessed hierarchy levels are:
  - Product hierarchy: Subtype level
  - **Time hierarchy**: Year level
  - Customer hierarchy: State level

So we're going to create three aggregate dimension tables and one aggregate fact table based on our sample scenario. The first table is named as DIM\_STATE\_AGG. This table stores the attribute columns regarding the STATE level and also it contains higher levels as well, which is the REGION level. You can see the sample view of the table in the following screenshot:

olumns Dal	ta Constraints	Grants Statistic	s   Triggers   Flashback   D	ependencies	Details  Indexes  S0
🞝 🚯 ۴	XBB	Sort   Filter:			
2	REGIONKEY 🚦	STATEKEY	LEVEL_KEY 🚦 REGION	STATE	
1	44	1	0 Central	IL	
2	44	2	0 Central	IN	
3	44	3	0 Central	LA	
4	44	4	0 Central	MN	
5	44	5	0 Central	MO	
6	44	6	0 Central	NE	
7	44	7	0 Central	OH	
8	44	8	0 Central	ОК	
9	44	9	0 Central	TX	
10	44	10	0 Central	WI	
11	60	11	0 East	СТ	
12	60	12	0 East	DC	
13	60	13	0 East	FL	
14	60	14	0 East	GA	
15	60	15	0 East	KY	
16	60	16	0 East	MA	
17	60	17	0 East	MD	
18	60	18	0 East	ME	
19	60	19	0 East	NC	
20	60	20	0 East	NH	
21	60	21	0 East	NY	



- DIM\_SUBTYPE\_AGG SUPPLIER2 Columns Data Constraints Grants Statistics Triggers Flashback Dependencies Details Indexes SQL 📌 🝓 🛃 🗶 🐻 🐘 | Sort... | Filter: E TYPEKEY A SUBTYPEKEY E LEVELKEY SUBTYPE TYPE\_CODE SQL History
- 2. The second table stores SUBTYPE and TYPE levels of data and it's called as DIM\_SUBTYPE\_AGG.

3. The last aggregated dimension table is DIM\_YEAR\_AGG. It only stores YEAR level of data. The parent level of YEAR level is GRAND TOTAL. So there are no other levels that are higher than YEAR level.

SUPPI	JER2	DIM_YEAR_AGG		
Columns	Data Constra	aints   Grants   St	tatistics   Tr	riggers   Flashback   Dependencies   Details   Indexes   SQL
📌 🚯	🛃 🗶 🚳 I	🐘   Sort	Filter:	
	YEARKEY	LEVELKEY	YEAR	
1	1	0	1998	
2	2	0	1999	
_	_			



Using Aggregates and the Time Series Functions -

4. Here is the aggregated fact table, which is called as FACT\_SALES\_AGG. This table stores precomputed measure that are aggregated at YEAR, SUBTYPE, and STATE levels.

nns (	Data Const	traints   Grants	Statistics	Triggers Flashback Depend	len	cies   Details   Indexes   SQL			
<u>69</u> [	🍦 🗶 👒	🐘   Sort	Filter:						
2	STATE	SUBTYPE	YEAR	DOLLARS		NET_WEIGHT	2	UNITS_ORDERED	UNITS_SHIPPED
1	19	92	1	27352.109931468963495		21341.5299444198607469		2292	2268
2	19	101	1	6959.0600309371948055		6076.20000076293945		307	307
3	19	29	1	97871.11990165710435		20048.340136408805783		3649	3627
4	19	65	1	22320.020111083984273		11817.479978561401319		503	501
5	19	18	1	22578.130045890808045		10098.28999328613281		976	965
6	4	138	1	2132.3899788856506393		1164.089994430541983		134	129
7	5	39	1	2155.5699977874755786		1250.519995480775832568		329	320
8	5	55	1	34056.880115509033069		11658.199970245361282		664	608
9	5	5	1	27094.010049819946231		9509.5699965953826913		623	617
10	5	16	1	660.6699972152709951		166.07000100612640414		46	44
11	5	142	1	24081.4699262380599763		14239.96998041868207731		883	789
12	28	75	1	408979.7808383703226888		428218.3301284313198794		22488	22249
13	28	42	1	127543.21974870562533805		72471.6100335121153272		4477	4327
14	28	6	1	79788.4100046157833886		161441.74018669128411		5659	5509
15	28	101	1	10142.2900376319885439		8932.9200141429900952		673	647
16	28	1	1	1034087.7109723091121026		569561.918435573577542		27165	26888
17	28	146	1	33454.3500020503996894		11966.650019645690896		1905	1870
18	28	76	1	103744.2001163959499669		90128.6501698493954937		11381	11280
19	28	136	1	2308.38999989628791345		500.79000209271907851		76	71
20	28	78	1	307617.64095115661578	1	86282.96003007888789694		7559	7339
21	28	98	1	159765.989922888576614		232303.839965820312401		10031	9795

## How it works...

After creating these aggregate tables, we'll expect that whenever someone executes a query that includes the sum of DOLLARS and STATE attribute column, the query will be satisfied from the FACT\_SALES\_AGG table instead of the detailed fact table. Eventually the query response time will be reduced and it won't be a resource intensive query. At the end, this will improve the performance of the queries. We'll have to make some changes in the repository so that the BI server can navigate the query to the proper fact table depending on the selected levels.

#### There's more...

Creating and maintaining these aggregate tables also has a cost. Normally, it's not easy to modify the database, because creating one more table means that new **Extraction**, **Transformation**, **and Loading** (**ETL**) **processes** need to be defined and maintained, in addition to the ones that already exist.

Plus, there could be many aggregate tables depending on the number of dimensions and the number of levels in the hierarchies. Creating all of the aggregate tables for every combination of levels at different dimension hierarchies is also not recommended. It won't be easy to maintain the ETL process. On the other hand, having aggregate tables will definitely improve the performance. So we should balance the number of aggregate tables. We should first monitor the usage statistics, and then we should decide about the levels that the aggregate tables would store.

Let's assume that the data warehouse is populated every night at 2:00 A.M. Now once the detailed fact table is loaded from various sources, you'll have to recalculate these aggregate tables. Having many aggregate tables will increase the time of the ETL process.

Using a multidimensional source is another solution for summary reports. Instead of creating aggregate tables, we can use the Essbase server to create **OLAP Cubes** and store the summary results in these cubes. This is going to be covered in the *Chapter 4*, *Working with Multidimensional Data Sources*.

# Implementing aggregate tables

In order to improve query performance, we have created aggregate tables at the database level. Now we're going to modify the Physical and BMM layers of the repository to gain benefit of summary data.

- Physical layer: Aggregate tables should be imported and physical joins should be created
- Business Model and Mapping layer: Secondary logical table sources are going to be added to the corresponding logical tables
- Presentation layer: No modification will be made at this layer. Usage of aggregate tables will be transparent to the end users

## How to do it...

1. As we have already demonstrated how to import tables into the Physical layer in *Chapter 1, Exploring and Building the Repository*, you won't find every detailed step in this task. Here is the screenshot that shows the imported tables.

				DIM_SUE	TYPE_AG	GG		<u> </u>					
				Columns	4 Types	Length	Nulla						
				LEVELKEY	DOUBLE	15	True						
				SUBTYPE	INT	5	True						
				SUBTYPEKEY	DOUBLE	15	True						
				TYPEKEY	DOUBLE	15	True	-1					
					1			_					
蕭 DIM_YEA	R_AGG		<u> </u>	THE FACT_SA	LES_AGG	ì		-	m DIM_ST	ATE_AGG			<u>∎</u>
E DIM_YEA	R_AGG	Length	941a	FACT_SA	ALES_AGO	_	Nulla		E DIM_ST	ATE_AGG	Length	Null	
Columns	_	Length 15				_	Nulla True				Length	Null True	÷
Columns	Types		Nulla	Columns	🛆 Types	Length	_		Columns	∠ Types			÷
Columns -	DOUBLE	15	Nulla True	Columns DOLLARS	C Types DOUBLE	Length 15	True		Columns LEVEL_KEY	Z Types DOUBLE	15	True	÷

2. The physical joins between the fact table and all three dimensions tables should be created. The first physical join is between FACT\_SALES\_AGG and DIM\_SUBTYPE\_AGG tables. The join condition is as follows:

"orcl".""."SUPPLIER2"."DIM\_SUBTYPE\_AGG"."SUBTYPEKEY" =
"orcl".""."SUPPLIER2"."FACT\_SALES\_AGG"."SUBTYPE"

The definition of the join object is as seen in the following screenshot:

Physical Foreign Key - FACT_SALES_AGG_FKey#1		_ 🗆 🗙
Name: FACT_SALES_AGG_FKey#1		
Table:	Table:	
DIM_SUBTYPE_AGG	FACT_SALES_AGG	
⊆olumn:	Column:	
Name Type Operator:	Name	Туре 🔺
SUBTYPEKEY DOUB	NET_WEIGHT	DOUB
EVELKEY DOUB	STATE	DOUB-
SUBTYPE INT	SUBTYPE	DOUB
TYPEKEY DOUB	UNITS ORDERED	DOUB
Driving table: None Type:	Inner	7
Cardinality		
C N C 0,1 C L C Unknown	C 1 C 0,1 € N C	Unknown
Hint:		
Expression:		
"ord".""."SUPPLIER2"."DIM_SUBTYPE_AGG"."SUBTYPEKEY" =		<u>~</u>
"ord".""."SUPPLIER2"."FACT_SALES_AGG"."SUBTYPE"		
		v
	OK Cancel	Help .



3. The second join is between FACT\_SALES\_AGG and DIM\_STATE\_AGG tables and here is the join condition:

```
"orcl".""."SUPPLIER2"."DIM_STATE_AGG"."STATEKEY" =
"orcl".""."SUPPLIER2"."FACT_SALES_AGG"."STATE"
```

The definition of the join object is as seen in the following screenshot:

Physical Foreign Key - FACT_SALES_AGG_FKey#2		<u>_                                    </u>
Name: FACT_SALES_AGG_FKey#2		
Iable:	Table:	
DIM_STATE_AGG	FACT_SALES_AGG	
<u>C</u> olumn:	C <u>o</u> lumn:	
Name Type Operator:	Name	Type 🔺
STATEKEY DOUB	DOLLAR5	DOUB
LEVEL_KEY DOUB	NET_WEIGHT	DOUB
REGION VARCI	STATE	DOUB
REGIONKEY	SUBTYPE	DOUB
Driving table: None Type:	Inner	<b>*</b>
Cardinality		
C N C 0,1 C I C Unknown	C 1 C 0/1 C N C	Unknown
Hint:		
Expression:		
"ord".""."SUPPLIER2"."DIM_STATE_AGG"."STATEKEY" = "ord".""."SUPPLIER2"."FACT_SALES_AGG"."STATE"		-
		<b>v</b>
	OK Cancel	Help

4. The last join is between FACT\_SALES\_AGG and DIM\_YEAR\_AGG tables and its condition is as follows:

```
"orcl".""."SUPPLIER2"."DIM_YEAR_AGG"."YEARKEY" =
"orcl".""."SUPPLIER2"."FACT_SALES_AGG"."YEAR"
```

The definition of the join object is as seen in the following screenshot:

Physical Foreign Key - FACT_SALES_AGG_FKey		_ 🗆 🗵
Name: FACT_SALES_AGG_FKey		
Table:	Table:	
DIM_YEAR_AGG	FACT_SALES_AGG	
<u>C</u> olumn:	C <u>o</u> lumn:	
Name Type Ogerator:	Name	Type 🔺
CONTRACTOR DOUBLE	UNITS_ORDERED	DOUB
VEAR DOUBLE	YEAR	DOUB
		•
Driving table: None Type:	Inner	7
Cardinality		
CN C0,1 C1 CUnknown	O 1 O 0,1 © N	C Unknown
Hint:		
Expression:		
"ord".""."SUPPLIER2"."DIM_YEAR_AGG"."YEARKEY" = "ord".""."SUPPLIER2"."FACT_SALES_AGG"."YEAR"		<u> </u>
ord i i soft aaste i i Her jandes noor i eek		
		_
		× .
	OK Cancel	Help

- 5. Now we'll have to make modifications at the Business Model and Mapping layer. We will add one more logical table source to the Dim\_Customer logical table. The first logical table source will be mapped to the detailed dimension table at the Physical layer. The second logical table source will be mapped to the aggregate dimension table.
- 6. Create a new logical table source by right-clicking on the Dim\_Customer logical table and selecting the **New Object** | **Logical Table Source** option. This will bring up the new window and we're going to set the name of the logical table source as Agg CustomerLTS.

7. We're going to select the physical table by clicking the + sign. After selecting the aggregate dimension table, you'll see the window as displayed in the following screenshot.

Logical Table Source - Agg_(	CustomerLTS			<u>_ 0 ×</u>
General Column Mapping C	Content Parent-Child Se	ttings		
Name: Agg_CustomerLTS				
Djsabled	Dimension Browse			
Map to these tables:				* ×
UPPLIER2''	DIM_STATE_AGG"			
joins:				
Table 1	Table 2	1	Гуре	
⊻iew Details				
Priority Group: 0				
Description:				
				×
		OK	Cancel	Help

8. Now we're going to make the column mapping on the **Column Mapping** tab of the same **Logical Table Source**. You'll see that only two columns are mapped and all the others are unmapped. This is because the aggregate dimension table doesn't store any details except the STATE and REGION levels.

ogical column to physical column m	anning				
	apping:			& E	Ŷ
Logical Column	Expression		Physical Ta	ble	Γ
Address		×			
Dity		×			
Customer		<b>X</b>			1
Customer Key		×			1
District		<b>X</b>			1
Phone		×			
Region	REGION	<b>X</b>	DIM_STATE_AG	iG	
Route Code		<b>X</b>			
Sales Rep		×			
State	STATE	×	DIM_STATE_AG	G	L
Zip Code		×			



9. The last modification will be done on the **Content** tab of the **Logical Table Source**. We'll have to define the levels at which this logical table source can satisfy queries. This step is very important. Making any kind of mistake will cause the BI server to use a wrong logical table source for the queries. We're going to select the State level for the Customer Logical Dimension. Setting this property means that any query that contains the State or higher level columns (such as Region Level) will be satisfied by using the AggCustomerLTS logical table source.

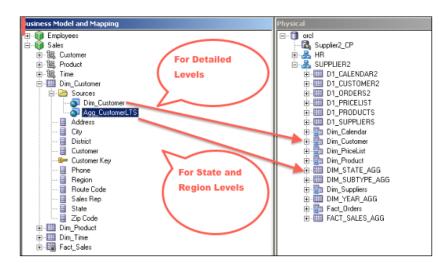
Logical Table Source - Agg_(	CustomerLTS		_ 🗆 🗙
General Column Mapping C	Content Parent-Child Settings		
Aggregation content, group b	y Logical Level		
239-9	, berg stranger and a second		More
Logical Dimension	Logical Level		
Customer	State 🔀		
Eragmentation content:			
Eragineriation content.			
			- ⊡
			-
This source should be car	nbined with other sources at this le	vel	_
	er to limit rows returned (exclude th		
	er to inne tows retained (exclude an	e whene p	
			- <u>B</u>
			-
Select distinct values			_
	OK	Cancel	Help

10. The Content tab of the Logical Table Source window shows the levels that this source would satisfy. So we have to modify the content of the first logical table source to the most detailed level in the hierarchy.

Logical Table Source - Dim_(	Eustomer		<u>_ 0 ×</u>
General Column Mapping C	Content Parent-Child Settings		
Aggregation content, group b	y Logical Level		-
	, j <del>ant and a</del>		More
Logical Dimension	Logical Level		
Customer	Customer 🔀		
Fragmentation content:			
Eragmeniation content:			
			- ⊡
			-
This source should be con	mbined with other sources at this le	vel	_
	ter to limit rows returned (exclude th		
		,	
			- <u>E</u>
			-
Select <u>distinct</u> values			
	ОК	Cancel	Help
			/

11. We have created the second logical table source for the Dim\_Customer logical table. Expand the Sources folder to see the logical table sources. The BMM Layer will look like the following screenshot:

#### Chapter 3



12. It's time to do similar steps for the remaining two dimension tables and one fact table. The steps are going to be exactly the same. We're going to add the second logical table source that will be mapped to the proper aggregate dimension table and then check the column mappings in order to be sure about whether the correct mappings are done. The last step will be about setting the proper level depending on the data that is stored in the aggregate tables. So you'll see that the second logical table source of the Dim\_Product table is also created as follows:

ical Table Source - Agg_Proc	ductLTS		_ 0
eneral Column Mapping Conte	ent   Parent-Child Settings	1	
cucia l'account adda à l'accou		1	
Name: Agg ProductLTS			
Djsabled	Dimension Browse		
dap to these tables:			🕂 🕂
Urord""SUPPLIER2"."DIM_	CUDTVDE ACC"		
OICH SUFFLIERZ . DIM	SUBITE_Add		
ical Table Source - Agg_Pro	ductLTS		_ 0
eneral Column Mapping Cont	ent   Parent-Child Settings	1	
	_		
Show mapped columns	V	Show unmapped	columns
			R. 🔗
Logical column to physical colum	n mapping:		1210 E
Logical Column	Expression	Physic	al Table
Logical Column Diet Code		Physic	al Table
Diet Code Generic		Physic X	al Table
Diet Code Generic ITEMSUPPLIER		Physic X	al Table
Diet Code Generic		Physic X X X	al Table
Diet Code Generic ITEMSUPPLIER		Physic X X X	cal Table
Diet Code Generic ITEMSUPPLIER Package Code		Physic X X X	cal Table
Diet Code Generic ITEMSUPPLIER Package Code Package Weight		Physic X X X X X X X X	cal Table
Diet Code Generic ITEMSUPPLIER Package Code Package Weight PRICE Product Key Specific	Expression		
Diet Code Generic TEMSUPPLIER Package Code Package Weight PRICE Product Key Specific Sub Type		Physic	
Diet Code Generic TEMSUPPLIER Package Voight Package Voight PRIOLE Product Key Specific Sub Type Supplier Code	Expression SUBTYPE	X X X X DIM_SUB	TYPE_AG
Diet Code Generic TEMSUPPLIER Package Code Package Weight PRICE Product Key Specific Sub Type	Expression		TYPE_AG
Diet Code Generic TEMSUPPLIER Package Voight Package Voight PRIOLE Product Key Specific Sub Type Supplier Code	Expression SUBTYPE TYPE_CODE	X X X X DIM_SUB	TYPE_AG
Diet Code Gereric TEMSUPPLIER Package Volght Package Volght PRICE Soub Type Soub Type Soub Type Soub Type Code Type Code col Table Source - Agg_Proc	Expression SUBTYPE TYPE_CODE HuctT5	X X X X DIM_SUB	TYPE_AG
Diet Code Gerenic TIE MSUPPLIER Package Code Package Veight PRICE Solo Type Solo Type Sub Type Supplier Code Type Code	Expression SUBTYPE TYPE_CODE HuctT5	X X X X DIM_SUB	TYPE_AG
Diet Code Generic TEMSUPPLIER TEMSUPPLIER TEMSUPPLIER Package Weight PRICE Product Key Specific Sub Type Sub Type Suppler Code Type Code Ical Table Source - Agg_Prod eneral Column Mapping Conte	Expression SUBTYPE TYPE_CODE ductLTS ent Parent-Child Settings	X X X X DIM_SUB	TYPE_AG
Diet Code Gereric TEMSUPPLIER Package Volght Package Volght PRICE Soub Type Soub Type Soub Type Soub Type Code Type Code col Table Source - Agg_Proc	Expression SUBTYPE TYPE_CODE HuctT5	X X X X DIM_SUB	TYPE_AG
Diet Code Generic TEMSUPPLIER TEMSUPPLIER TEMSUPPLIER Package Weight PRICE Product Key Specific Sub Type Sub Type Suppler Code Type Code Ical Table Source - Agg_Prod eneral Column Mapping Conte	Expression SUBTYPE TYPE_CODE ductLTS ent Parent-Child Settings	X X X X DIM_SUB	
Diet Code Generic TEMSUPPLIER Package Volght PRICE Product Key Specific Sub Type Sub Type Sub Type Sub Type Sub Type Sub Type Code role Code role Code role Code Col Table Source - Agg_Proc eneral Column Mapping Conto Aggregation content, group by	Expression  SUBTYPE  TYPE_CODE  ductLTS  Parent-Child Settings  Logical Level	X X X X DIM_SUB	TYPE_AG
Diel Code Generic ITEMSUPPLER Package Code Package Veight PRICE Product Key Specific Sub Type Suppier Code Type Code Type Code Col Table Source - Agg_Proc eneral Column Mapping Conto Aggregation content, group by Logical Dimension	Expression SUBTYPE TYPE_CODE ductLTS ent Parent-Child Settings	X X X X DIM_SUB	TYPE_AG



Logical Dimension

Time

Logical Table Source - Agg\_TimeLTS \_ **D** × General Column Mapping Content Parent-Child Settings Name: Agg\_TimeLTS Dimension Browse 🔲 Djsabled 🕂 🗙 Map to these tables: "ord".."SUPPLIER2"."DIM\_YEAR\_AGG" Logical Table Source - Agg\_TimeLTS \_ 🗆 🗵 General Column Mapping Content Parent-Child Settings ☑ Show mapped columns Show unmapped columns P R. Logical column to physical column mapping: Logical Column Physical Table Expression YEAR YEAR X DIM\_YEAR\_AGG Logical Table Source - Agg\_TimeLTS General Column Mapping Content Parent-Child Settings Aggregation content, group by Logical Level • More..

Logical Level

Yea

- 🗙

13. The details of the logical table source that belongs to the Dim\_Time logical table are as follows:

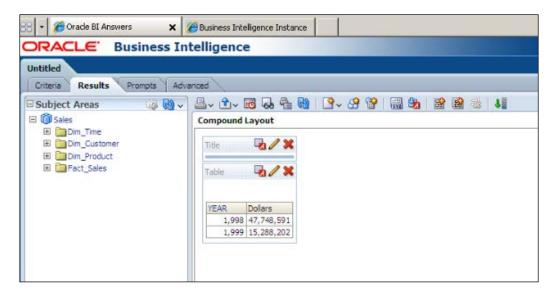


14. Here are the details of the last logical table source that belongs to the fact table.

Logical Table Source - Agg_FactLT	5	_				
General Column Mapping Content	Parent-Child Settings					
Name: Agg_FactLTS						
Disabled Dimension Browse						
Map to these tables:			×			
inord""SUPPLIER2"."FACT_S	ALES AGG"		—			
	HEE0_HINN					
			1-1-1			
Logical Table Source - Agg_FactLT						
General Column Mapping Content	Parent-Child Settings					
Show mapped columns	🔽 Sho	w unmapped columns				
			-			
<ul> <li>Logical column to physical column ma</li> </ul>	apping:		8			
2.5						
Logical Column	Expression	Physical Table				
Logical Column Dollars	DOLLARS	FACT_SALES_AGG				
Logical Column Dollars Net Weight Shipped	DOLLARS	FACT_SALES_AGG				
Logical Column Dollats Net Weight Shipped Units Ordered	DOLLARS	FACT_SALES_AGG FACT_SALES_AGG FACT_SALES_AGG				
Logical Column Dollars Net Weight Shipped	DOLLARS	FACT_SALES_AGG				
Logical Column Dollars Net Weight Shipped Units Ordered Units Shipped	DOLLARS NET_WEIGHT UNITS_ORDERED UNITS_SHIPPED	FACT_SALES_AGG FACT_SALES_AGG FACT_SALES_AGG FACT_SALES_AGG				
Logical Column Dollats Net Weight Shipped Units Ordered	DOLLARS NET_WEIGHT UNITS_ORDERED UNITS_SHIPPED	FACT_SALES_AGG FACT_SALES_AGG FACT_SALES_AGG FACT_SALES_AGG				
Logical Column Dollars Net Weight Shipped Units Ordered Units Shipped	DOLLARS	FACT_SALES_AGG FACT_SALES_AGG FACT_SALES_AGG FACT_SALES_AGG				
Logical Column Dollars Net Weight Shipped Units Ordered Units Shipped	DOLLARS	FACT_SALES_AGG FACT_SALES_AGG FACT_SALES_AGG FACT_SALES_AGG				
Logical Column Dollars Net Weight Shipped Units Ordered Units Shipped Logical Table Source - Agg_FactLTS General Column Mapping Content	DOLLARS NET_WEIGHT UNITS_ORDERED UNITS_SHIPPED S Parent-Child Settings	FACT_SALES_AGG FACT_SALES_AGG FACT_SALES_AGG FACT_SALES_AGG	•			
Logical Column Dollars Net Weight Shipped Units Ordered Units Skipped Logical Table Source - Agg_FactLTS General Column Mapping Content Aggregation content, group by ✓ Show mapped ✓ Show y Logical Dimension	DOLLARS NET_WEIGHT UNITS_ORDERED UNITS_SHIPPED S Parent-Child Settings	FACT_SALES_AGG FACT_SALES_AGG FACT_SALES_AGG	•			
Logical Column         Dollars         Net Weight Shipped         Units Ordered         Units Skipped         Logical Table Source - Agg_FactLTS         General       Column Mapping         Content         Aggregation content, group by         ✓       Show mapped         ✓       Show mapped         Logical Dimension       State	DOLLARS NET_WEIGHT UNITS_ORDERED UNITS_SHIPPED Parent-Child Settings Logical Level nmapped Logical Level	FACT_SALES_AGG FACT_SALES_AGG FACT_SALES_AGG	•			
Logical Column         Dollars         Net Weight Shipped         Units Ordered         Units Skipped         Cogical Table Source - Agg_FactLTS         General       Column Mapping         Content         Aggregation content, group by         ✓       Show mapped         ✓       Show state         Logical Dimension       Customer         Customer       State         Product       SubTy	DOLLARS NET_WEIGHT UNITS_ORDERED UNITS_SHIPPED Parent-Child Settings Logical Level nmapped Logical Level	FACT_SALES_AGG FACT_SALES_AGG FACT_SALES_AGG	•			
Logical Column         Dollars         Net Weight Shipped         Units Ordered         Units Skipped         Logical Table Source - Agg_FactLTS         General       Column Mapping         Content         Aggregation content, group by         ✓       Show mapped         ✓       Show mapped         Logical Dimension       State	DOLLARS NET_WEIGHT UNITS_ORDERED UNITS_SHIPPED Parent-Child Settings Logical Level nmapped Logical Level	FACT_SALES_AGG FACT_SALES_AGG FACT_SALES_AGG	•			
Logical Column         Dollars         Net Weight Shipped         Units Ordered         Units Skipped         Cogical Table Source - Agg_FactLTS         General       Column Mapping         Content         Aggregation content, group by         ✓       Show mapped         ✓       Show state         Logical Dimension       Customer         Customer       State         Product       SubTy	DOLLARS NET_WEIGHT UNITS_ORDERED UNITS_SHIPPED Parent-Child Settings Logical Level nmapped Logical Level	FACT_SALES_AGG FACT_SALES_AGG FACT_SALES_AGG	•			

## How it works...

There won't be any modification at the Presentation layer. Business users are going to select the columns in the analyses as they work. Using aggregate tables is transparent to the users. In the background, the BI server is going to navigate the request to the proper logical table source at the BMM layer according to the definition of the logical table sources. For example, we're going to create an analysis that includes only two columns. The selected columns are YEAR and Dollars.



Because the BI server is aware of the aggregated tables it's going to access the aggregate tables instead of accessing the detailed fact table. There won't be any calculation at runtime. It's going to just retrieve the result set from the precomputed aggregate table. It will be useful to enable the query logging at the user level. You can increase the user's logging level from 0 to 2 in the Identity Manager that is part of the BI Administration Tool. Once the logging level is set to 2, the physical SQL statements are going to be logged into a file named NQQuery.log. BI developers won't be able to access this file directly because it's stored in the file system on the BI server. Developers can access the content of the logfile from Presentation Services. After logging into Presentation Services, navigate to **Administration | Manage Sessions**.

#### Chapter 3

The content of the log is as follows:

```
WITH
SAWITH0 AS (select sum(T946.DOLLARS) as c1,
T942.YEAR as c2
From
DIM_YEAR_AGG T942,
FACT_SALES_AGG T946
where ( T942.YEARKEY = T946.YEAR )
group by T942.YEAR)
select distinct 0 as c1,
D1.c2 as c2,
D1.c1 as c3
from
SAWITH0 D1
Order by c2
```

#### There's more...

There's also a cost of using aggregate tables besides their advantages. These aggregate tables should be maintained during the ETL process, which is a time-consuming task. We won't be able to create many aggregate tables because of the time pressure. We should create the aggregate tables after finding out which levels are frequently accessed. As the data warehouses will be refreshed during the non-business hours, it's a limited duration. Let's assume that refreshing of the data warehouse is going to be started at midnight. Obviously, this entire process should finish before the business hours start. First, the detailed fact tables and dimension tables are going to be updated, and then the summary (aggregate) tables. Modifying the aggregate tables will take time. There will be calculations and only summary data is going to be inserted into these tables. Then it'll come to do the maintenance tasks at the database level, such as gathering optimizer statistics. As you can see, there are many tasks to do starting from midnight to the beginning of the business hours. Unfortunately, we won't be able to create the summary tables according to every available perspective. We'll need to make a decision about the summary tables that will be populated. In order to make a good decision, we can enable usage tracking to monitor the end users' behavior. Enabling usage tracking will be covered in Chapter 6, Managing Usage Tracking and Enabling the Cache.

107

## **Using the Aggregate Persistence Wizard**

Designing and creating the aggregate tables is not an easy task. Especially, creating the aggregate dimension tables and aggregating the fact tables will take some time. You'll have to think about the joins as well.

There's a utility called **Aggregate Persistence** in **BI Administration Tool**. This utility will help us create the aggregate tables and load the precomputed data into them automatically. But you'll have to reflect all changes to the ETL process. Once this wizard is executed, the aggregate tables are going to be created in the database. Also, summary data will be calculated and it's going to be inserted into the aggregate tables. Obviously these tables should be imported into the BI repository and the physical joins should be created. These two steps are going to be done automatically too. The next step is reflecting the changes in the BMM Layer. Actually, Aggregate Persistence Wizard will do this task too. As a summary, it's a completely automated process. The new physical tables are going to be named based on a setting in the NQSConfig.INI file. This file is the configuration file of the BI server. The default value of the AGGREGATE\_PREFIX parameter is SA\_. So all the new tables will have a prefix as SA .

In order to demonstrate the usage of this utility, let's assume that these are the most frequently accessed levels:

- ► Time dimension: Month level
- Product dimension: Subtype level
- Customer dimension: Region level

At the end of the wizard, you'll see that these levels are created and modified automatically.

Aggregate tables are created and precomputed data is inserted into these tables. They are also imported to the Physical layer. Physical joins are also automatically created. New logical table sources are added. The column mappings are done. Also all the corresponding levels are selected in the Content tab of the new logical table sources.

# How to do it...

1. Open **BI Administration Tool** and open the repository. Click on the **Utilites...** option in the **Tools** menu.

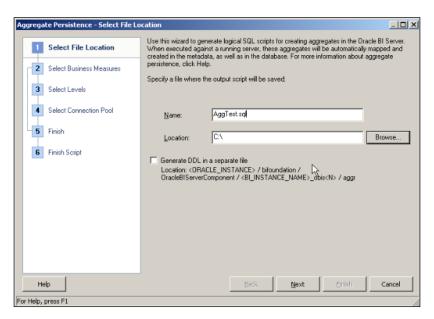
😑 Oracle BI Administratio	on Tool - SalesRepository.rpd		
Eile Edit View Manage	Tools Actions Window Help		
🗋 🗅 📽 📽 🗑 🗐 🔰	Update All Row Counts Show Consist <u>e</u> ncy Checker Ctrl+E	ଷ୍ଟ୍ର କ୍ରୁ	<b>6 6 X</b>
Presentation	Query Repository Ctrl+Q		Business Model and Mapping
⊡- 👘 Sales	Utjilties		🖃 🔞 Sales
	Options		⊕-128, Customer ⊕-128, Product
Dim_Product			iģ-víškų, Time
			Dim_Customer
			te-term Dim_Product term Dim_Time
			Image: Fact_Sales

2. Clicking on **Utilities** will pop up the **Utilities** window. We're going to select the **Aggregate Persistence** option from the list and click on **Execute**.

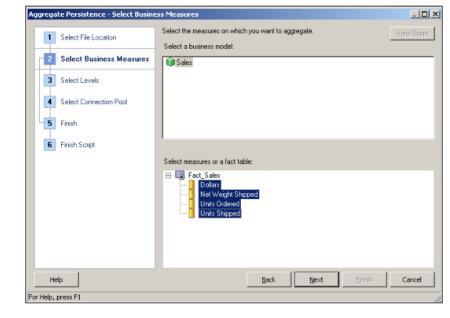
Utilities	<u>- 🗆 ×</u>
Replace Column or Table in Logical Table Sources Dracle BI Event Tables Externalize Strings Rename Wizard Update Physical Layer Repository Documentation Generate Metadata Dictionary Remove Unused Physical Objects Aggregate Resistence Generate Deployment File	Execute Cancel Help



 The Aggregate Persistence Wizard will pop up with six steps. The first step is Select File Location and we're going to define the name of the script file and the path of the file.



4. Select the measure that will be aggregated from the Fact\_Sales table at the Select Business Measures step.



- 5. According to our sample scenario, we're going to the select levels of the hierarchies in order to make the aggregation in the Select Levels step. We can also select the Use Surrogate Key checkboxes to define them on the new aggregate tables. Surrogate keys are used to distinguish the records from each other during the ETL process. We're not going to use them in our scenario.
  - Region Level for the Customer dimension
  - SubType Level for the Product dimension
  - Month Level for the Time dimension

gregate Persistence - Sele	ct Levels		
1 Select File Location	Select the dimension levels	s of aggregation you want to use:	View Script
2 Select Business Measu	Logical Dimension	n Logical Level	Use Surrogate Key?
3 Select Levels	Customer Product	Region SubType	
4 Select Connection Poo	Time		
5 Finish			
6 Finish Script			
Help		Back Next	Enish Cancel



- 6. Now we're going to define the physical database settings in order to create the aggregate tables.
  - **Database:** ORCL
  - **Schema:** SUPPLIER2
  - Connection Pool: Supplier2\_CP
  - Aggregate Table Name: ag\_Fact\_Sales

Aggregate Persistence - Select Conne	ction Pool 📃 🗆 🗙
Select File Location     Select Business Measures     Select Levels	Select a location for the aggregate table: View.Script
4 Select Connection Pool	Catalog / Schema
5 Finish	⊡- 🗊 orcl
6 Finish Script	
	Connection Pool
	Aggregate Table Name ag_Fact_Sales
Help	Back Next Enish Cancel
Physical Schema : "orcl""SUPPLIER2"	/

-112-

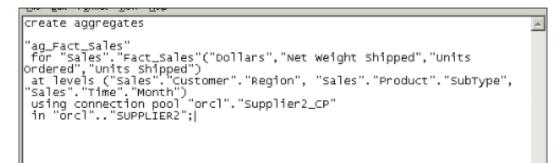
7. You'll see the preview of the script and if you're interested in defining a new aggregate, you may select the **Define another aggregate** option. In our scenario, we're going to select the **I am done** option. By clicking the **Next** button, it'll take us to the last step.

Aggregate Persistence - Finish	
1 Select File Location	The following is the logical SQL that generates the aggregate table as defined in View Script the previous steps.
2 Select Business Measures	
3 Select Levels	"ag_Fact_Sales"
Select Connection Pool	for "Sales", "Fact_Sales" ("Dollars", "Net Weight Shipped", "Units Ordered", "Units Shipped") at levels ("Sales", "Customer", "Region", "Sales", "Product", "SubType", "Sales", "Time", "Mo using connection pool "orof", "Supplier2_CP"
5 Finish	in "ord""SUPPLIER2"
6 Finish Script	Define another aggregate.     I am done.
Help	Back Next Enish Cancel
For Help, press F1	

8. The last step of the wizard is the summary screen. It shows the path of the file that is created and the content of the script. We'll click on **Finish**.

Aggregate Persistence - Finish Script		
1 Select File Location	The following script has been generated based on your input and will be saved at:	
2 Select Business Measures	Create Aggregates Script C:VAggTest sql	
3 Select Levels		
Select Connection Pool		
5 Finish		*
6 Finish Script	"ag Fact Sales"	
	og_rodu_sates for "Sates","Fact_Sates","Dollars","Net Weight Shipped","Units Ordered","Units S at levels ("Sates","Customer", "Region", "Sates","Product", "SubType", "Sates","Th using connection pool "orof", "Supplier2_CP" in "orof", "SUPPLIER2";	hipped' me''.'M
Нер	Back Mext Einish	Cancel
For Help, press F1		

9. When you check the C: location, you'll see that AggTest.sql file is created. You can see the content of the file.



-114

10. Now it comes to executing this BI server script. There are three ways to execute it:

- Command Line: By using ngcmd.exe
- **Job Manager**: By creating a new job that will use the ngcmd script
- **Presentation Services**: By executing the script from Presentation Services.

We're going to use the third option in the demonstration. After logging into Presentation Services, you'll see a link named **Administration** above the global toolbar.



11. Clicking on **Administration** will open the **Administration** page. When you scroll down, you'll see the **Issue SQL** hyperlink.

Administration Kone Catalog Davidourds v Syned Jt Catalog Davidour	As weblogic ~
Physical Presentation Catalog Path C: [pracle/pbi/jnstances/jnstan	2
Available Pacing Memory (NB) 2998	
Available Hight (Finder V) (M) 2390 Available Vitual Address Space (MD) 1771	
Replication Enabled	
Maintenance Mode is currently off.	
Create, edit and delete Catalog Groups. Manage layers, background maps and images.	-
Hanage Privileges Manage privileges and rights given to users and groups.	
Marketing	
Session Management Hanage Marketing Jobs and database cache result sets.	
Hanage Sessions Hanage Marketing Defaults Wew Oracle Business Intelligence session information including active users and queries. Manage the default settings such as Default Campaign Load Format and Default Global Audience for Marketing	
Hanage Agent Session s Vew Agent session information including Agent state and recipients.	
BI Publisher	
Manage BI Publisher Manage BI Publisher Manage BI Publisher Manage BI Publisher data sources, scheduler configuration, delivery destinations, and runtime properties.	
Manage Device Types Create, edit, view or debite Device Types.	
Toggle Naintenance Mode Maintenance Mode is currently off.	
Reload Files and Hetadata Reload XML message files, refresh server metadata, and clear caches.	
Issue SQL Issue SQL directly to Orade BI Server.	

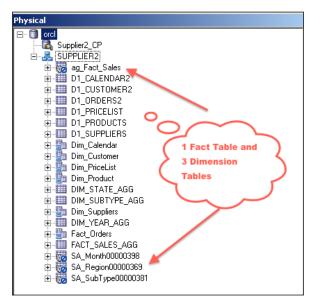


12. Click on the **Issue SQL** link and a new page will appear on the screen. Paste the contents of the AggTest.sql file and click on the **Issue SQL** button.

ORACLE Business Intelligence
Administration
Issue SQL
Enter a SQL statement to issue directly against the Oracle BI Server. This page is for testing the Oracle BI Server only. Results are returned analysis.
create aggregates "ag_Fact_Sales" for "Sales". "Fact_Sales" ("Dollars", "Net Weight Shipped", "Units Ordered", "Units Shipped") at levels ("Sales". "Customer". "Region", "Sales". "Product". "SubType", "Sales". "Time". "Month" ) using connection pool "ord". "Supplier2_CP" in "ord". "Stipped": Issue SQL: Oracle BI Server Logging Level Default  Use Oracle BI Presentation Services Cache No columns returned.

## How it works...

After the SQL statement is executed, we can check the modifications in the repository. You'll see that the aggregate dimension and fact tables are created in the Supplier2 schema; also precomputed data is inserted into these tables. Plus they're already imported to the Physical layer.





Business Model and Mapping ⊡- 📦 Sales 🗄 🗟 Customer 🕘 🖳 Product 🗄 🛍 Time 🔄 🛄 Dim\_Customer i Dim\_Product 🖃 🛄 Dim\_Time 🖻 🔁 Sources ---🛐 Dim\_Calendar 🔊 Agg\_TimeLTS SA\_Month00000398\_orcl Day in Month DAY\_IN\_YEAR DAY\_NAME Date MONTH MONTH\_IN\_YEAR Month Code YEAR 🧼 Day 🖃 🔚 Fact\_Sales 🖻 🗁 Sources S Fact\_Orders S Agg\_FactLTS 🔯 ag\_Fact\_Sales\_orcl Dollars Net Weight Shipped Units Ordered Units Shipped Region Total Dollars Year Total Dollars Total Year Percentage

We can easily check the modifications at the BMM layer. The new logical table sources are created and all of the settings of the sources were done with the script execution.

You'll also see that all the proper hierarchy levels are set up correctly for all logical dimensions.

eneral Column Mapping	Content Parent-Child Settin	38	
Aggregation content, group I	by Logical Level		•
Show mapped	Show unmapped		More
Show mapped  Logical Dimension	Show unmapped		More
		×	More
Logical Dimension	Logical Level		More

### There's more...

As you see, creation of the aggregate tables is really easy by using the Aggregate Persistence Wizard. You should only consider the changes that you'll have to do in the ETL processes.

## **Creating calculations by using the time series functions**

It's very important to enable end users to compare the business performance with previous time periods. By achieving this, end users will understand the business better. Business users need to make these comparisons across multiple time periods.

For example, let's assume that business users are asking for the sales amount of this month and the sales amount for last month. Most probably, they're looking forward to comparing these two values and seeing the difference. Here is one method:

- Calculate the sales amount of this month: This can be achieved by one query
- > Calculate the sales amount of last month: This is another query
- Calculate the difference between these months: This will be the last query

As you see, we'll need at least three queries. There's another solution in Oracle Business Intelligence Enterprise Edition. It's time series functions. There are three types of time series functions:

- AGO: Calculates aggregated value as of some time period shifted from current time
  - Syntax: Ago (<<Measure>>, <<Level>>, <<Number of Periods>>)
  - Measure: Dollars, Units Ordered
  - Level: Year, Quarter, Month, Day
  - Number of Periods: 1, 2, 3, and so on

-118

- TODATE: Aggregates a measure attribute from the beginning of a specified time period to the currently displayed time
  - **Syntax:** ToDate(<<Measure>>,<<Level>>)
  - Measure: Dollars, Units Ordered
  - Level: Year, Quarter, Month, Day
- PERIODROLLING: Performs an aggregation across a specified set of query grain periods
  - Syntax: PeriodRolling(<<Measure>>, <<integer>>, <<integer>>)
  - Measure: Dollars, Units Ordered
  - **Integer:** 2 (last 2 periods), 3 (last 3 periods)
  - Integer: 0 (Current period)

In order to use the time series functions, there should be at least one Time dimension like in the following screenshot:

Business Model and Mapping	Physical
- 🗑 Sales	
B B Customer	
Product	
i⊟-102, Time ar-La Time Total	
inite rotal	
Year Total Dollars	
🖻 🖓 Month	
MONTH	
- @ Month Code	
↓ Day	
Logical Dimension - Time	
General Tables	
Name: Time	
Rane. Trine	
Default root level: Time Total	•
Structure	
Ragged	
Skipped Levels	
Description:	
	*
	<u>~</u>
	1
OK Cancel	Help
For Help, press F1	14



Also chronological keys should be defined at the levels of Time hierarchy. Chronological keys are used to identify the data at a particular level. The data in the time dimension needs to follow a particular order. The time series functions use these keys during the calculation.

rimary key:	M2Key			
				× /
Key Name	Columns	Description	Use for Display	Chronological Key
M2Key	Month Code			✓
M1Key	MONTH			

## How to do it...

1. In order to use the time series functions, we're going to add a logical column to the logical table named Fact\_Sales to display the Month Ago Dollars column.

Business Model an	d Mapping			Ph
⊡- 🕡 Sales				+
主· 鷆 Custome	fr and a second s			
🗉 🖳 Time				
E- Dim_Cus				
Dim_Pro				
⊡ ⊡ Dim_Tim ⊡ ⊡ Fact_Sa				
	New Object	+	Logical Table Source	<u> </u>
			Logical Column	
Ne.	Check Out	-		
Ur	Cut	Ctrl+X		
Ur	Сору	Ctrl+C		
Re	Paste	Ctrl+Y		
🔤 Ye	Delete	Del		
- To	Duplicate			
-				
	Check Consistency			
	Mark			
	Set Icon			
	Expand All			
	Business Model Diagram	•		
	Physical Diagram			
	Query Related Objects			
	Rename Wizard			
	Rename			
	Properties			



2. A new **Logical Column** window pops up. Set the name of the new column as Month Ago Dollars. The new logical column is not mapped to any physical column or to another existing logical column yet. We are going to define the mapping in the **Column Source** tab.

ogical Column - Month Ago Dollars	
General Column Source Aggregation Levels	
Name: Month Ago Dollars Belongs to Table: "Sales". "Fact_Sales"	(UNKNOWN)
Sort order column:	
None	etear
Descriptor ID column:	
None S	et Cjear
Description:	<u></u>
	-
	-1
1	
OK	Cancel Help

- 3. There are two options in the Column Source tab:
  - Derived from physical mappings
  - Derived from existing columns using an expression



The second option will be selected and we're going to click on the Edit Expression icon.

Logical Column - Month Ago DollarsX
General Column Source Aggregation Levels
Data Type: UNKNOWN Length I Nullable
Derives from:
Column Source Type C Derived from physical mappings Show al logical sources Logical Table Source Mapped as Edt
Derived from existing golumns using an expression
Edit Expression
OK Cancel Help

4. When the **Expression Builder** window pops up on the screen, you'll see the **Time Series Functions** option. We're going to select the Ago function and the list of input arguments will be displayed.

-122

### – Chapter 3

Expression Builder - Derived logical colum	in 👘		_ 🗆 🗵
Category: Time Dimensions Logical Tables Operators Expressions Functions Constants Types		Ago(< <measure>&gt;, &lt;<level>&gt;, &lt;<number of="" periods="">&gt;)</number></level></measure>	
Functions:         Calendar Date/Time Functions         Conversion Functions         Display functions         Lookup Functions         Nathematic Functions         String Functions         System Functions         Time Series Functions:         Ado         PeriodRolling         ToDate	>		
Find:			NOT , Undo
Sort Panes		<u>OK</u> <u>Cancel</u>	Help

- 5. The input arguments will be selected as follows:
  - **Measure**: Dollars
  - Level: Month
  - Number of Periods: 1 (for a month ago)

Expression Builder - Derived logical colum	n	_ 🗆 🗙
Category: Time Dimensions Logical Tables Operators Expressions Functions Constants Types	Ago("Sales"."Fact_Sales"."Dollars", "Sales"."Time"."Month", 1)	I

6. We're going to use similar steps to demonstrate the ToDate and PeriodRolling functions. The only different step will be on the **Expression Builder** window. So you'll find only these details on the following screenshots.

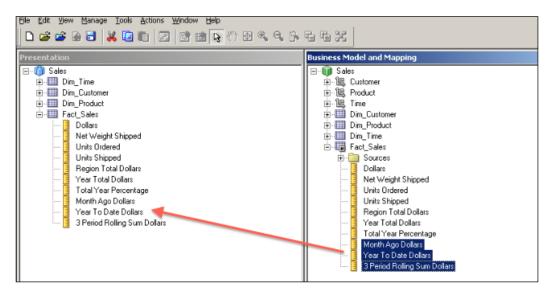
The second function will be based on the ToDate function. We're going to create the Year To Date Dollars column.

Expression Builder - Derived logical colum						_ 🗆 ×
Category: Time Dimensions Logical Tables Operators Expressions Functions Constants Types	ToDate(	"Sales", "Fact_Sales", "[	Dolars" , "Sales	"."Time"."Vear" )		
Time Dimensions:	8					
Eind: Time: Year Month Day						
Find:	+ -	*/   ())>	< = <=	>= <> AND	OR NOT	, <u>U</u> ndo Help

7. And the last example will be about the PeriodRolling function. We're going to create a new column named 3 Period Rolling Sum Dollars.

Category: Time Dimensions Logical Tables Operators Expressions Functions Constants Types	PeriodRoling("Sales", "Fact_Sales", "Dollars" , -2, 0	
ogical Tables: Dim_Time Dim_Customer Dim_Product Fact_Sales Eind: Eind: Columns: Dollars Net Weight Shipped Units Ordered Units Shipped Region Total Dollars Year Total Dollars Year Total Dollars Year Total Dollars Year Total Dollars Year Total Dollars Year To Date Dollars		
Find:	+ · * /     ( ) > < = <= >= <> AND	OR NOT , Undo

8. Obviously after creating these logical columns, presentation columns should be created by dragging them on the Presentation layer.



## How it works...

We have created three new measure columns that are based on the time series functions. This is how these three columns look in the analysis.

Table					
				u.	
MONTH Dollars	Dollars	Month Ago	Year To Date	3 Period Rolling Sum	
MONTH	Dollars	Dolars	Dollars	Dollars	
January	3,568,665		3,568,665	3,568,665	
February	3,884,407	3,568,665	7,453,072	7,453,072	
March	3,975,734	3,884,407	11,428,807	11,428,807	
April	3,907,255	3,975,734	15,336,061	11,767,396	
May	4,061,557	3,907,255	19,397,618	11,944,545	
June	3,994,531	4,061,557	23,392,149	11,963,342	
July	4,054,411	3,994,531	27,446,560	12,110,499	
August	4,242,611	4,054,411	31,689,171	12,291,553	
September	3,810,263	4,242,611	35,499,434	12,107,286	
October	4,596,372	3,810,263	40,095,806	12,649,246	
November	3,655,169	4,596,372	43,750,975	12,061,804	
December	3,997,616	3,655,169	47,748,591	12,249,157	
Grand Total	47,748,591	43,750,975	306,806,909	131,595,372	



## There's more...

It's possible to calculate similar results without using time series functions, but it'll take more time and also it won't be easy to maintain them. It's recommended to use these time series functions wherever possible.

# **4** Working with Multidimensional Data Sources

In this chapter, we will cover:

- Importing the multidimensional data source
- Accessing members and member counts
- Creating the multidimensional Business Model
- Implementing Horizontal Federation
- Implementing Vertical Federation

## Introduction

**Online Transactional Processing (OLTP)** databases are optimized for transaction processing. The performance of the Insert, update, and delete SQL statements are very important in the OLTP databases. They store the data in the two-dimensional structures called as tables. Enterprises need to retrieve valuable information from these databases to make strategic decisions. The databases that are optimized for queries are called as data warehouses. The need for the data warehouses is obvious for analytical reporting. They store the data in the tables like the OLTP databases. The major difference between the OLTP and data warehouse databases is the design of the tables. Normalization rules are applied in the OLTP to improve the performance of the transactions. On the other hand, data warehouses are mostly designed based on denormalization rules.

Working with Multidimensional Data Sources -

**Online Analytical Processing (OLAP)** databases store summary data and they are used to generate aggregated result sets. They store their data in multidimensional structures that are called Cubes. They store precalculated result sets so that whenever a user executes a query, the result set is generated very quickly. They consist of measures and dimensions. To use the OLAP cubes, you must first define the structure by specifying the measures and the dimension columns. After this definition, the cube should be processed. Processing the cube means loading the data from the data warehouse into the cube structure and making any possible calculations. The query language of these multidimensional sources is called **Multidimensional Expressions (MDX)**.

Multidimensional sources are very useful although they have a cost. After implementing multidimensional sources and creating the cubes, you'll have to maintain them.

Cubes should be processed when ETL jobs are finished loading the data to core data warehouses.

## Importing the multidimensional data source

Detailed data that is stored in OLTP databases should be loaded into core data warehouses and then the structure of the cubes should be created in multidimensional source databases. In our case this source will be based on Essbase Server.

Oracle Business Intelligence Enterprise Edition Server can be configured to connect to these multidimensional sources including Essbase Servers. We're not going to discuss how to build a cube in this recipe. We're going to learn how to create a repository based on the Essbase source.

#### How to do it...

 We're going to use BI Administration Tool to import multidimensional source metadata to the Physical layer of the repository. When you click on the Import Metadata option from the File menu, the Import Metadata wizard will pop up. We'll have to select the Connection Type option as Essbase and the server name where Essbase is installed and configured. Additionally, User Name and Password should be entered in order to access Cubes.

#### Chapter 4

Select Data Source	Import Type:	Local Machine	
	Connection Type:	Essbase	
Select Metadata Types	Essbase Server:	localhost	
Select Metadata Objects	User Name:	admin	
Map to Logical Model	Password:	•••••	
Publish to Warehouse		ß	

2. In the next step, you'll see the list of data sources. We're going to select the cube that we'll import to the Physical layer. In our scenario we're going to use the Forecast source. It contains sales related data. Also select the Import UDAs checkbox. User Defined Attribute (UDA) is a descriptive tag about an outline member. One UDA can be attached to many members to simplify the on-going database operations.

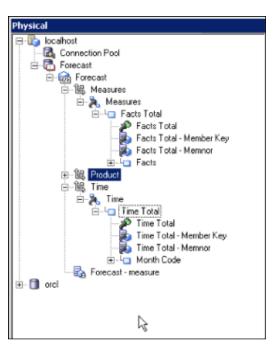
Select Data Source	Select the metadata objects you want to i	mport into the physical layer of the repository.
	End:	2 2
Select Metadata Types	Data source view:	Repository View:
Select Metadata Objects	B-D Demo B-D Demo B-D Sample	End ord
Map to Logical Model	Bample_U Bample_U Bample_U Bample_U	
Publish to Warehouse	B Co Sampeast DMDemo B Co ASOsamp B Co Forecast	54
	⊕ up <u>Market</u> ⊞-Do Market	
	Import UDAs	
	Show complete structure	Show complete structure
Help		Back Next Einish Cano

Working with Multidimensional Data Sources -

3. After selecting a cube, you'll see the dimensions and measures that will be imported.

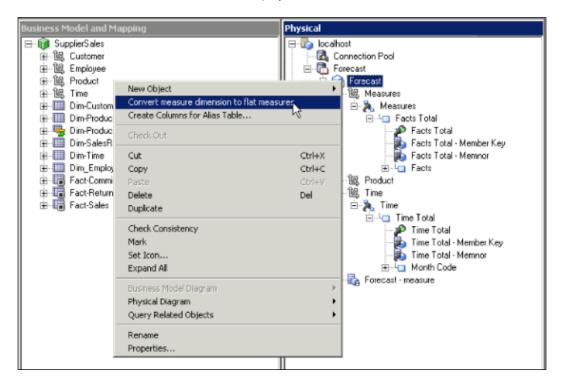
Select Data Source		mport into the physical layer of the repository.
2 Select Metadata Types	End: Data source view:	Repository View:
Select Metadata Objects		Calhost     Grecast     Grecast
Map to Logical Model	🛱 🌇 Sample_U	
5 Publish to Warehouse	B B Samppart B B Samppart B B J Sampast B B Samp ASOsamp B B Forecast B B Market	Image: Second secon
	I Import UDAs	
	Show complete structure	Show complete structure
Help		Back Next Einish Cancel

4. Clicking on **Finish** in the wizard will display the objects newly imported to the Physical layer. So **Measures**, **Product**, and **Time** dimensions are already imported. The icons of the objects are also different than table or view object's icon.





5. By default, measures are displayed like dimension levels. To change this default behavior, right-click on the cube and select **Convert measure dimension to flat measures**. So measures will be displayed in a flat level.



#### How it works...

We have just finished importing a multidimensional source. You'll notice that the structure of the physical layer looks like a Business Model in the BMM layer. But actually, it's the Physical layer.

## Accessing members and member counts

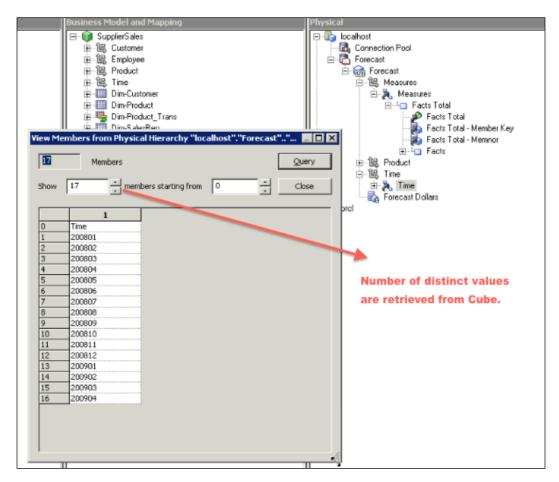
It's important to understand the structure of the data in the cubes such as those in RDBMS tables. You can easily access the data from **BI Administration Tool**.



Working with Multidimensional Data Sources

How to do it...

When you right-click on the cube, you'll see **View Members**. A new window pops up that will display the number of members. Also you're going to see the distinct values. This result set is accessed from the multidimensional source.



#### How it works...

BI Server generates an **MDX query** so that it displays the number of attribute values. MDX and SQL languages are used to query databases. SQL statements are used to construct a relational view. MDX generates multidimensional views that consist of multiple-dimension attributes in the result set. While the SQL statements use tables as sources, MDX uses Cubes. The structure of the MDX statement is composed of the following clauses:

▶ WITH (optional): It allows calculated members to be computed during the processing

- ▶ SELECT: It identifies the dimension members on each axis
- ▶ FROM: The names of the cubes that are being queried
- ▶ WHERE (optional): It defines which dimension is used as a slicer

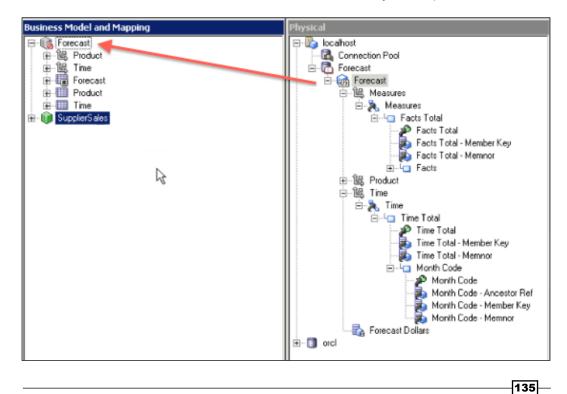
## **Creating the multidimensional Business Model**

Creating a Business Model for cubes is easier than RDBMS tables. Actually, the structure of cubes is very similar to the Business Models. Cubes contain dimensions and measures. We can see that structure in the Physical layer as well.

Dimensions and their levels are already created in the cubes. Measures are also specified in the cubes. So all required object definitions already exist in the cubes.

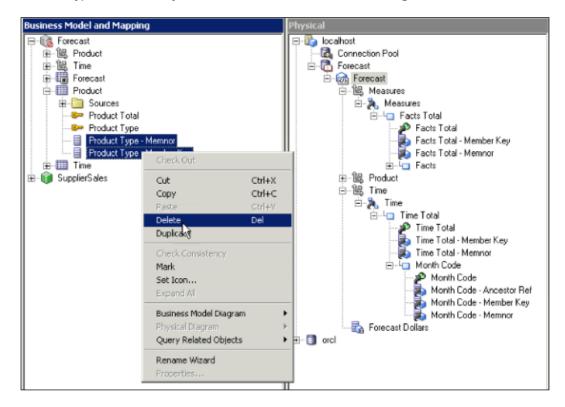
#### How to do it...

 First step will be creating a blank Business Model in the BMM layer. Then we're just going to drag-and-drop a cube from the Physical layer onto the new Business Model. At this step, all logical dimensions and fact tables will be created automatically, plus dimensions and their hierarchies are also created in only one step.



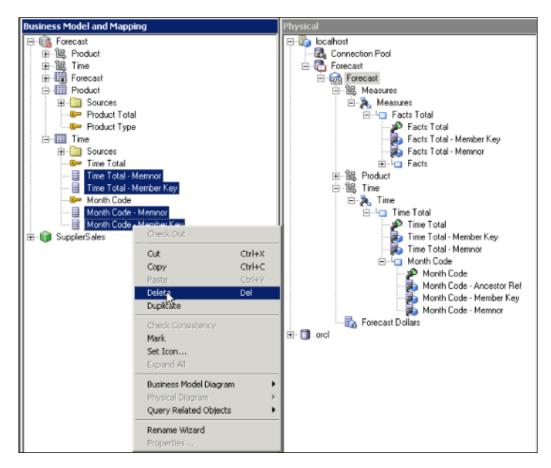
Working with Multidimensional Data Sources -

 Now we're going to clean up the Forecast Business Model. Unneeded columns should be removed from the model. Product Type - Memnor and Product Type - Member Key columns will be removed in the following screenshot:



-136

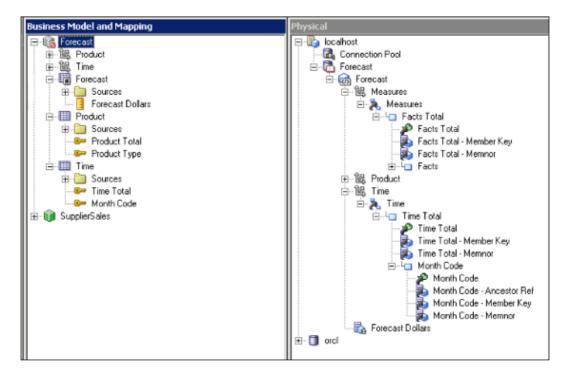
3. We're going to remove member key and memnor columns from the **Time** logical dimension table. Normally these member keys (and no columns) are required in cubes and not in Business Models.



137—

Working with Multidimensional Data Sources -

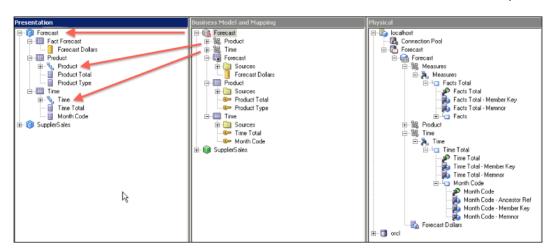
- 4. As a result, we have finished creation of a new Business Model. Two dimensions with their hierarchies are created. The Business Model includes three logical tables:
  - Forecast: Logical fact table
  - Product: Logical dimension table
  - Time: Logical dimension table



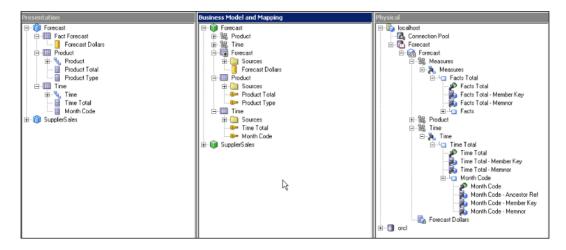
5. But the new Business Model is still inconsistent, although everything is correct in the model. The only missing definition in the repository is **Subject Area**. Forecast Business Model is not mapped with any **Subject Area**. So this should be created in the Presentation layer. This is another easy step. Just drag-and-drop the Business Model into the Presentation layer.

-138

#### Chapter 4



 Presentation tables, columns, and hierarchies will be automatically created in the Presentation layer. And at last, the Forecast Business Model will be consistent so it will be available for queries.

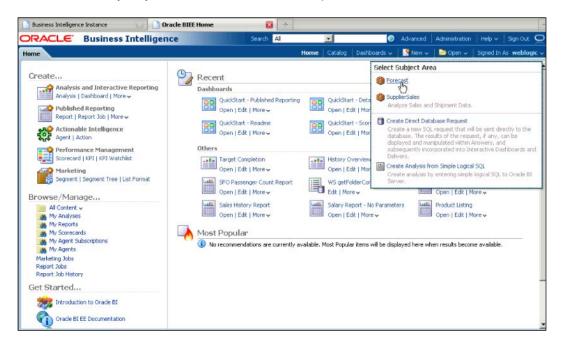


139—

Working with Multidimensional Data Sources

#### How it works...

Now it's time to test the Business Model. We're going to verify if the new repository is ready and available in Presentation Services. When you log into BI Presentation Service and start to create a new analysis, you'll see that the **Forecast** subject area is available to end users.



As a simple test, we're going to add **Product Type** and **Forecast Dollars** to the new analysis and check the result set. As you'll see in the following screenshot, the result set is retrieved from the **Forecast** cube that is a multidimensional source. Also when you check the query log, you'll see that MDX query is generated by the BI Server and executed against the Essbase Server.

-140

#### Chapter 4

DRACLE Business I	Intelligence	Sear	h Al 👱		۲	Advanced	Administration	Help 🗸	Sign Out
Untitled			Home C	atalog Das	hboards ~	New 🗸	🗁 Open 🗸	Signed In	As weblogic
Criteria Results Prompts Ad	Wanced								
=Subject Areas 🛛 🙆 🚱			? 🚟 🗞 🗃 🗃	8 1					
🗉 🔞 Forecast	Compound Layo	the second s							
El Carte Forecast     El Carte Forecast     El Carte Forecast     El Carte Forecast     El Carte Forecast	Title	B/X							
	Table	2/×							
	Product Type	Forecast Dollars							
	Baking	4,960,587		N					
	Beef	4,950,266		2					
	Beverage	4,432,356							
	Bread	1,582,391							
	Cereal	1,312,721							
	< Cheese	11,313,937							
	Condiments	9,139,368							
Catalog 🐁 😓 🧷 🕻	Dessert	2,242,673							
ist All	Entre	1,842,041							
	Frozen	2,489							
E My Folders	Grains	42,957							
E 🛅 Shared Folders	Lamb	75,091							
	Non-food	4,581,249							
	Pasta	151,146							
	Pork	3,465,919							
	Poultry	7,236,589							
🛛 Views 🛛 🐁 🎴 🗸 🌽 🎙		275,628							
Title	Seafood	2,770,684							
	Snacks	1,486,378							
Table	Soun	829 543							

#### There's more...

Multidimensional source is integrated into the BI Repository and it's working perfectly. Now we can gain benefit of some reports that will show us Forecast and Actual values. As you already noticed, the Forecast cube stores projected values. On the other hand, actual values are stored in the RDBMS tables. We're going to learn how to integrate cube and RDBMS sources in the Business Model in the next recipe.

## **Implementing Horizontal Federation**

As we discussed in the beginning of this chapter, OLAP cubes store precomputed summary data. Business users may need to compare the values that are stored in the cubes with the values from the relational databases. Combining the result sets from two different data sources can solve this business challenge.

**Horizontal Federation** allows us to generate a result set that is retrieved from both multidimensional and relational data sources. We'll have to make some modifications in the Business Model in order to implement Horizontal Federation.

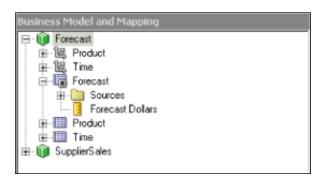
In our scenario, projected values will be retrieved from multidimensional sources. The **Forecast Dollars** column will be the example. And we're going to use the **Dollars** column from the relational data source. So the business users will be able to compare the actual and projected values in the same report.



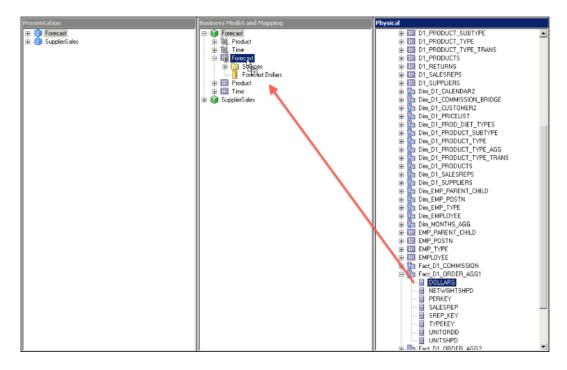
Working with Multidimensional Data Sources

#### How to do it...

1. Let's check the logical table sources of the **Forecast** table. You'll see that there's only one source and it's already mapped to multidimensional source.

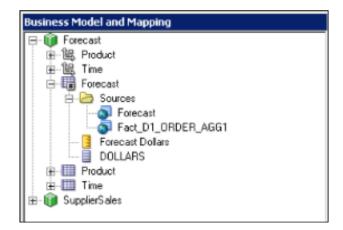


2. Drag-and-drop the **Dollars** physical column from the physical layer onto the **Forecast** logical table.

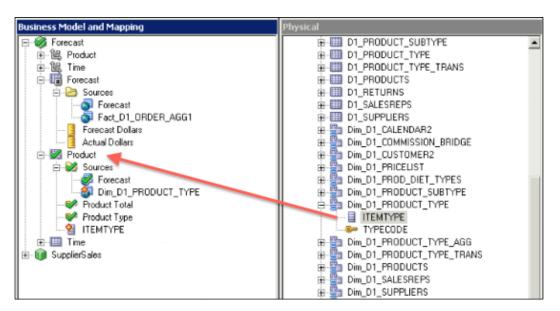




3. The last action is going to create the second logical table source in the **Forecast** logical table. The new source is automatically mapped with the relational table.



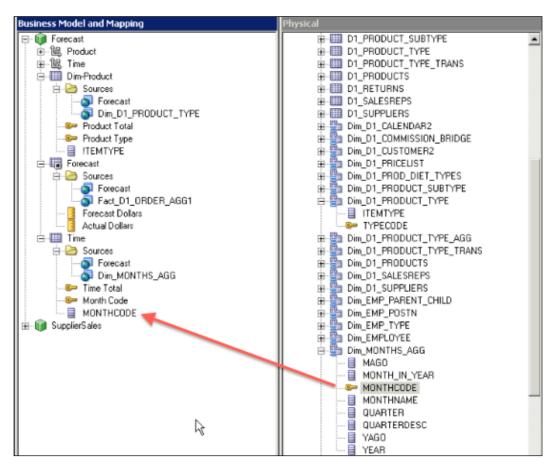
4. Repeat the step for the remaining dimension logical tables. Second logical table sources should be created for both **Product** and **Time** tables. First we're going to make the configuration in the **Product** table.





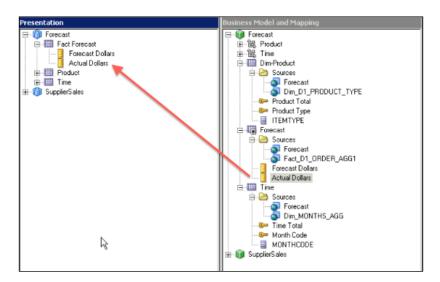
Working with Multidimensional Data Sources -

5. Then the same step will be repeated for the **Time** table as shown in the following screenshot. Now all the logical tables have two logical table sources.



 Obviously, in order to implement Horizontal Federation correctly, we'll have to create required presentation columns in the Presentation layer. In our example, the Actual Dollars column is going to be created and mapped to the Actual Dollars logical column in the Business Model and Mapping layer.

-144



#### How it works...

In order to test the new repository, we've added **Product Type**, **Forecast Dollars**, and **Actual Dollars** from the selection pane to the analysis. You'll see that the BI Server generates the result set correctly. It accesses both sources to generate the result set. The **Forecast Dollars** column values are populated from multidimensional source and the **Actual Dollars** column values are from the relational database.

DRACLE Business	Intelligence		Search Al	•	
Untitled				Home Catalog	Dashboards 🗸
Criteria Results Prompts	Advanced				
Subject Areas	· · · -	al 🐴 🚯 💁 d	9 😚 🔛 🐘		li
E D Forecast	Compound Layo				
E Product E Time E Fact-Forecast	Table		₽0/	×	
	Product Type	Forecast Dollars	Actual Dollars		
	Baking	4,960,587	4,925,521		
	Beef	4,950,266			
	Beverage	4,432,356	4,398,107		
	Bread	1,582,391	1,578,743		
	Cereal	1,312,721	1,309,071		
	Cheese	11,313,937	7,140,616		
	Condiments	9,139,368	9,105,121		
	Dessert	2,242,673	2,208,427		
	<ul> <li>Entre</li> </ul>	1,842,041	1,807,794		
	Frozen	2,489	521		
🗉 Catalog 🛛 🐁 😓 🧷	Grains	42,957	39,419		
List All	Lamb	75,091	71,553		
My Folders	Non-food	4,581,249	4,547,002		
E Shared Folders	Pasta	151,146	147,409		
El Shared Holders	Pork.	3,465,919	3,431,672		
	Poultry	7,236,589	7,202,342		
	Rice	275,628	271,889		
	Seafood	2,770,684	2,736,436		
	Snacks	1,486,378	1,482,841		
🗆 Views 🛛 🐁 🎴 🗸 🥠		829,543	826,005		
Title	Vegetable	5,020,199	4,985,949		
Table					
1000	selection Ste	ne			
	wselection ste	ha			

145—

Working with Multidimensional Data Sources -

#### There's more...

You can also check the query log file. You'll find two queries were executed against two different data sources.

## **Implementing Vertical Federation**

Multidimensional sources store aggregated data, not the detailed data. Because of their nature, they just contain summary data at certain levels. These levels are specified during creation of the cubes.

Vertical Federation provides the ability to drill through aggregate multidimensional data into detail relational data.

We're going to use a different cube named Market to demonstrate Vertical Federation. As you've already learned how to import the multidimensional metadata and how to create a business model, these steps will be skipped in our example.

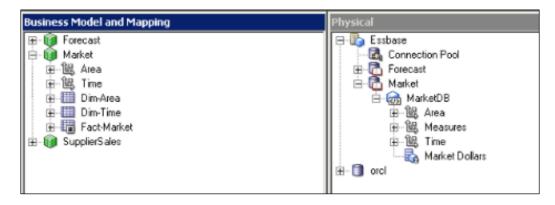
Here's the new source and new Business Model:

The new cube contains Dollars values that are aggregated at these levels:

- ► Area dimension: District level
- Time dimension: Year level

Relational source contains **Dollars** values that are aggregated at these levels:

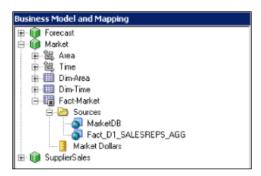
- > Area dimension: Sales person level (lower detail level than the District level)
- **Time dimension**: Year level



146

#### How to do it...

1. We're going to create a second logical table source for the fact logical table. The first logical table source is mapped with a multidimensional source. The second one is mapped with a relational data source.



2. As you'll remember, whenever a logical table has more than one logical table source, you should give instructions to the BI server about the usage of these sources, so we're going to specify the same level that the aggregation is done in the source. You'll see both levels are set for the multidimensional source properties. The levels are specified in the **Content** tab of the logical table source.

	y Logical Level	<u> </u>
Show mapped		Moge
Logical Dimension	Logical Level	
Area Time	District YB	
ragmentation content:		
		- <u>-</u>
This source should be co	mbined with other sources at this l	
-	mbined with other sources at this later to first rows returned (exclude t	rvel
-		rvel



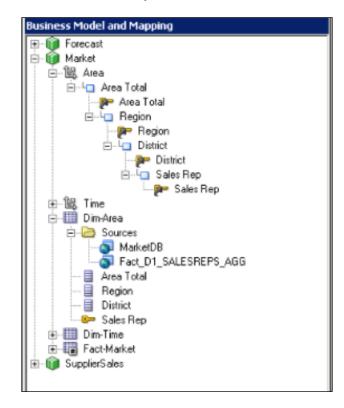
Working with Multidimensional Data Sources -

 Similar action is going to be repeated for the second logical table source that is mapped with a relational data source. But this time the Sales Rep level is going to be selected in the Content tab in the Logical Table Source – Fact\_D1\_SALESREPS\_ AGG window because the relational data source contains aggregated values at the Sales Person level.

Show mapped	Show unmapped	Moje
Logical Dimension	Logical Level	
Area Time	Sales Rep YB	X
i me	in	*
	N	
	45	
34 33		
Eragmentation content:		
		<u> </u>
		-
_ Ihis source should be or	ombined with other sources at thi	is level
Use this " <u>W</u> HERE clause" f	ilter to limit rows returned (exclud	e the "WHERE")
		i 🖸

-148

4. We'll have to repeat these steps for the remaining logical tables. Second logical table sources should be defined that will be mapped to relational data sources and also contents should be defined. In addition to these settings, the **Sales Rep** logical level should be created in the hierarchy because by default the cube doesn't contain any data below the **District** level. Also, required new presentation columns are going to be created in the Presentation layer.



#### How it works...

Now we're going to test the new modifications. We're going to create a simple analysis that will contain two attribute columns and one measure column.

- **Region**: Mapped to the multidimensional source
- > District: Mapped to the multidimensional source
- Dollars: Mapped to the multidimensional source



Working with Multidimensional Data Sources —

You'll see that the result is generated from the multidimensional source.

DRACLE Business Inf	telligenc	e	Search	Al	-	
Untitled	10.25				Home Catalog	Dashboards 🗸
Criteria Results Prompts Advan	ced					
=Subject Areas 🛛 🏭 🗸		<b>3 4 6</b>	9~ 89 99		h 🔐 🔐 🗟 ا	
🗏 🔞 Market	Compound					
🗷 🛄 Area 🗷 🎦 Time 🖅 📴 Fact-Market	Title		<b>B</b> /	×		
	Table			×		
	Region	District	Market Dollars			
	Central	Gulf	814,648			
		LowerMidWest	4,654,545			
		MidWest	2,354,705			12
		Texas	3,984,062			G
		UpperMidWest	1,132,842			32.8
	East	Florida	1,625,588			
		MidAtlantic	3,775,583			
=Catalog 🐁 🛵 🖉 🝓		UpperSouth	6,244,606			
List All		Yankee	13,344,845			
My Folders	West	California	16,127,207			
Given Started Folders		Desert	6,911,760			
zi i phared Polders		Northwest	2,162,063			

But if the end user wants to drill down through the **District** level, the multidimensional source won't be able to satisfy the entire query. The **Sales Person** hierarchy level is mapped to the relational column.

-150-

So this time you'll gain the benefit of Vertical Federation. Lower detail column (**Sales Rep**) values will be retrieved from relational data sources and the rest will be retrieved from the Essbase cube.

ORACLE Business In	telligenc	e	Search	Al	•	0
Untitled				Home	Catalog	Dashboards 🗸
And the second s	inced					
🖃 Subject Areas 🛛 🧔 🙀 🗸	<b>□</b> ~ <b>□</b> ~	R 🐱 🐴 🕅	1 🕒 - 😚 😭	🔛 🖏 🔐 🖥		
🖂 🔞 Market	Compound	Layout				
Area	Title			<b>B</b> 6	/ X	
E      Region     E      Safes Rep.	Table			Pa 4	*	
E CArea	Region	District	Market Dollars	Sales Rep	6	
🗄 🧰 Time	Central	Gulf	814,648	MARY SILVER		
Fact-Market		LowerMidWest		CHRIS MUIR		
			3,475,158	GARY LISCIARELLI		
		MidWest	1,111,591	DALE AREND		
		1000000000	1,243,114	LYLE IRWIN		
	-	Texas	the second se	GARY SMITH		
	•	00000	1,006,127	JOSE CRUZ		
				RUBEN LOPEZ		
Catalog 🛛 🐁 🛵 🧷 🐏		UpperMidWest	541,640	ANDREW TAYLOR		
ist All		100000000000000000000000000000000000000	428,704	BARBARA JENSEN		
	-		162,498	DICK SCHMIDT		
8 My Folders 8 Shared Folders	East	Florida	846,425	ANNE WILLIAMS		
Shared Folders	100000	0004000	689,577	DONALD KIMBRIEL		
			89,586	PETER LEON		
		MidAtlantic	712,308	DALE FAIRWEATHER		
			438,956	GEORGE MASUR		
	_			PAULA MADISON		
🛛 Views 🛛 🐁 💁 🗸 🌽 💥				WALLY RAISANEN		
1 Title		UpperSouth		CHRIS DREW		
Table		- Contraction	2,912,393	KATIE RICHARDS		
Table	⊡Selection	n Steps	0.000 543	LEALENCE		

#### There's more...

Designing the structure of the cubes in Data Federation is quite important. You won't be able to store all the details in the cubes. The duration of the cube process can take long hours so we have to decide about the data granularity that will be stored in the cubes. We need to monitor the user behaviors. Enabling usage tracking in the repository allows us to monitor the statistics about report executions. This will be covered in *Chapter 6, Managing Usage Tracking and Enabling the Cache*.

151

# **5** Security in Oracle BI

In this chapter, we will cover:

- Configuring security settings
- Creating users
- Creating groups
- Creating application roles
- Setting up permissions on repository objects
- Configuring query limits
- Specifying the time restrictions
- Creating data filters

## Introduction

In Business Intelligence projects, configuring security settings is one of the most important steps. Business users should be authenticated and they should only access the data which they need. In order to do this, we have to configure the authentication and the authorization methods.

The default authenticator is the WebLogic Server. We already discussed that OBIEE 11*g* is integrated with the WebLogic Server. The user accounts are going to be created in the WebLogic Server. Optionally, LDAP authentication can be configured. The advantage of LDAP authentication is that we don't need to create user accounts in WebLogic. Instead of that, we can use the existing user accounts that are already created on the LDAP servers. In our sample scenario, we are going to use the default authentication so that we can create the user accounts. In order to manage the security, we're going to use groups. User accounts and groups will be created in the **WebLogic Server Administration Console** window.

Security in Oracle BI -

Then we need to create the Application Roles and map the application roles with the groups. Application roles will be created and managed in **Oracle Enterprise Manager Fusion Middleware Control**. Enterprise Manager is used to manage the applications that are integrated with WebLogic Server. OBIEE 11g is one of the applications that can be managed by Enterprise Manager.

After the authentication configuration, it will come to authorization rules. We are going to grant privileges to the user accounts or to the application roles in the BI server repository. Obviously, we're going to use **BI Administration Tool** to achieve this.

As a summary you can find the security mapping below:

USER ACCOUNTS  $\rightarrow$  GROUPS  $\leftarrow \rightarrow$  APPLICATION ROLES  $\leftarrow$  PERMISSIONS

Security permissions can be implemented in three ways:

- ► **Object-level security**: We can set permissions on objects such as subject areas, presentation tables, columns, and so on.
- Data-level security: We can define data filters to eliminate some of the rows from the result set. Let's assume that there are two region managers and they both need to access the fact table, but they should see only the region data that they are responsible for.
- Presentation Catalog security: We can set permissions on the Presentation Catalog objects such as dashboards, analyses, KPIs, and so on.

You're going to find all the details about security in this chapter.

## **Configuring security settings**

We're going to create user accounts and groups in **WebLogic Administration Console** and create the application roles in **Oracle Enterprise Manager Fusion Middleware Control**. Then we're going to import the user accounts and the application roles into the repository by using **BI Administration Tool**.

We're going to learn how to access the **Administration Console** window and the **Enterprise Manager** window.

#### How to do it...

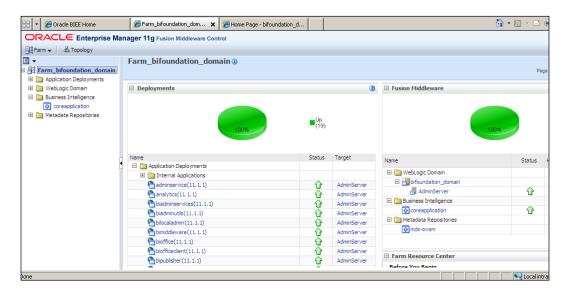
1. Login to **Oracle WebLogic Server Administration Console** in order to create users and groups. The default port number of the **Administration Console** window is 7001. The web address is http://servername:7001/console.

154

 Once you log in, click on the Security Realms link. You will find only one realm by default, called My Realm. You'll see the list of the user accounts and the groups. Then create the user accounts and the groups and configure the membership of the groups. We're going to use these groups to map them with the application roles.

	- WLS Console - Windows Internet Explorer			_ # :
🕽 🕑 💌 🙋 http://localhost:7001/ci	onsole/console.portal?_nfpb=true0_pageLabel=HomePage1		💌 🖻 🕂 🗙 💽 ting	P
le Edit Yiew Figvorites Iools (	94b			
Favorites 🙀 🙋 Oracle BIEE Home	🙋 Oracle Enterprise Manager 🙋 Oracle WebLogic Server	Ad 😰 Oracle Enterprise Manager (		
🗧 🖌 🏀 Oracle BIEE Home	Cracle Enterprise Manager	ndatio x	👌 • 🔂 · 🗆 🖶 • 849**	• Safety • Tools • 🔞 •
ORACLE WebLogic Se	rver® Administration Console			0
Change Center	🕯 Home Log Out Preferences 🖾 Record He		Welcome, weblogic Connected to:	bifoundation_domain
View changes and restarts	Home			
Click the Lock & Edit button to modify, add delete items in this domain.	or Home Page			]
Lock & Edt	- Information and Resources -			
Release Configuration	Helpful Tools	General Information		
	Configure applications	<ul> <li>Common Administration Task Descriptions</li> </ul>		
Domain Structure	<ul> <li>Configure GridLink for RAC Data Source</li> </ul>	<ul> <li>Read the documentation</li> </ul>		
ofoundation_domain	<ul> <li>Recent Task Status</li> </ul>	<ul> <li>Ask a question on My Oracle Support.</li> </ul>		
Environment     Deployments	<ul> <li>Set your console preferences</li> </ul>	<ul> <li>Oracle Guardian Overview</li> </ul>		
Services	Orade Enterprise Manager			_
Security Realms	- Domain Configurations			
Diagnostics	Domain	Services	Interoperability	
	Domain	Messaging	WTC Servers	
		<ul> <li>3MS Servers</li> </ul>	<ul> <li>Jolt Connection Pools</li> </ul>	
	Environment	<ul> <li>Store-and-Forward Agents</li> </ul>		
	<ul> <li>Servers</li> </ul>	<ul> <li>3MS Modules</li> </ul>	Diagnostics	
	Clusters	<ul> <li>Path Services</li> </ul>	<ul> <li>Log Files</li> </ul>	
iow do L.	Virtual Hosts	<ul> <li>Bridges</li> </ul>	Diagnostic Modules	
IOW GO I	Migratable Targets	Data Sources	Diagnostic Images	
<ul> <li>Search the configuration</li> </ul>	Coharanna Saniare	Resident Phone	. Damiart Darformanna	Va + 100% +

3. Login to **Oracle Enterprise Manager Fusion Middleware Control** to create application roles by accessing the web page at http://servername:7001/em.





Security in Oracle BI -

- Identity Manager

   Action Edit Help

   Identity Management

   Image: Bl Repository

   Adaptors

   Image: Display name

   Image: Display name
   </tr
- 4. Open the Oracle **BI Administration Tool** to set up permissions on repository objects. Then open **Identity Manager** from the **Manage** menu.

#### How it works...

As the first step, we have to create user accounts and groups by using **WebLogic Server Administration Console**. User accounts are going to be members of groups. Later on, they will come to application security. We're going to create application roles and map these roles to the groups.

After all these steps, user accounts and application roles are accessible from **Identity Manager** and we're going to set up permissions in the repository.

#### There's more...

We should also think about the security settings in the Presentation Catalog. We can either use the Presentation Services web interface or **Catalog Manager** to set up permissions on the catalog objects.

## **Creating users**

Business users should be authenticated when they need to access Presentation Services. Oracle BI is configured to use the directory server embedded in **Oracle WebLogic Server**. WebLogic Authentication Provider is used by default. We're going to create users by accessing **Oracle WebLogic Server Administration Console**.

#### How to do it...

 Once you are logged into Oracle WebLogic Server Administration Console, you'll see the Domain Structure pane. Click on the Security Realms link to access the list of realms in the domain.

🔠 🔹 🔏 Oracle BIEE Home	6 Farm_bifoundation_domain ( 6 Summary of Security Rea 🗙
	ver® Administration Console
Change Center	î Home Log Out Preferences 🔛 Record Help
View changes and restarts	Home >Summary of Security Realms
Click the Lock & Edit button to modify, add o delete items in this domain.	Summary of Security Realms
Lock & Edit Lock & Edit Release Configuration Domain Structure bifoundation_domain B-EnvironmentDeployments B-Services B-Services B-Interoperability D-Diagnostics	A security realm is a container for the mechanismsincluding users, groups, security roles, security policies, and multiple security realms in a WebLogic Server domain, but only one can be set as the default (active) realm. This Security Realms page lists each security realm that has been configured in this WebLogic Server domain. Cline Customize this table Realms (Filtered - More Columns Exist) Click the Lock & Editbutton in the Change Center to activate all the buttons on this page. New Delete
	☐ Name ↔ Default Realm
	myrealm true
	New Delete



Security in Oracle BI \_\_\_\_\_

2. Click on myrealm to access all the security settings. You'll also see the **Users and Groups** tab.

(A-0429-5), #22-2016/13		17 Mail 1997	<ul> <li>Second 11</li> </ul>				
Shange Center	Home Log Out	Preferences 🚵	Record Help		<u> </u>		Welcome, weblogic Connected to: bifoundation_doma
/iew changes and restarts	Home >Summary of	i Security Realms >#	nyrealm				
lick the Lock & Edit button to modify, add or elete items in this domain.	Settings for myrea	alm					
Lock & Edit	Configuration U	Users and Groups	Roles and Polic	cies Credential Mappin	gs Providers	Migration	
Release Configuration	General RD8MS	S Security Store	User Lockout	Performance			
omain Structure	Cick the Lock & E	Edit button in the C	Change Center to	modify the settings on t	nis page.		
foundation_domain Environment	Save						
Deployments Services Security Realms Interoperability	Use this page to or Note: If you are are not av	e implementing secu	urity using JACC (		act for Containe EJBs in the Admir	rs as defined i istration Cons	n 35R 115), you must use the DD Only security model. Other WebLogic Server models ole are disabled.
"Environment "Services "Services "Security Reams "Interoperability "Diagnostics	Note: If you are	e implementing secu	urity using JACC ( curity functions fo	Java Authorization Cont	act for Containe 3Bs in the Admir	rs as defined i istration Cons	n XR 115), you must use the DO Only security model. Other WebLogic Server models ofe are disabled. The name of this security realm. More Info
Deployments Services Security Realms Interoperability	Note: If you are are not av	e implementing secu valiable and the se	urity using JACC ( curity functions fo	Java Authorization Cont or Web applications and I	act for Contains DBs in the Admir	rs as defined i istration Cons	ole are disabled.

3. Go to the **Users and Groups** tab and then click on the **Lock & Edit** button. We cannot modify security settings without locking. You'll also have to click on **Release Configuration** after finishing modifications.

ange Center	🔒 Home Log Out Preferences 🔤 Record Help	Welcome, weblogic Connected to: bifoundation_do
w changes and restarts	Home >Summary of Security Realms >myrealm >Users and Groups	
ending changes exist. Click the Release fouration button to allow others to edit the	Settings for myrealm	
iguration button to allow others to edit the	Configuration Users and Groups Joles and Policies Credential Mappings Providers	Migration
Lock & Edit Release Configuration	Users Groups	
nain Structure	This page displays information about each user that has been configured in this security realm.	
Environment Deployments	<sup>©</sup> Customize this table Users	
Environment Deployments Services Becurity Realms Interoperability		Showing 1to 3 of 3 Previous   Net
invironment Jeployments Jervices Jecurity Realms Interoperability	Users	Showing 1to 3 of 3 Previous   Ner Provider
nvironment leployments ervices courity Realms nteroperability	Users	
invironment Jeployments Jervices Jecurity Realms Interoperability	Users           News         Detects           If         Hame A         Description	Provider
nvironment leployments ervices courity Realms nteroperability	Users         Dotts           Image: The state sta	Provider DefaultAuthenbcator
undeton.gomein Environnent Deployments Security Ream Security Ream Disgnostics	Users           New:         Description           ESsystemUser         BI System User           CraceSystemUser         Oracle application software system user.	Provider Defaultkuthenbcator Defaultkuthenbcator

-158-

4. We're going to enter the username and password in the new window. Once it's finished, click on **OK**.

used to identify your new User.	
ur new User?	
Cuneyt	
he new User?	
user.	
DefaultAuthenticator 💌	
the login name for the new User.	
•••••	
	ur new User? Cuneyt he new User? user. DefaultAuthenticator 💌 the login name for the new User.

### How it works...

Now that the user is created, it's time to create groups and make the user a member of the new group.

etting	gs for my	realm								
Config	guration	Users and Groups	Roles and Policies	Credential Mappings	Providers	Migration				
User	s Group	ps								
This page displays information about each user that has been configured in this security realm.										
Customize this table Users New, Delete Showing 1 to 4 of 4 Previous Next										
	Name 4	<i>~</i>	Descrip	tion					Provider	
	BISystem	lUser	BI System	n User					DefaultAuthenticator	
	Cuneyt								DefaultAuthenticator	
	OradeSy	stemUser	Oracle a	plication software system	em user.				DefaultAuthenticator	
	weblogic								DefaultAuthenticator	
Nev	W Deiet	te							Showing 1 to 4 of 4 Prev	/ious   Ne



Security in Oracle BI -

#### There's more...

Instead of assigning privileges to user accounts, we should assign it to groups to manage security settings in an efficient and secure way.

## **Creating groups**

Again we're going to use the **WebLogic Administration Tool** to configure the group settings. Groups are going to be created in the **Users and Groups** tab, as well. We're going to create a group named Sales Managers in our sample scenario. The groups can used in any application that is integrated with the WebLogic Server.

#### How to do it...

 Click on the Groups tab in the Settings for myrealm page to access the list of existing groups.

nfig	uration Users and	Groups	Roles and Policies	Credential Mappings	Providers	Migration			
sers	Groups								
	tomize this table	ion about (	each group that has b	een configured in this s	ecurity realm.				
Nev	Delete							Showing 1	to 10 of 11 Previous   N
	Name 🗇		Description						Provider
	AdminChannelUsers		AdminChannelUsers	can access the admin d	hannel.				DefaultAuthenticator
	Administrators		Administrators can v	iew and modify all reso	urce attribute	s and start and stop s	ervers.		DefaultAuthenticator
	AppTesters		AppTesters group.						DefaultAuthenticator
	BIAdministrators		BI Administrators Gr	oup					DefaultAuthenticator
	BIAuthors		BI Authors Group						DefaultAuthenticator
	BIConsumers		BI Consumers Group	)					DefaultAuthenticator
	CrossDomainConnect	ors	CrossDomainConnec	tors can make inter-dor	main calls from	n foreign domains.			DefaultAuthenticator
	Deployers		Deployers can view	all resource attributes a	and deploy ap	plications.			DefaultAuthenticator
	Monitors		Monitors can view a	nd modify all resource a	ttributes and	perform operations no	ot restricted by roles.		DefaultAuthenticator
	Operators					d perform server lifec			DefaultAuthenticator

-160

- 2. Click on the **New** button and enter the details:
  - Name: SalesManagers
  - Description: Test Group
- 3. Once you have finished, click on **OK**.

A Home Log Out Prefere	nces 🗠 Record Help						
Home >Summary of Security	/ Realms >myrealm >Users and Groups >Cuneyt >Users and Groups						
Create a New Group							
OK							
Group Properties							
The following properties w * Indicates required fields	ill be used to identify your new Group.						
What would you like to name your new Group?							
* Name:	SalesManagers						
How would you like to descr	ibe the new Group?						
Description:	Test Group						
Please choose a provider fo	r the group.						
Provider:	DefaultAuthenticator 💌						
OK Cancel							

161—

Security in Oracle BI -

4. The next step is to add the user into the group, in this case SalesManagers. There are also default groups that are created with the installation of OBIEE. We're going to add the user into the default groups too. Click the **Users** list and edit the new user by clicking on its name. Then click on the **Groups** tab and select the groups to make the membership. Click on the **Save** button after you finish.

tings	for Cuneyt				
eneral	Passwords	Attributes	Groups		
Save				nde.	
arent	Groups:		c	hosen:	
	ine: IAdministrati rossDomainC eployers Ionitors		>	SalesManagers BIConsumers BIAuthors	
	perators racleSystem	Group	33		

#### How it works...

We've added the user into these groups:

 SalesManagers: This is the sample group we've created. We're going to use this group in our sample scenario.

-162

- BIConsumers: This is a default group and it's mapped to the BIConsumer application role in the Enterprise Manager. The members of this application role can access the analyses in Presentation Services. End-users should be a member of this group to access the analyses that are created by the BI developers.
- BIAuthors: This is another default group and it's mapped to the BIAuthor application role. The members of this role can access the analyses and also they can create new analyses. The users who want to construct the analyses should be a member of this group. Power users and BI developer roles are the candidates for the BIAuthors group.

#### There's more...

Now, we'll have to map these groups to application roles in order to set up permissions in the repository. These groups are only used to categorize the user accounts in the WebLogic Server. Only application roles are going to be displayed in the **Identity Manager**. We're going to learn how to configure the application roles in the next recipe.

## **Creating application roles**

Application roles define a set of permissions that are granted to a user or group and they are defined in **Oracle Enterprise Manager Fusion Middleware Control**. These are the default application roles:

- ► BIAdministrator: This application role grants administrative permissions. This application role is a member of the BIAuthor role. So it inherits the permissions from the BIAuthor role.
  - BIAuthor: This application role grants permissions to create and edit analyses. This role is a member of BIConsumer role.
    - BIConsumer: This role grants permissions to access analyses that are created by other users.
- BISystem: This role is required by the Oracle BI system

163

#### Security in Oracle BI -

## How to do it...

1. Log in to **Oracle Enterprise Manager Fusion Middleware Control**. Right-click on coreapplication and select **Application Roles** from the **Security** menu.

	rise Ma	nager 11g Fu	ision Middleware Cont	rol
📑 Farm 🗸 🕺 Topology				
∃ ▼ ∃ B Farm_bifoundation_domai	n	🚞 Busine	ss Intelligence	
Application Deploymen     WebLogic Domain		Target coreapplicati	on	Type Oracle BI Instance
Business Intelligence     Coreapplica     Metadata Reposi	Home Monitorir	g ≻		
	Security	>	Application Policies	5
	General I	nformation	Apprication Roles	

2. You'll see the list of existing **Application Roles**. Click on the **Create** button to start creating a new application role named SalesManager.

	Coreapplication () Business Intelligence Instance -		
1	These are also application roles that	y security aware applications that are specific to th are created in the context of end users accessing the WebLogic Domain, use the Oracle WebLogic Serv	
	Policy Store Provider     Search		
•	Enter search keyword for role nam Select Application Stripe to Search		plication stripe to search if application uses a stripe
	Role Nam	e 🛛 🕑	
	Create 🛛 🖓 Create Li	e 🥖 Edit 💥 Delete	
	Role Name	Members	Description
	BISystem	BISystemUser	
	BIAdministrator	BIAdministrators	
	BIAuthor	BIAuthors, BIAdministrator	
	BIConsumer	BIConsumers, BIAuthor, authenticated-role	

-164-

3. Enter the name and display name of the new application role. We're going to use SalesManager as the name.

Application Roles > Create Applic	ation Role	
Create Application Role		
General		
Application Stripe	obi 🔹	
" Role Name	SalesManager	
Diada, Nama	Sales Managers Role	
Display Name	and the standard a staller	

4. When you scroll down, you'll see the **Members** section. You can map groups or users to this application role. Click on the **Add Group** button to select groups and click on **OK** to finish creating the SalesManager application role.

plication Roles > Create Application Role	
embers n application role may need to be mapped t	o users or groups defined in enterprise LDAP server, or the role can be mapped to other application roles.
Roles	
Add Application Role Add Gro	up 💥 Delete
Name	Туре
SalesManagers	Group
BIConsumers	Group
BIAuthors	Group
Users	
Users	



Security in Oracle BI \_\_\_\_\_

 After creating the application role, we're going to restart the BI Server component to make the new application roles available. Click on the **Restart** button in the **Overview** tab.

] ▼ ]∰ Farm_bifoundation_domain		plication () ntelligence Instance <del>+</del>						
Application Deployments     WebLogic Domain     MebLogic Intelligence	Change Ce	nter: 🛛 🔑 Lock and Edit	Configuration	l				
oreapplication	Overview	Capacity Management	Diagnostics	Security	Deployment			
🗄 🚞 Metadata Repositories	System Sh	System Shutdown & Startup						
	B		100%		■ <sup>Up</sup> (5)			
	System St		ystem Compone	ents Je <b>System</b>	Цр (5)			
			ystem Compone		Up (5)	Restart		
		atus onents are avaiable	ystem Compone	e System		Restart		

## How it works...

We've created the SalesManager application role and mapped it to SalesManagers group. So the user account that is a member of the SalesManagers group is going to inherit the security permissions from the application role.

-166-

#### Chapter 5

Coreapplication () Business Intelligence Instance +								
These are also application roles that are	security aware applications that are specific to th e created in the context of end users accessing t WebLogic Domain, use the <u>Oracle WebLogic Ser</u>	he application.						
Eroncy Store Provider								
□ Search								
Enter search keyword for role name	r search keyword for role name to guery roles defined by this application. Use application stripe to search if application us							
Select Application Stripe to Search	V obi							
Role Name	۷							
Create Like.	🧷 Edit 💥 Delete							
Role Name	Members	Description						
BISystem	BISystemUser							
BIAdministrator	BIAdministrators							
BIAuthor	BIAuthors, BIAdministrator							
BIConsumer	BIConsumers, BIAuthor, authenticated-role							
SalesManager	SalesManagers, BIConsumers, BIAuthors	Test Role						

#### There's more...

The users, groups, and application roles are all created. Now it's time to use them, in order to set up permissions. These identity objects won't be displayed by default in the repository. They should be imported to the repository. We're going to learn how to set the object permissions by using these application roles in the next recipe.

## Setting up permissions on repository objects

After creation of the user accounts and the application roles, we're going to discuss setting up permissions on the repository objects. Business users can access only the Presentation layer objects in the repository through the Presentation Services. All of the authenticated users shouldn't be able to access all subjects areas. They should see the objects that they need to see. We're going to learn how to set up permissions on the Presentation layer objects in this recipe.

167—

Security in Oracle BI \_\_\_\_\_

We can setup the permissions on these objects:

- Subject areas
- Presentation tables
- Presentation columns

# Getting ready

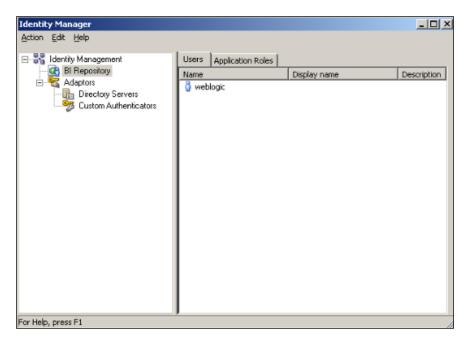
Users are going to be imported to the repository. To achieve this, we'll have to open **BI Administration Tool** and access the repository in online mode. We can't import these objects in offline mode.

## How to do it...

1. Open the **BI Administration Tool** and open the repository in online mode.

Oracle BI Administration Tool File Tools Help	
D 📽 📽 🖗 🗗 💥 🖻 🛍 🗷 🔮	■ > <> ● <> <> <> <> <> <> <> <> <> <> <> <> <>
ш В  • Ц В С	en Online coreapplication_0H1115734093
For Help, press F1	

2. Open the **Identity Manager** from **Manage** menu and check the list of the existing users. You'll only see the weblogic user account.



3. When you click on the **Application Roles** tab, you should see all the default application roles, including the SalesManager role.

Identity Manager			<u>- 🗆 ×</u>
Action Edit Help			
Identity Management     BI Repository     Adaptors     Directory Servers     Custom Authenticators	Users Application Roles Name BIAdministrator BIAuthor BIConsumer BISystem SalesManager	Display name BI Administrator Role BI Author Role BI Consumer Role BI System Role Sales Managers Role	Description



Security in Oracle BI \_\_\_\_\_

4. Click on the Set Online User Filter... option from the Action menu.

Identity Manager	
Action Edit Help	
New  Set Online User Filter	Users Application Roles
Close Alt F4	Name Displa
Custom Authenticators	🧯 weblogic

5. Enter \* as a wild character to import all user identities.

Oracle BI Administration Tool	×
Specify wildchar filter to fetch users (empty for no fetch)	
OK Cancel	

6. You'll see all the user accounts. Then close the **Identity Manager** and return to **BI Administration Tool**.

Identity Manager			
Adaptors Adaptors Custom Authenticators	Users Application Roles Name OracleSystemUser BISystemUser Cuneyt	Display name	Description Oracle a BI Syste



7. Double-click on Sales subject area and open the properties window. You'll see the **Permissions** button. The same button exists on all presentation tables as well. You can set up permissions on subject area or also on each presentation table.

	on Tool - coreapplication_0H1115734093 (Server	
Ele Edt Vew Manage Iools A		
Presentation	General Presentation Tables   Aliases	
Dim_Time ⊕-202 Dim_Customer	Name: Bass Permissions	
⊕ 2 Dim_Product ⊕ 2 Fact_Sales	Custom display name VALUEOF(NQ_SESSION.CN_Sales) Business modet Sales	
	Export logical keys	
	not assigned Set	
	Custom description VALUEOF(NQ_SESSION.CD_Sales)	
	Description:	
	OK Cancel Help	
Subject Area "Sales"	r	

8. A permissions window will pop up. You'll see the list of applications roles and users as well. You can change the default permissions from this window. You can easily limit access to some application roles or users. The Read/Write permission is going to be needed only when you enable end-users to gain benefit of the write-back feature.

		ileau/ wine	No Access	Default
syone	۲	0	0	
dministrator	0	0	0	۲
uthor	0	0	0	۲
onsumer	0	0	0	۲
ystem	0	0	0	۲
esManager	0	0	0	۲
ystemUser	0	0	0	۲
neyt	0	0	0	۲
cleSystemUs	0	0	0	۲
ologic	0	0	0	۲
neyt cleSystemUs	0000	0000	0000	*



Security in Oracle BI -

## How it works...

We've configured the permission settings on the repository objects. When the business users log in to Presentation Services, they are going to see the subject areas based on the permissions that are granted on them. If a user doesn't have permission on a specific subject area then that subject area will not be displayed in Presentation Services.

## There's more...

These are all permissions regarding the repository objects. You might be interested in row-level restrictions. We're going to cover row-level security in the *Creating Data Filters* recipe later in this chapter.

# **Configuring query limits**

Configuring limits are very useful when it comes to performance tuning. End-users might execute queries and the returning result set might contain hundred thousands of rows. Eventually, this will negatively impact the performance. We'll have to configure **query limits** to avoid such a situation.

#### How to do it...

1. Query limits can be configured at the user or the application role level. Applying query limits at the application role level will be easier. Open the **Identity Manager** and double-click on **Application Role**.

Online) Oracle BI Administration Tool - co     Ele Edt View Manage Tools Actions Wind	Application Role - SalesManager		l
Image: Presentation         Soles:         Soles:	Name: SelestMensor: Display name: Sales Managers Role Description: Test Role Members: Ø weeblogic Ø Curreyt		
Application Role : "SalesManager"	Add. Bernove OK Cano	el Help	

2. Click on the **Permissions** button. You'll see **User/Application Role Permissions** window. There are three tabs in this window. Click on the **Query Limits** tab.

User/App	lication Role Permissions - SalesManager			<u>_ [] ×</u>
Object P	emissions   Data Filters   Query Limits			
	missions for selected presentation and marketing objects or for all objects originating from a physical the objects available for querying in the end-user reporting environment.	connection. T	he permissions se	et here will
			+	×   🗟
Тур		Read	Read/Write	No Access
	Click here to add an object & set permission	0	0	0
		ок	Cancel	Help
	L	04	Carloei	nep

3. All query limits are ignored by default. One of the limits is called as Status Max Rows and it's also ignored. The Max Rows attribute is set to 100000 by default.

U	er/Appli	ication Role Permiss	ions - SalesManag	jer						_ 🗆 X
ſ	Object Pe	missions   Data Filters	Query Limits							
Iſ										
	Туре	Database	Restrict	Status Max Rows	Max Rows	Status Max Time	Max Time (Minutes)	Populate Privilege	Execute Direct Database Requests	
		orcl		Ignore	100000	Ignore	10	Ignore	Ignore	
								DK	Cancel	Help



Security in Oracle BI -

4. Now let's assume that we need a limit that the result set cannot exceed 1000 rows for the SalesManager application role. Change the Max Rows value to 1000 and click on the Status Max Rows column. Change it to **Enable**.

ject Per	missions   Data Filters Qu	uery Limits							
Туре	Database	Restrict	Status Max Rows	Max Rows	Status Max Time	Max Time (Minutes)	Populate Privilege	Execute Direct Database Reguests	
0	orcl		Enable 💌	1000	Ignore	10	Ignore	Ignore	

## How it works...

After configuring these limits, business users will not be able to execute all kind of queries. Once the logical request is generated, BI Server is going to check these limits. Depending on the limit values, business users might see error messages. These limits could be applied with different values to different database connections. In our case, there's only one database connection and its name is orcl.

You might also apply a limit regarding the duration of the query.

r/Appli	cation Role Permissions	s - SalesMana	ger						_ 0
bject Per	missions   Data Filters   Qu	ery Limits							
		'							
Туре	Database	Restrict	Status Max Rows	Max Rows	Status Max Time	Max Time (Minutes)	Populate Privilege	Execute Direct Database Requests	
9	orcl		Enable	1000	Enable	3	Ignore	Ignore	

## There's more...

Executing **direct database requests** means end-users could create their own query regardless of subject areas and execute the physical query against the specific database. But this could be risky. So you can also disable this setting for databases.



# **Specifying the time restrictions**

## Introduction

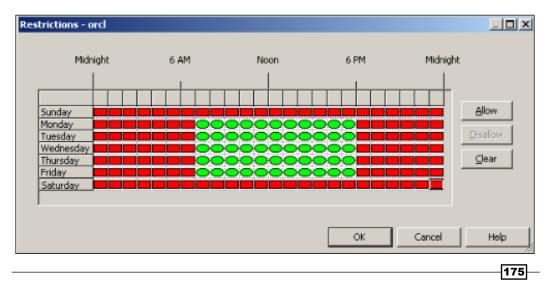
Limiting access to the BI Server during the maintenance period could be a good solution. You can apply time-based restrictions for users or application roles. You can easily disallow business users to execute queries at the specified periods. We're going to learn how to implement time-based restrictions in this recipe.

## How to do it...

1. To implement time-based restrictions double-click on the **User** or **Application Role** tab and go to the **Query Limits** tab. Click on the Restrict column in this window.

U	ser/Appli	cation Role Permissi	ons - SalesManag
	Object Pe	missions   Data Filters	Query Limits
	Туре	Database	Restrict
	a	ord	
		uci	i

2. You can easily set the allowed or disallowed periods by clicking on the **Allow** and **Disallow** buttons.



Security in Oracle BI -

## How it works...

These time-based restrictions can be customized for each database and also for different application roles. For example, managers could log in during non-business hours and others couldn't.

## **Creating data filters**

End-users might need to access the same presentation tables but they're required to see different data sets. This could be achieved only by creating data filters. This is also called row-level security. Let's assume that two different users need to access the same table. But one of the users may be responsible for the west region and the other may be the employee who is responsible for the east region. They should access only the data that is related to their region. In such cases, row-level security will be the best solution.

We're going to learn how to implement data filters in this recipe.

## How to do it...

 Open the Identity Manager and double-click on any application role. When the User/Application Role Permissions window pops up, click on the Permissions button and go to the Data Filters tab. You'll notice that there's no data filter by default.

Jser/Application	on Role Peri	missions - SalesManager			<u>_ D ×</u>
Object Permiss	ions Data Fi	ilters Query Limits			
Filters set on	presentation o	objects will be applied in addition to the ones ap	plied on the uno		
Subject Area:	AI	Total Filters: 0		🕈 🗶 🖪 🖪 📘	* *>
Туре	Layer	Name Click here to add an object and set filter	Status	Data Filter	
				OK Cancel	Help

177-

2. Click on the **Add** button to create a data filter for the SalesManager application role. The **Browse** window will pop up and you'll select a presentation column to apply the filter on. In our case, we're going to implement a data filter based on the Region column.

Browse	
Sales  Sales  Sales  Sales  Dim_Time  Solution  Customer  Customer  Customer  Customer  Customer  Customer  Customer  Sales  Phone  Region  Route Code  Sales Rep  Sales Rep  Sales  Zip Code  Sales  Fact_Sales  Presentation  Business Model	Name:       X       Query         Iype:       Presentation Table       Image: Concel
Presentation Column : "Sales""Dim_Customer"."R	kegon" //

3. Select the Presentation column. It is going to be added to the data filter automatically. Now click on the Edit Expression icon to specify the filter condition.

User/Application Role Perm	nissions - SalesManager			
Object Permissions Data Filt	ers Query Limits			
Data filters can be set here o Filters set on presentation ob	on logical and presentation layer objects. App jects will be applied in addition to the ones a	lying filter on a logica pplied on the underlyi	al object will impact all subject areas which us ing logical objects.	e the object.
Subject Area: Al	Total Filters: 0	+	🗙 🗟 🖪	» »
Type Layer	Name	Status	Edit Expression	
Presentation	"Sales""Dim_Customer"."Region" Click here to add an object and set filter	Enabled		
	Teleck field to add an object and set filler 1			
			OK Swed	1
			OK Cancel	Help

Security in Oracle BI -

- Expression Builder Security Filter Category: Logical Tables Operators ٠ "Sales"."Dim\_Customer"."Region" = 'West' Expressions Expressions Functions Constants Types Repository Variables -Logical Tables: Dim\_Time Dim\_Customer Dim\_Product Fact\_Sales 8 Eind: Columns: Address City District Customer Customer Key Customer Ke Phone Region Route Code Sales Rep State Zip Code + - \* / || ( ) > < = <= >= <> AND OR NOT , Undo Find: <u>o</u>k ⊆ancel Help Sort Panes "Sales"."Dim\_Customer"."Region"
- 4. Use the **Expression Builder** window to create a data filter. Click on **OK** to close the **Expression Builder**.

5. Here is the result. We have created the data filter based on the Region column. The result set is going to be generated with this filter.

User/Application Role Perm	issions - SalesManager			] ×
Object Permissions Data Filte	ers Query Limits			
	n logical and presentation layer objects. Ap jects will be applied in addition to the ones		a logical object will impact all subject areas which use the object, underlying logical objects.	
Subject Area: All	▼ Total Filters: 0		🕂 🗶 🗟 🖪 📔 🔪 🦻	
Type Layer	Name	Status	Data Filter	וב
Presentation	"Sales""Dim_Customer"."Region" Click here to add an object and set filter	Enabled	"Sales"."Dim_Customer"."Region" = 'West'	
-				
			OK Cancel Help	

## How it works...

After creating this data filter if anyone who is member of the SalesManager application role tries to execute any query, the result set is going to be generated, but a filter is going to be applied automatically. Only the records belonging to the west region will be displayed. In our sample scenario, we've used a static value as a condition.

When it comes to creating data filters, you don't have to specify a filter condition by using a string. We might gain benefit by using variables. Session variables could be used instead of the string value. Let's assume that we've already created a session variable named VAR REGION. Then we would have used the filter as specified below:

"Sales"."Dim\_Customer"."Region" = VALUEOF(NQ\_SESSION."VAR\_REGION")



In this chapter, we will cover:

- ► Enabling Usage Tracking
- Creating the Business Model for Usage Tracking
- Creating dashboards for Usage Statistics
- Enabling the cache
- Gathering cache statistics
- Managing the cache

# Introduction

When Oracle BI is deployed, we can't be sure about what kind of queries are going to be executed by the end users. We need to know end users' behaviors. Another business challenge can be regulatory requirements that include monitoring **usage statistics**. We already learned about query logging. When we change the logging attribute of any user, we know that the query is going to be logged in the NQQuery.log file. But it doesn't satisfy all business requirements. Instead of managing the logging attribute for each user, we can gain the benefit of **Usage Tracking**.

## **Enabling Usage Tracking**

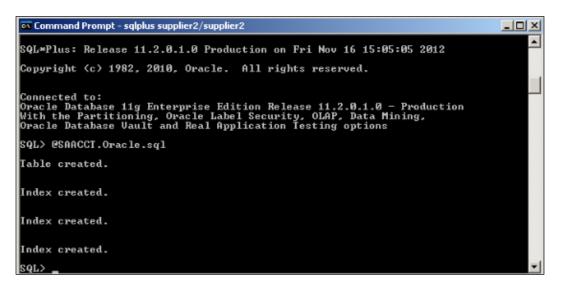
Usage Tracking is a very important feature of Oracle BI. It can be enabled at the server level and it can store all query execution information in a table in the database. This feature allows us to create usage reports as well. We're going to learn how to enable Usage Tracking in this recipe. After enabling Usage Tracking we're going to access some sample analyses. This will generate the logs about the query executions and these logs will be stored in the Usage Tracking table. Then we will create the reports that will show the usage statistics.

### How to do it...

1. To store the usage data in a database table, first of all we'll have to create this table. The table creation script can be found in the installation directory. The folder where you can find the scripts is <ORACLE\_INSTANCE>\bifoundation\ OracleBIServerComponent\coreapplication obis1\schema.

🗁 C:\oracle\obi\instances\inst	ance1\bifoundati	on\OracleBI5	erverComponent\coreapplica	ation_obis1\sc	- 🗆 🗵
<u>File Edit Yiew Favorites T</u>	ools <u>H</u> elp				<b>*</b>
🔇 Back 👻 🕥 🖌 🌮 Searc	h 防 Folders 🛛 🖗	\$ D 🗙 🖌	) 🖽-		
Address 🛅 C:\oracle\obi\instances	\instance1\bifounda	tion\OracleBISe	rverComponent\coreapplication_o	bis1\schema	💌 🔁 Go
Name 🔶	Size	Туре	Date Modified	Attributes	
MKTG.D82.sql	3 KB	SQL File	6/29/2011 11:34 AM	A	
MKTG.MSSQL.sql	3 KB	SQL File	6/29/2011 11:34 AM	A	
MKTG.Orade.sql	3 KB	SQL File	6/29/2011 11:34 AM	A	
MKTG.TERADATA.sql	3 KB	SQL File	6/29/2011 11:34 AM	A	
SAACCT.DB2.sql	2 KB	SQL File	6/29/2011 11:34 AM	A	
SAACCT.MSSQL.sql	2 KB	SQL File	6/29/2011 11:34 AM	A	
🗐 SAACCT.Orade.sql 🚽	2 KB	SQL File	6/29/2011 11:34 AM	А	
SAACCT.Teradata.sql	2 KB	SQL File	6/29/2011 11:34 AM	А	
SAEPT.DB2.sql	1 KB	SQL File	6/29/2011 11:34 AM	А	
SAEPT.M55QL.sql	1 KB	SQL File	6/29/2011 11:34 AM	А	
SAEPT.Oracle.sql	2 KB	SQL File	6/29/2011 11:34 AM	A	
SAEPT.Teradata.sql	1 KB	SQL File	6/29/2011 11:34 AM	A	
UpgradeSAACT.MSSQL.sql	3 KB	SQL File	6/29/2011 11:34 AM	A	
UpgradeSAACT.Oracle.sql	1 KB	SQL File	6/29/2011 11:34 AM	A	
14 objects			24.1 KB	Ny Comput	or
14 ODJECIS			24.1 KB	3 My Comput	er /

2. The SAACCT.Oracle.sql script file is going to be used to create the Usage Tracking table. It's good to create this table in another schema but we're going to use the same schema, named SUPPLIER2 in the example.



3. Now we're going to import this table but it'll be good to create a new database in the repository. Click on **New Database...**.

orcl 🛃 Supplier2_Cl 8 🛃 SUPPLIER2			
		-1	
New Database			
Check Out			
Cut Copy Paste Delete Duplicate	Ctrl+X Ctrl+C Ctrl+V Del		
Check Consistence Mark Set Icon Expand Al	Y		
Business Model Di Physical Diagram	agram 🕨		
Properties		1	



4. We enter the name of the database and select the type of the database from the **Database** drop-down list in the **Database – UsageTrackingDB** window.

Database - UsageTrackingDB	<u>_ D ×</u>
General Features Connection Pools Display Folders	
Name: UsageTrackingDB	_
Data source definition	
Dgtabase Oracle 11g/Exadata	•
CRM metadata tables 🗌 Virtual Private Database	
Persist connection pool	
not assigned Set Gea	
Allow populate gueries by default	
Allow direct database requests by default	
Description:	
	~
	<u> </u>
OK Cancel	Help



5. Next step will be creation of the connection pool object for the new database. Right-click on the database and select **New Object** and then **Connection Pool...**.

		Physical	w2.09		
		E 🛃 SUPP	LIER2		
	Physical Di	isplay Folder	New Object	÷.	
	Connection Physical So		Check Out		
	Physical C		Cut	Ctrl+X	
	Physical Ta	-	Copy	Ctrl+C	
-			Paste Delete Duplicate	Ctrl+V Del	
			Check Consistency Mark Set Icon Expand AT		
			Business Model Diagram Physical Diagram Query Related Objects	)-  -  -	
			Rename Properties		]

- 6. Enter the details of the connection pool:
  - Name: UsageTrackingCP
  - Call interface: Default (OCI 10g/11g)
  - Data source name: orcl
  - **User name:** supplier2



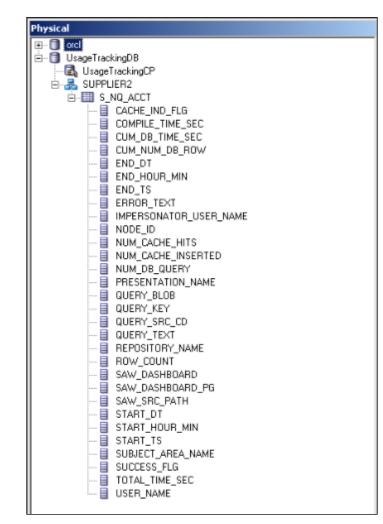
• **Password**: supplier2

Connection Pool - Usa	jeTrackingCP		_ 🗆 X
General Connection S	cripts [ XML ] Write Back ]	Miscellaneous	
Name: UsageTrac	kingCP		Permissions
Call interface:	Default (OCI 10g/11g)		•
Maximum connections	10 -		
🔲 🗄 equire fully qualifi	ed table names		
D <u>a</u> ta source name:	orcl		
Shared logon			
User name:	supplier2	Password:	
☑ Enable connection	pooling		
∐imeout:	5	(mi	inutes] 💌
Use multithreaded			
Parameters suppor			
Isolation levet	Default		
			<b>T</b>
	OK	Cancel	Help

- 7. After creating the connection pool, we're going to import the new table, named s\_NQ\_ACCT. You'll see the imported table in the following screenshot. This Usage Tracking table consists of several columns. During the execution of the queries, the BI Server captures important information that will be very useful in monitoring the users' behaviors. Some of the columns are listed as follows:
  - □ CACHE\_IND\_FLG: Indicates if the query is satisfied from the cache or not
  - QUERY TEXT: Stores the SQL statement that is executed
  - START\_DT and START\_HOUR\_MIN: Shows the start time in days, hours, and minutes of the query execution

-186-

- END\_DT and END\_HOUR\_MIN: Shows the end time in days, hours, and minutes of the query execution
- SAW\_DASHBOARD and SAW\_DASHBOARD\_PG: The dashboard and the dashboard page name of the analysis that is displayed



187—

We've finished the repository steps. Now we're going to modify the configuration file Oracle BI Server in order to enable Usage Tracking. The configuration file path is <ORACLE\_ INSTANCE>\config\OracleBIServerComponent\coreapplication\_obis1 and the name of the file is NQSConfig.INI.

1. Now, we're going to edit this file. The configuration file is divided into sections. One of the sections is named [USAGE TRACKING].

```
[USAGE_TRACKING]
ENABLE = NO;
STORAGE_DIRECTORY = "<directory path>";
CHECKPOINT_INTERVAL_MINUTES = 5;
FILE_ROLLOVER_INTERVAL_MINUTES = 30;
CODE_PAGE = "ANSI"; # ANSI, UTF8, 1252, etc.
DIRECT_INSERT = YES;
PHYSICAL_TABLE_NAME = "<Database>"."<Schema>"."<Table>";
CONNECTION_POOL = "<Database>"."<Connection Pool>";
BUFFER_SIZE = 250 MB;
BUFFER_TIME_LIMIT_SECONDS = 5;
NUM_INSERT_THREADS = 5;
MAX_INSERTS_PER_TRANSACTION = 1;
```

2. We're going to modify some attribute values in this section. The modified values are specified in bold. If the DIRECT\_INSERT parameter is set to NO, the usage tracking statistics will be stored in the files instead of the tables. Recommended practice is setting this value to YES. When it's set to YES, you will have to specify the PHYSICAL\_TABLE\_NAME and the CONNECTION\_POOL parameter values. These parameters set the storage for the statistics. The BUFFER\_SIZE parameter sets the memory size that will be allocated by the BI Server for the usage tracking. Depending on the workload, you may increase this value.

```
[USAGE_TRACKING]
ENABLE = YES;
STORAGE_DIRECTORY = "<directory path>";
CHECKPOINT_INTERVAL_MINUTES = 5;
FILE_ROLLOVER_INTERVAL_MINUTES = 30;
CODE_PAGE = "ANSI"; # ANSI, UTF8, 1252, etc.
DIRECT_INSERT = YES;
```

188

```
PHYSICAL_TABLE_NAME =
"UsageTrackingDB"."SUPPLIER2"."S_NQ_ACCT";
CONNECTION_POOL = "UsageTrackingDB"."UsageTrackingCP";
BUFFER_SIZE = 250 MB;
BUFFER_TIME_LIMIT_SECONDS = 5;
NUM_INSERT_THREADS = 5;
MAX_INSERTS_PER_TRANSACTION = 1;
```

3. After saving the configuration file, we'll have to restart the BI Server by using Oracle Fusion Middleware Enterprise Manager. Click on the **Restart** button.

ORACLE Enterprise Ma	an	ager 11g Fusion Middleware Control	
🕂 Farm 🗸 🕺 Topology			
Farm_bifoundation_domain     Application Deployments		Coreapplication () Business Intelligence Instance -	
WebLogic Domain     Business Intelligence		Change Center: PLock and Edit C	onfiguration
		Overview Capacity Management	Diagnostics Security Deployment
🗄 🫅 Metadata Repositories		System Shutdown & Startup	
		Sys	100% Up (5)
	•	System Status	Manage System
		All components are available	Start Stop Restart
		Diagnostics	
		Most Recent Errors	
		Severity Message No recent errors to report	

189—

# How it works...

1. It's time to test **Usage Tracking**. We're going to log in to Presentation Services and create a simple analysis, as in the following screenshot:

Criteria Results Prompts Adva	anced		®   <u>P</u> ~ d	0 00 0		<b>BS</b> 11
E Coses	Compound				•••••••••••••••••••••••••••••••••••••••	
Dim_Time     Dim_Customer	Title	Layout	<b>B</b>	× ×		
Dim_Product     Dim_Froduct     Dim_Fact_Sales	Table		5/			
	Region	Dollars	Units Ordered			
	Central	12,919,162	546,663			
	East	24,977,381	1,191,635			
	West	25,140,251	1,049,764			
Catalog ♣ ↔ / ₩						

2. You'll see that log data about the query execution is inserted into the  ${\tt S_NQ_ACCT}$  table.

View	)ata I	from Table "UsageTrac	kingDB""SUPPLIER2"."S	_NQ_ACCT"						_ 8 ×
1		rows 🗆 🖸	tinct							Query
Shov	2				rows startin	g from 0				Close
		CACHE_IND_FLG	COMPILE_TIME_SEC	CUM_DB_TIME_SEC	CUM_NUM_DB_ROW	END_DT	END_HOUR_MIN	END_TS	ERROR_TEXT	IMPERSONATOR
0	N		0.00	0.00		11/16/2012 12:00:00 AM	18:24	11/16/2012 6:24:12 PM	NULL	NULL
1	N		1.00	0.00	3.00	11/16/2012 12:00:00 AM	17:40	11/16/2012 5:40:01 PM	NULL	NULL

-190

## There's more...

After enabling Usage Tracking, we can easily learn about the user behavior and these important statistics data will be used in performance tuning. We're going to focus on only frequently executed queries to make decisions in the design of the aggregate tables. You can see the usage tracking information that is accessed through Presentation Services in the following screenshot:

JSER_NAME	QUERY_TEXT	START_HOUR_MIN	QUERY_TEXT	ROW_COUNT	TOTAL_TIME_SEC
weblogic	SELECT 0 s_0, "Sales". "Dim_Customer". "Region" s_1,	09:56	1	34	0
weblogic	"Sales", "Dim_Customer", "State" s_2,	11:58	1	34	0
weblogic	"Sales"."Fact_Sales"."Dollars" s_3 FROM "Sales" ORDER BY 1. 2 ASC NULLS LAST, 3 ASC NULLS LAST	16:51	1	34	0
weblogic	1, 2 ASCINOLES LAST, 3 ASCINOLES LAST	17:34	1	34	0
weblogic		20:44	1	34	1
weblogic	SELECT 0 s_0, "Sales". "Dim_Customer". "Region" s_1, "Sales". "Dim_Customer". "State" s_2, "Sales". "Each Sales" inclusion 0.55000 "Sales" w///555	16:51	1	16	0
weblogic	"Sales", "Fact_Sales", "Dollars" s_3 FROM "Sales" WHERE ("Dim_Customer", "Region" = 'East') ORDER BY 1, 2 ASC NULLS LAST, 3 ASC NULLS LAST	17:36	1	16	0
weblogic	SELECT 0 s_0, "Sales". "Dim_Customer". "Region" s_1, "Sales". "Dim_Customer". "State" s_2, "Sales". "Fact_Sales". "Units Ordered" s_3 FROM "Sales" ORDER BY 1, 2 ASC NULLS LAST, 3 ASC NULLS LAST	21:50	1	34	0
weblogic	SELECT 0 s_0, "Sales". "Dim_Customer". "Region" s_1, "Sales". "Dim_Customer". "State" s_2, "Sales". "Fact_Sales". "Units Ordered" s_3, "Sales". "Fact_Sales". "Units Shipped" s_4 FROM "Sales" ORDER BY 1, 2 ASC NULLS LAST, 3 ASC NULLS LAST	21:20	1	34	1
weblogic	SELECT 0 s_0, "Sales". "Dim_Customer". "Region" s_1, "Sales". "Dim_Customer". "State" s_2, "Sales". "Fact_Sales". "Units Ordered" s_3, "Sales". "Fact_Sales". "Units Shipped" s_4 FROM "Sales" WHERE ("Dim_Customer". "Region" = "East") ORDER BY 1, 2 ASC NULLS LAST. 3 ASC NULLS LAST	21:21	1	16	0

# Creating the Business Model for Usage Tracking

Usage Tracking is enabled now. The logs are going to be inserted into the log table always because we've set the DIRECT\_INSERT parameter value to YES in the configuration file. We can execute queries against this table and check the statistics. If you have a physical table in the repository, it'll be easier to access the statistics through Presentation Services. As you'll remember, in order to access any physical table from the Web UI, we have to create a Business Model and also a Subject Area for the model. After that, we can access this important data from Presentation Services.

191

## How to do it...

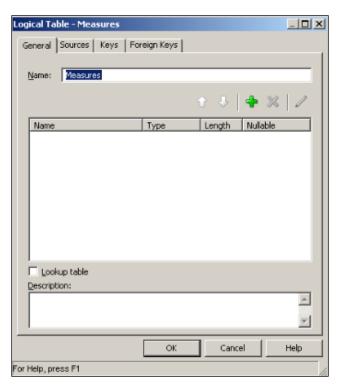
1. We're going to start creating a new Business Model. But this time, there's only one Physical table. This is the reason why we don't need any physical join. We're going to create four logical tables and define logical joins in the Business Model and Mapping layer. Right-click on the BMM layer, select **New Business Model**, and enter the name of the Business Model.

Business Model - UsageTracking	
General Display Folders	
Name: UsageTracking	
Djsabled	
Description	
	*

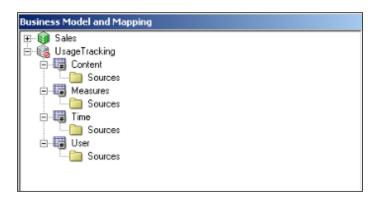
2. We're going to create four logical tables in this new Business Model. So right-click on the model and select **New Object** and then **Logical Table**.

Business Mo	del and Mapping		Physical
🖽 👰 Sales			E- Corci
esU 🧞 🗠	New Object	Þ	Logical Display Folder
			Logical Table
	Check Out Check Out Business Model	1	
	Check Out business model		
	Cut	Ctrl+X	
	Сору	Ctrl+C	
	Paste	Ctri+V Del	
	Delete Duplicate	Del	
	Create Subject Areas for Logical Stars and Snowflake:		
	Check Consistency		
	Mark		
	Set Icon Expand Al		
	cxpaid Mi		
	Business Model Diagram		
	Physical Diagram	- F	
	Query Related Objects	•	
	Rename Wizard		
	Rename		
	Properties		
	Estimate Levels		

3. You'll just enter the name of the logical table such as Measures.

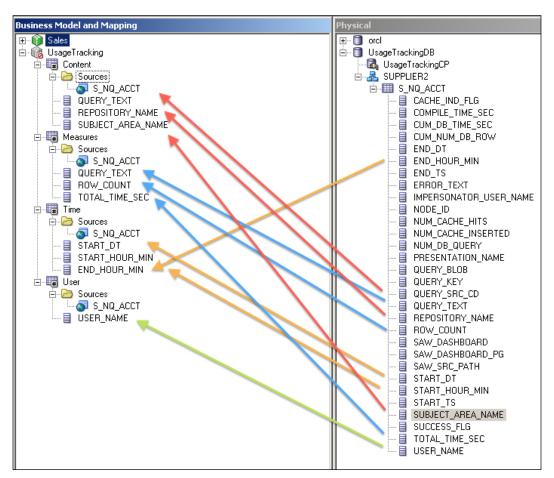


4. The remaining three logical tables are going to be done the same way. You can see them in the following screenshot:



193—

- 5. The logical tables are not mapped to any Physical table so we're going to add the logical table source to each of the logical tables. We're going to drag-and-drop corresponding physical columns onto the logical tables. The UsageTracking Business Model is shown as follows:
  - □ Content logical table: QUERY\_TEXT, REPOSITORY\_NAME, SUBJECT\_ AREA NAME
  - □ Measures logical table: QUERY\_TEXT, ROW\_COUNT, TOTAL\_TIME\_SEC
  - □ Time logical table: START\_DT, START\_HOUR\_MIN, END\_HOUR\_MIN



User logical table: USER\_NAME

- 6. In the next step, we'll have to define the relations between the logical tables by using Business Model Diagram. After opening the **Business Model Diagram** window, click on the **New Join** button. Next, click on first measure logical table, then the dimension table. You're going to repeat this three times so that three joins will be created. Additionally, we need to define the logical keys on the logical tables like the following:
  - □ **Content**: QUERY\_TEXT
  - D Time: START DT
  - □ **User**: User NAME

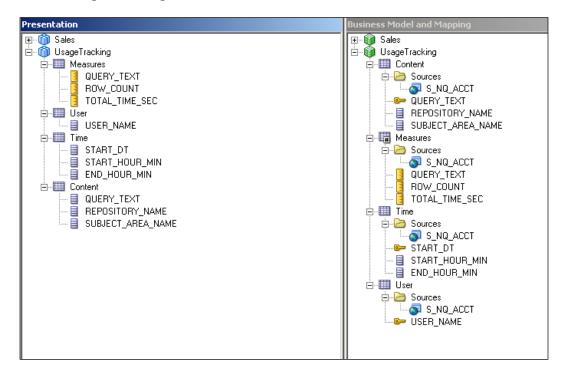
Content				믝		E Measures				▣
Columns 🛆	Types	Length	Nullable			Columns 2	Types	Length	Nullable	-
QUERY_TEXT	VARCHAR	1,024	True			L		_		_
REPOSITORY_NAME	VARCHAR	128	True			QUERY_TEXT	VARCHAR	1,024	True	-
SUBJECT_AREA_NAME	VARCHAR	128	True			ROW_COUNT	DOUBLE	10	True	_
					1	TOTAL_TIME_SEC	DOUBLE	10	True	
Time	Types	Length	Nullable			E User				<u> </u>
	Types	Length	Nullable True				Types	Length	Nullable	<b>_</b>
Columns 🛆						E User	Types VARCHAR	Length 128	Nullable True	<b>_</b>
Columns 🛆	DATETIME	0	True			Columns 2	_			

7. The last step regarding the BMM layer is going to be about defining aggregation rules of the logical columns in the Measure logical table.

Business Model and Mapping
Sales     Sales     UsageTracking     Content     Gasures     QUERY_TEXT     COUNT     ROW_COUNT     TOTAL_TIME_SEC     SUM      Time
in 🛄 User



8. All of the tasks in the BMM layer are finished now. Just to make this new Business Model visible in Presentation Service, we're going to create a Subject Area in the Presentation layer. We're going to achieve this by dragging-and-dropping the UsageTracking Business Model to the Presentation layer. Now, you can also save the repository and check the global consistency. You'll notice that the UsageTracking Business Model will be set to enabled.



## How it works...

After enabling the Business Model, we can access this **UsageTracking** subject area from Presentation Services for reporting purposes.

Search All	•	🚯 Advanced   Administration   Help 🗸   Sign Out 📿
Но	<b>me</b>   Catalog	Dashboards 🗸 🗍 🔮 New 🗸 🛛 🗁 Open 🗸 🛛 Signed In As 🛛 weblogic 🗸
		Select Subject Area
		m Sales
QuickStart - Scorecard		MusageTracking
Open   Edit   More 🗸		Create Direct Database Request
QuickStart - Overview Open   Edit   More ↓		Create a new SQL request that will be sent directly to the database. The results of the request, if any, can be displayed and manipulated within Answers, and subsequently incorporated into Interactive Dashboards and Delivers.
RegionIsPrompted Open   Edit   More ↓		Create Analysis from Simple Logical SQL Create analysis by entering simple logical SQL to Oracle BI Server.

# **Creating dashboards for Usage Statistics**

Oracle BI Server's repository is now ready to create reports regarding **Usage Statistics**. We're going to create some sample analyses and publish them in the dashboard for BI Administrators. Creating dashboards is going to be covered in *Chapter 10, Creating and Configuring Dashboards*, and we're going to use an existing dashboard. In our sample scenario, it will be **My Dashboard**. Obviously, this **UsageTracking** subject area should not be accessible by the end users. This is only for BI Administrators.

## How to do it...

- We're going to create some analyses in the UsageTracking subject area. You can easily repeat this task to create multiple analyses. After logging in to Presentation Services, click on the New button and select Analysis. Then we're going to select the UsageTracking subject area to create the analysis. In the first example, I've only used four columns:
  - SUBJECT\_AREA\_NAME
  - START\_DT



- □ ROW\_COUNT
- D TOTAL\_TIME\_SEC

ORACLE Business In	telligence Search Al 💽 💿 Advanced   Administration   Help 🗸   Sign Out 📿
Untitled	Home 🖯 Catalog 🗍 Dashboards 🗸 📄 😤 New 🗸 📄 Signed In As 🗰 😼 New 🗸 📄 Open 🗸 🗍 Signed In As 🗰 🕹 Signed In As
Criteria Results Prompts Adv	anced 🛛 🗧 🖬 🕐
🗆 Subject Areas 🛛 🏟 🗸	▼48 mm
UsageTracking	🗆 Selected Columns 🛛 🖓 🍇
Measures     Generation     Generation     Generation     Generation	Double click on column names in the Subject Areas pane to add them to the analysis. Once added, drag-and-drop columns to reorder them. Edit a column's properties, formula and filters, apply sorting, or delete by clicing or hovering over the button next to its name.
TOTAL_TIME_SEC     Government     User_NAME	Content Time Measures SUBJECT_AREA_NAME R: START_DT R: ROW_COUNT R: TOTAL_TIME_SEC R:
-END_HOUR_MIN	4
Content	□ Filters 🖓 🍓 >
QUERY_TEXT     G     REPOSITORY_NAME	Add filters to the analysis criteria by clicking on Filter option for the specific column in the Selected Columns pane, or by clicking on the filter button in the Filter pane header. Add a saved filter by clicking on add button after selecting its name in the catalog pane.
SUBJECT_AREA_NAME	<ul> <li>International and the second seco</li></ul>
	- Add Filters Here.
E Catalog 😤 🐻 🥢 🚵	
E My Folders	
My Folders     Shared Folders	
Shared Folders	

2. When you click on the **Results** tab, you'll see the result set. In order to publish these analyses in the dashboard, we'll have to save the Web object by clicking on the **Save Analysis** button.

ORACLE Business In	telligence				Search Al		Ð	Advanced	Administration	Help 🗸	Sign Out
Untitled					in the second	Home Catalog	Dashboards 🗸	New ~	Dpen 🗸	Signed In (	As weblogic ~
Criteria Results Prompts Adv	vanced										
🗆 Subject Areas  🆓 🗸	💁 🗠 🚾 💀 🐁 🕻	8   💁 🖉 🚱	📓 🍇 😫	2 2							
E 🕼 UsageTracking	Compound Layout										
H Contesting Contestin	Title			ų	a / 🗙						
H Content	Table			q	/*						
	SUBJECT_AREA_NAME	START_DT	ROW_COUNT	TOTAL_TIME_SEC							
	Sales	11/16/2012 12:00:00 AM	155		1						
		11/16/2012 12:00:00 AM	3		0						
🗏 Catalog 👘 🐻 🖉 🕅											
List All											
My Folders     Shared Folders											

-198-

3. Here is another example of an analysis in the **UsageTracking** subject area.

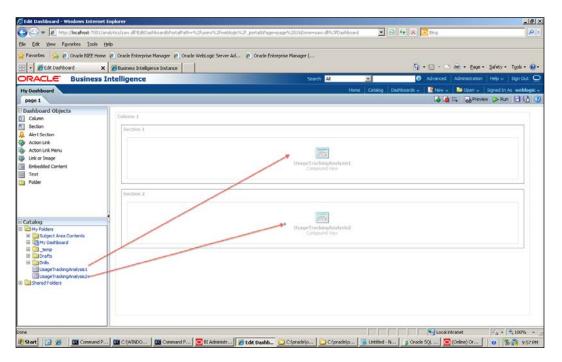
RACLE	Business In	telligence	Search Al	A	dvanced Administra	ition   Help ↓   Sign (	Out
sageTrackingAnaly	sis2		Ho	ne 🛛 Catalog 🚽 Dashboards 🗸 📄	🕈 New 🤟 📄 Open	🗸 🕴 Signed In As 🛛 we	blog
Criteria Results	Prompts Adva	anced				Saved 📄 🖥	a
Subject Areas	🔶 🚯 🦚	🕘 - 🖭 - 💀 🐁 🐘 💽 - 🤔 😭 📰 🕄	🗃 🔜   4				
UsageTracking		Compound Layout					
Measures     Guser     Time     Content		Title Table				₽a. ₽a.	
		QUERY_TEXT			ROW COUNT	TOTAL TIME SEC	
		EXECUTE PHYSICAL CONNECTION POOL "UsageTrackingDB", "UsageT CUM, NUM, DB, ROW, END, DT, END, HOL, RND, TS, ERROR, TI, NUM, CAO'E, INSERTED, NUM, DB, QUERY, PRESENTATION NAME, C SAW, DASHEDARD, SAW, DASHEDARD, PG, SAW, SRC, PATH, START TOTAL, TIME, SEC, USER, NAME from S, NO, ACCT	EXT, IMPERSONATOR_USER_NAME, NODE_ID, I QUERY_KEY, QUERY_SRC_CD, QUERY_TEXT, RE	NUM_CACHE_HITS, POSITORY_NAME, ROW_COUNT,	icow_count	2	0
		EXECUTE PHYSICAL CONNECTION POOL "UsageTrackingDB". "UsageT			1		0
		SELECT 0 s_0, "Sales". "Dim_Customer". "Region" s_1, "Sales". "Dim_Tir Shipped" s_4 FROM "Sales" ORDER BY 1, 3 ASC NULLS LAST, 2 ASC N	ne"."YEAR" s_2, "Sales"."Fact_Sales"."Dollars" s IULLS LAST	_3, "Sales". "Fact_Sales". "Net Weight	6	٥ ١	0
Catalog	1 to 1 to 2	SELECT 0 s_0, "Sales". "Dim_Customer". "Region" s_1, "Sales". "Fact_S 2 ASC NULLS LAST	ales". "Dollars" s_2, "Sales". "Fact_Sales". "Units C	rdered" s_3 FROM "Sales" ORDER BY	1, 3	3	1
	- 68 / VU	SELECT 0 s_0, "Sales". "Dim_Product". "Sub Type" s_1, "Sales". "Fact_S ORDER BY 1, 2 ASC NULLS LAST	Sales". "Units Ordered" s_2, "Sales". "Fact_Sales".	"Units Shipped" s_3 FROM "Sales"	150	5	0
My Folders		SELECT 0 s_0, "UsageTracking". "Content". "SUBJECT_AREA_NAME" s "UsageTracking". "Measures". "ROW_COUNT" s_3, "UsageTracking". "M LAST, 3 ASC NULLS LAST	_1, "UsageTracking". "Time". "START_DT" s_2, feasures". "TOTAL_TIME_SEC" s_4 FROM "Usage	Tracking" ORDER BY 1, 2 ASC NULLS	3	2	0
Views 😤	9 - / U X	Add to Briefing Book					
Table							
		Selection Steps					

4. And now it's time to publish these two analyses on a dashboard. Bl Administrators will access the dashboard and see the statistics regarding query executions. Click on the **Dashboards** drop-down list and select **My Dashboard** from the menu list. Then we're going to click on the **Edit** hyperlink to open the **Dashboard Builder**.

ORACLE	Business Intelligence		Search All	-	Advance	Administration	Help v	Sign Out
My Dashboard				Home Cata	log 🛛 Dashboards 🗸 🔤 New	🗸 🛛 🗁 Open 🗸	Signed In	As weblogic v
					Most Recent(My Das	board - page 1)		H. ?
					Hy Dashboard			
		This page has no con	hast					
		To add content, dick Edit dhere	or in the toolbar.					
		This page has no con To add content, click Edit 🖉 here	tent. or in the toolbar.					



5. When the Dashboard Builder is opened, we're going to drag-and-drop the previously saved analyses on to the **Drop Content Here** section, and then click on the **Save** button and then the **Run** button.





## How it works...

We have added two new pieces of content into **My Dashboard**. When you go to the **My Dashboard** page, you'll see the analyses.

	Business Intelligence			Search	Al	-	Ð	Advanced	Administration	Help 🗸 🛛 Si	ign Out
y Dashboard					Home	Catalog	Dashboards 🗸	New 🗸	📔 🗁 Open 🗸	Signed In As	weblog
											E
3											
UsageTrackingA	nalvsis1										
		SUBJECT AREA NAME	START DT	ROW COUNT	TOTAL TIME SEC						
		Sales	11/16/2012	159	TOTAL_TIME_SEC	1					
			12:00:00 AM								
			11/16/2012 12:00:00 AM	3		0					
				1							
sageTrackingA	nalysis2										
								-			
			CONDUCT 11/2 070		C 14 14 14 10 100				DW_COUNT	TOTAL_TIME_SE	EC
EXECUTE PHYSICAL ERROR_TEXT, IMPE REPOSITORY_NAM	. CONNECTION POOL "UsageTrackingDB". "UsageTrack ERSONATOR_USER_NAME, NODE_ID, NUM_CACHE_HI E, ROW_COUNT, SAW_DASHBOARD, SAW_DASHBOAI J.NQ_ACCT	ITS, NUM_CACHE_INSERTED, N	<pre>NUM_DB_QUERY, PRE</pre>	SENTATION_NAME, QU	JERY_KEY, QUERY_	RC_CD, Q	UERY_TEXT,	ND_TS,	DW_COUNT 2	TOTAL_TIME_SE	EC 0
EXECUTE PHYSICAL ERROR_TEXT, IMPE REPOSITORY_NAM JSER_NAME from S EXECUTE PHYSICAL	ERSONATOR_USER_NAME, NODE_ID, NUM_CACHE_HI E, ROW_COUNT, SAW_DASHBOARD, SAW_DASHBOAI _NQ_ACCT _ CONNECTION POOL "UsageTrackingD8". "UsageTracki	ITS, NUM_CACHE_INSERTED, N RD_PG, SAW_SRC_PATH, STAF ingCP" select count(*) from S_N	NUM_DB_QUERY, PRE RT_DT, START_HOUR	SENTATION_NAME, QU _MIN, START_TS, SUB	JERY_KEY, QUERY_ JECT_AREA_NAME,	SRC_CD, Q SUCCESS_	UERY_TEXT, FLG, TOTAL_TIME_S	ND_TS, EC,	2 2	TOTAL_TIME_SE	EC 0
EXECUTE PHYSICAL RROR_TEXT, IMPE REPOSITORY_NAM JSER_NAME from S EXECUTE PHYSICAL SELECT 0 s_0, "Sale	ERSONATOR_USER_NAME, NODE_ID, NUM_CAOHE_HI E, ROW_COUNT, SAW_DASHBOARD, SAW_DASHBOAR 5_NQ_ACCT CONNECTION POOL "UsageTraddingDB"."UsageTraddi zs". 'Dim_Customer". "Region" s_1, "Sales". 'Dim_Time'.'	ITS, NUM_CACHE_INSERTED, N RD_PG, SAW_SRC_PATH, STAF ingCP" select count(*) from S_N	NUM_DB_QUERY, PRE RT_DT, START_HOUR	SENTATION_NAME, QU _MIN, START_TS, SUB	JERY_KEY, QUERY_ JECT_AREA_NAME,	SRC_CD, Q SUCCESS_	UERY_TEXT, FLG, TOTAL_TIME_S	ND_TS, EC,	2 2 1 6	TOTAL_TIME_SE	EC 0
EXECUTE PHYSICAL RROR_TEXT, IMPE REPOSITORY_NAM JSER_NAME from S EXECUTE PHYSICAL SELECT 0 s_0, "Sale AST, 2 ASC NULLS ELECT 0 s_0, "Sale	ERSONATOR, USER, NAME, NODE, DJ, NUM, CAO'E, HA E, ROW, COUNT, SAW, DASHBOARD, SAW, DASHBOA J, NQ, ACCT CONNECTION POOL "UsageTradingDB". "UsageTradid s". "Dim, Customer". "Region" s_1, "Sales". "Dim, Time". LAST s". "Dim, Customer". "Region" s_1, "Sales". "Fact_Sales"	TTS, NUM_CACHE_INSERTED, N RD_PG, SAW_SRC_PATH, STAR ingCP" select count(*) from S_N 'YEAR" s_2, "Sales". "Fact_Sales ". "Dollars" s_2, "Sales". "Fact_Sa	IUM_DB_QUERY, PRE RT_DT, START_HOUR IQ_ACCT s". "Dollars" s_3, "Sale ales". "Units Ordered"	SENTATION_NAME, QL _MIN, START_TS, SUB s"."Fact_Sales"."Net W s_3 FROM "Sales" ORD	JERY_KEY, QUËRY_ JECT_AREA_NAME, /eight Shipped" s_41 IER BY 1, 2 ASC NUL	RC_CD, Q SUCCESS_I ROM "Sale	UERY_TEXT, FLG, TOTAL_TIME_S s" ORDER BY 1, 3 A	ND_TS, EC,	2 1 6 3	TOTAL_TIME_SE	EC 0
EXECUTE PHYSICAL ERROR_TEXT, IMPE REPOSITORY_NAM USER_NAME from S EXECUTE PHYSICAL SELECT 0 s_0, "Sak SELECT 0 s_0, "Sak SELECT 0 s_0, "Sak SELECT 0 s_0, "Sak	BRONATOR LUBER, NAME, NOCE, ID, NUM, CAÓRE, H R, ROW, COUNT, SAW, DASHBOARD, SAW, DASHBOAR J.NQ_ACCT CONNECTION POOL "UsageTradsingD8", 'UsageTradsing se". "Dim, Customer", 'Region" s. J., 'Sales", 'Dim, 'Time tas". "Dim, Customer", 'Region" s. J., 'Sales", 'Fact, Sales' se". "Dim, Customer", 'Sales', 'Fact, Sales'	TIS, NUM_CACHE_INSERTED, N RD_PG, SAW_SRC_PATH, STAF ingCP*select count(*) from 5_N "YEAR*s_2, "Sales". "Fact_Sales ". "Dollars" s_2, "Sales". "Fact_Sa ". "Units Ordered" s_2, "Sales".	IUM_DB_QUERY, PRE RT_DT, START_HOUR IQ_ACCT s". "Dollars" s_3, "Sale ales". "Units Ordered" "Fact_Sales". "Units Sh	SENTATION_NAME, QL _MIN, START_TS, SUB s"."Fact_Sales"."Net W s_3 FROM "Sales" ORD ipped" s_3 FROM "Sale	JERY_KEY, QUËRY_ JECT_AREA_NAME, /eight Shipped" s_4 I IER BY 1, 2 ASC NUL 25" ORDER BY 1, 2 A	RC_CD, Q SUCCESS_I ROM "Sale	UERY_TEXT, FLG, TOTAL_TIME_S s" ORDER BY 1, 3 A	ND_TS, EC,	2 1 6 3 150	TOTAL_TIME_SE	EC 0
EXECUTE PHYSICAL RROR, TEXT, IMP REPOSITORY, NAM SECUTE PHYSICAL SELECT 0 s_0, "Salk SELECT 0 s_0, "Salk SELECT 0 s_0, "Salk SELECT 0 s_0, "Salk SELECT 0 s_0, "Jua	ERSONATOR, USER, NAME, NODE, DJ, NUM, CAO'E, HA E, ROW, COUNT, SAW, DASHBOARD, SAW, DASHBOA J, NQ, ACCT CONNECTION POOL "UsageTradingDB". "UsageTradid s". "Dim, Customer". "Region" s_1, "Sales". "Dim, Time". LAST s". "Dim, Customer". "Region" s_1, "Sales". "Fact_Sales"	TTS, NUM_CACHE_INSERTED, N RD_PG, SAW_SRC_PATH, STAP IngCP" select count(") from S_N YEAR" s_2, "Sales". "Fact_Sales ". "Dollars" s_2, "Sales". "Fact_Sales ". "Units Ordered" s_2, "Sales". ". "Units Ordered" s_2, "Sales."	UM_DB_QUERY, PRE RT_DT, START_HOUR NQ_ACCT s". "Dollars" s_3, "Sale ales". "Units Ordered" "Fact_Sales". "Units Sh _DT" s_2, "UsageTrac	SENTATION_NAME, QL _MIN, START_TS, SUB s"."Fact_Sales"."Net W s_3 FROM "Sales" ORD inpped" s_3 FROM "Sale king"."Measures". ROM	JERY_KEY, QUËRY_ JECT_AREA_NAME, /eight Shipped" s_4 I IER BY 1, 2 ASC NUL 25" ORDER BY 1, 2 A	RC_CD, Q SUCCESS_I ROM "Sale	UERY_TEXT, FLG, TOTAL_TIME_S s" ORDER BY 1, 3 A	ND_TS, EC,	2 1 6 3	TOTAL_TIME_SE	0
EXECUTE PHYSICAL RROR, TEXT, IMP REPOSITORY, NAM SECUTE PHYSICAL SELECT 0 s_0, "Salk SELECT 0 s_0, "Salk SELECT 0 s_0, "Salk SELECT 0 s_0, "Salk SELECT 0 s_0, "Jua	BEGONATOR LUBER, NAME, NODE, ID, NUM, CAGHE, H E, ROW, COLINT, SAW, DASHBOARD, SAW, DASHBOA J, NQ, ACCT CONNECTION POOL, 'UsageTradsingb0'', 'UsageTradsingb ts' Toim, Customer', 'Region' s_1, 'Sales', Toim, Time', LIAGT is' Toim, Customer', 'Region' s_1, 'Sales', 'Fact, Sales is' Toim, Product', 'Sub Type' s_1, 'Sales', 'Fact, Sales is' Toim, Product', 'Sub Type' s_1, 'Sales', Tact, Sales is' Toim, Customer', 'Sub Type' s_1, 'Sales', 'Fact, Sales	TTS, NUM_CACHE_INSERTED, N RD_PG, SAW_SRC_PATH, STAP IngCP" select count(") from S_N YEAR" s_2, "Sales". "Fact_Sales ". "Dollars" s_2, "Sales". "Fact_Sales ". "Units Ordered" s_2, "Sales". ". "Units Ordered" s_2, "Sales."	UM_DB_QUERY, PRE RT_DT, START_HOUR NQ_ACCT s". "Dollars" s_3, "Sale ales". "Units Ordered" "Fact_Sales". "Units Sh _DT" s_2, "UsageTrac	SENTATION_NAME, QL _MIN, START_TS, SUB s"."Fact_Sales"."Net W s_3 FROM "Sales" ORD inpped" s_3 FROM "Sale king"."Measures". ROM	JERY_KEY, QUËRY_ JECT_AREA_NAME, /eight Shipped" s_4 I IER BY 1, 2 ASC NUL 25" ORDER BY 1, 2 A	RC_CD, Q SUCCESS_I ROM "Sale	UERY_TEXT, FLG, TOTAL_TIME_S s" ORDER BY 1, 3 A	ND_TS, EC,	2 1 6 3 150	TOTAL_TIME_SE	0
ERROR_TEXT, IMPE REPOSITORY_NAM USER_NAME from S EXECUTE PHYSICAL SELECT 0 s_0, "Sak LAST, 2 ASC NULLS SELECT 0 s_0, "Sak SELECT 0 s_0, "Sak SELECT 0 s_0, "Sak	BEGONATOR LUBER, NAME, NODE, ID, NUM, CAGHE, H E, ROW, COLINT, SAW, DASHBOARD, SAW, DASHBOA J, NQ, ACCT CONNECTION POOL, 'UsageTradsingb0'', 'UsageTradsingb ts' Toim, Customer', 'Region' s_1, 'Sales', Toim, Time', LIAGT is' Toim, Customer', 'Region' s_1, 'Sales', 'Fact, Sales is' Toim, Product', 'Sub Type' s_1, 'Sales', 'Fact, Sales is' Toim, Product', 'Sub Type' s_1, 'Sales', Tact, Sales is' Toim, Customer', 'Sub Type' s_1, 'Sales', 'Fact, Sales	TTS, NUM_CACHE_INSERTED, N RD_PG, SAW_SRC_PATH, STAP IngCP" select count(") from S_N YEAR" s_2, "Sales". "Fact_Sales ". "Dollars" s_2, "Sales". "Fact_Sales ". "Units Ordered" s_2, "Sales". ". "Units Ordered" s_2, "Sales."	UM_DB_QUERY, PRE RT_DT, START_HOUR NQ_ACCT s". "Dollars" s_3, "Sale ales". "Units Ordered" "Fact_Sales". "Units Sh _DT" s_2, "UsageTrac	SENTATION_NAME, QL _MIN, START_TS, SUB s"."Fact_Sales"."Net W s_3 FROM "Sales" ORD inpped" s_3 FROM "Sale king"."Measures". ROM	JERY_KEY, QUËRY_ JECT_AREA_NAME, /eight Shipped" s_4 I IER BY 1, 2 ASC NUL 25" ORDER BY 1, 2 A	RC_CD, Q SUCCESS_I ROM "Sale	UERY_TEXT, FLG, TOTAL_TIME_S s" ORDER BY 1, 3 A	ND_TS, EC,	2 1 6 3 150	TOTAL_TIME_SE	0 0 1 0 0
EXECUTE PHYSICAL ERROR, TEXT, IMP REPOSITORY, NAM USER, NAME from S EXECUTE PHYSICAL SELECT 0 s_0, "Sak SELECT 0 s_0, "Sak SELECT 0 s_0, "Sak SELECT 0 s_0, "Sak SELECT 0 s_0, "Sak	BEGONATOR LUBER, NAME, NODE, ID, NUM, CAGHE, H E, ROW, COLINT, SAW, DASHBOARD, SAW, DASHBOA J, NQ, ACCT CONNECTION POOL, 'UsageTradsingb0'', 'UsageTradsingb ts' Toim, Customer', 'Region' s_1, 'Sales', Toim, Time', LIAGT is' Toim, Customer', 'Region' s_1, 'Sales', 'Fact, Sales is' Toim, Product', 'Sub Type' s_1, 'Sales', 'Fact, Sales is' Toim, Product', 'Sub Type' s_1, 'Sales', Tact, Sales is' Toim, Customer', 'Sub Type' s_1, 'Sales', 'Fact, Sales	TTS, NUM_CACHE_INSERTED, N RD_PG, SAW_SRC_PATH, STAP IngCP" select count(") from S_N YEAR" s_2, "Sales". "Fact_Sales ". "Dollars" s_2, "Sales". "Fact_Sales ". "Units Ordered" s_2, "Sales". ". "Units Ordered" s_2, "Sales."	UM_DB_QUERY, PRE RT_DT, START_HOUR NQ_ACCT s". "Dollars" s_3, "Sale ales". "Units Ordered" "Fact_Sales". "Units Sh _DT" s_2, "UsageTrac	SENTATION_NAME, QL _MIN, START_TS, SUB s"."Fact_Sales"."Net W s_3 FROM "Sales" ORD inpped" s_3 FROM "Sale king"."Measures". ROM	JERY_KEY, QUËRY_ JECT_AREA_NAME, /eight Shipped" s_4 I IER BY 1, 2 ASC NUL 25" ORDER BY 1, 2 A	RC_CD, Q SUCCESS_I ROM "Sale	UERY_TEXT, FLG, TOTAL_TIME_S s" ORDER BY 1, 3 A	ND_TS, EC,	2 1 6 3 150		000000000000000000000000000000000000000
EXECUTE PHYSICAL RROR, TEXT, IMP REPOSITORY, NAM SECUTE PHYSICAL SELECT 0 s_0, "Salk SELECT 0 s_0, "Salk SELECT 0 s_0, "Salk SELECT 0 s_0, "Salk SELECT 0 s_0, "Jua	BEGONATOR LUBER, NAME, NODE, ID, NUM, CAGHE, H E, ROW, COLINT, SAW, DASHBOARD, SAW, DASHBOA J, NQ, ACCT CONNECTION POOL, 'UsageTradsingb0'', 'UsageTradsingb ts' Toim, Customer', 'Region' s_1, 'Sales', Toim, Time', LIAGT is' Toim, Customer', 'Region' s_1, 'Sales', 'Fact, Sales is' Toim, Product', 'Sub Type' s_1, 'Sales', 'Fact, Sales is' Toim, Product', 'Sub Type' s_1, 'Sales', Tact, Sales is' Toim, Customer', 'Sub Type' s_1, 'Sales', 'Fact, Sales	TTS, NUM_CACHE_INSERTED, N RD_PG, SAW_SRC_PATH, STAP IngCP" select count(") from S_N YEAR" s_2, "Sales". "Fact_Sales ". "Dollars" s_2, "Sales". "Fact_Sales ". "Units Ordered" s_2, "Sales". ". "Units Ordered" s_2, "Sales."	UM_DB_QUERY, PRE RT_DT, START_HOUR NQ_ACCT s". "Dollars" s_3, "Sale ales". "Units Ordered" "Fact_Sales". "Units Sh _DT" s_2, "UsageTrac	SENTATION_NAME, QL _MIN, START_TS, SUB s"."Fact_Sales"."Net W s_3 FROM "Sales" ORD inpped" s_3 FROM "Sale king"."Measures". ROM	JERY_KEY, QUËRY_ JECT_AREA_NAME, /eight Shipped" s_4 I IER BY 1, 2 ASC NUL 25" ORDER BY 1, 2 A	RC_CD, Q SUCCESS_I ROM "Sale	UERY_TEXT, FLG, TOTAL_TIME_S s" ORDER BY 1, 3 A	ND_TS, EC,	2 1 6 3 150		00000

## There's more...

This was a simple dashboard page. We're going to cover different views of the analyses in *Chapter 7, Creating Simple Oracle Business Intelligence Analyses.* We're going to add some graphic views to the existing analyses and this will make the reports more functional.

# **Enabling the cache**

The queries that are executed against the data warehouses causes large amount of database processing. Every time we access an analysis, the query is going to be generated by the BI Server and it's executed against the database. In order to improve the performance, we should balance the workload by enabling the cache on the BI Server. So when the query is executed for the first time, the result set is going to be cached on the BI Server. The result set is going to be generated from the cache in the subsequent executions.

201—

How to do it...

 The BI Server's cache is going to be enabled from Fusion Middleware Enterprise Manager Control. You'll see the **Performance** property page under the **Capacity Management** tab. Then click on the **Lock And Edit Configuration** link to modify the values.

DRACLE Enterprise	Manager 11g Fusion Middleware Control	Setup + Help + Log Ou
Farm 🗸 📥 Topology		
		Logget in as weblog Page Refreshed Nov 16, 2012 10/34/52 PM EET C
	Change Center: Jo Lock and Edit Configuration Overview Capacity Hanagement Disgnostics Security Deployment Metrics Availability Scalability Performance	3
	Performance Options Use this page to turne the performance of this BI instance. Enable Bi Server Cache	Apply User Session Expiry
	Enabling the server cathe con greatly improve performance by enabling users who shave data validity to retree row sets from queries that have already been run at the cost of the possibility of seeing stale data.     Maximum cache entity size     20 0 0 0 0	Reducing the user session regin y time will know any performance as resources associated with the session can be released to service new requests. The downide is that users will be requered to log in more frequently and can lose bransient session state. Every Time 210(6) Minutes and the term of term of the term of
	Clobal Cache These settings apply to the cache when the UI server is dustered. Global cache path Global cache size	In a sering with how much abla is remeved from the is server and processes. In entruit value is 5000, Reducing the maximum number of own processes an angolfandly morous performance by reducing the system resources that can be consumed by a given user session. Number Of Rows 65000 [6] Haximum Number of Rows to Download
	RPD Updates Disalouing RPD updates can increase performance.	Plaxmum Number of Kows to Downlaad Use this box to specify the number of rows in a view that can be downloaded (to html, mMal, poll, excel, etc.) The default value is 5500. Reducing the maximum number of rows that can be downloaded can improve performance where exports are common. Number Of Rows 2500 (5)
		Haximum Number of Rows Per Page to Include

2. After selecting the **Cache Enabled** checkbox, you'll need to click on the **Activate Changes** link.

Contraction of the second second second	Manager 11g Fusion Middleware Control	Setup + Help + Log Ou
Farm - & Topology		
	Coreapplication      Core	Logged in as weblogi Page Refreshed Nov 16, 2012 10:34-52 PM EET C
	Change Center: 🛛 🔂 Activate Changes 🖉 🐁 Release Configuration	3
	Overview         Capacity Hanagement         Disgnostics         Security         Deployment           Metrics         Availability         Scalability         Performance	
	Performance Options Use this page to ture the performance of this UI Instance. Enable UI Server Cache	Apply User Session Expiry
,	Evabling the server sche can greatly improve performance by evabling uses into share data visibility to reference row sets from queries that have already been run at the cost of the possibility of seeing state data.  For Cache enabled Maximum cache entry size 20  Mere  Maximum cache entry size 100  Mere	Reducing the user session easier time will horeave gen formance as resources associated with the session can be released to service new requests. The downade is that users will be required to log in more frequently and can lose brankering session state. Every Time 200 (a) Minutes (a) Maximum Number of Rows Processed when Rendering a Table View
	Clobal Cache These settings apply to the cache when the BI server is dustered. Clobal cache path Global cache size Global cache size Global cache size Global Cache	This setting limits how much data is retrieved from the BL Server and processed. The default value is 5000. Reducing the maximum number of rows processed can significantly improve performance by reducing the system resources that can be consumed by a given user easier. Number Of Roms 60000 and Maximum Number of Rows to Download
	RPD Updates	Use this box to specify the number of rows in a view that can be downloaded (to html, mhtml, pdf, excel, etc.) The default value is 2500. Reducing the maximum number of rows that can be downloaded can increave enformance where experts are common.
	Disallowing RPD updates can increase performance.	Number Of Rows 2500 G
		Maximum Number of Rows Per Page to Include

-202

3. Changes are going to be activated and the **Restart to apply recent changes** link will appear. Click on that link and restart the Bl Server.

ORACLE Enterprise	Aanager 11g Fusion Middleware Control	Setup + Help + Log Out
Farm - & Topology		
1.	1 coreapplication ()	Logged in as weblogic
Farm bifoundation_domain     Application Deployments     WebLogic Domain     Dusiness Intelligence	🐼 Business Intelligence Instance 👻	Page ReInshed Nov 16, 2012 10:34:52 PM EET C
	Change Center: PLock and Edit Configuration	0
Coreapplication	Overview Capacity Management Diagnostics Security Deployment	
🎦 Metadata Repositories	Metrics Availability Scalability Performance	
	Performance Options Use this page to take the performance of this BI Instance. Enable BI Server Cache	Apply User Session Expliny
	Enabling the server cache can greatly improve performance by enabling users who share data vability to retrieve two sets from queries that have already been run at the cost of the possibility of seeing state data.  Cache enabled  Global Cache  These settings apply to the cache when the BI server is dustered.  Global cache site  Globa	Reduing the user sension expiry the will horease performance as resources associated with the session can be relaxed to environ were expension. The domatide is that users will be required to log in more frequently and can lose transient session state. Dory Time 20019 Minutes a Minute Section 20019 Minutes Min
		This setting limits how much data is retrieved from the UI Server and processed. The default value is 65000. Reducing the existem resources that can be consumed by a given user session. Number Of Ross <u>essan</u>
	RPD Updates Disallowing RPD updates can increase performance.	Use this box to specify the number of rows in a view that can be downloaded (to thmi, whink yof, word, etc.) The default value is 2000. Reducing the number of rows that can be downloaded can more up of formance where exports are common. Number Of Rows 2500 (5)
		Maximum Number of Rows Per Page to Include

## How it works...

We have enabled the cache on the BI Server. After you execute queries, the generated result sets will be stored in the cache so that, in the subsequent execution of the same queries, the result is going to be retrieved from the cache. This is going to eliminate repeated database processing tasks.

#### There's more...

We also need to manage the cache because when the data warehouse is refreshed or updated, the cached should be maintained as well. Otherwise, end users will access old result sets that are satisfied from the cache. We're going to cover these challenges in the last task of this chapter.

# **Gathering cache statistics**

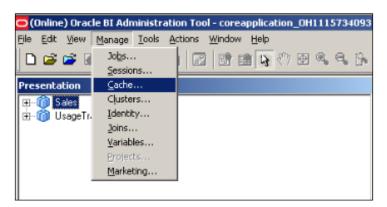
Cache statistics can be gathered by using **Cache Manager**. It's a tool that is part of the BI Administration Tool. These statistics will help us to understand the queries that are satisfied from the cache. If most of the time the queries are not being retrieved from the cache, it means that we're not managing the cache successfully.

203—

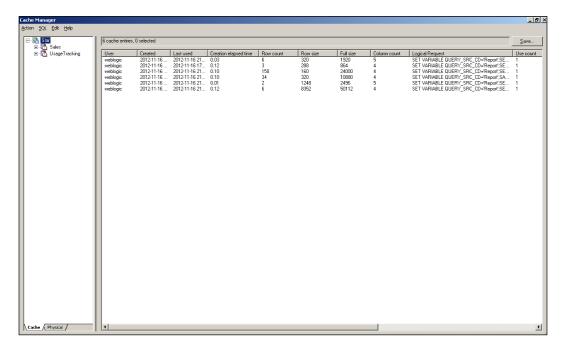
Managing Usage Tracking and Enabling the Cache

How to do it...

1. Open the **BI Administration Tool** in online mode. Cache Manager is not activated if you open the repository in offline mode. Click on the **Cache** menu item from the **Manage** menu list.



2. Cache Manager is going to be opened. You'll see the cached objects and queries in this window.





3. We'll have to click on **Show Info** from the **Action** menu list. This will open the cache statistics.

ction <u>SQL</u>		Help	1				
<u>R</u> efresh Show Info				6 cache entries,	0 selected		
Close	Alt	F4	9	User	Created	Last used	Creation elapsed time
				weblogic	2012-11-16		
				weblogic		2012-11-16 17	
				weblogic		2012-11-16 21	
				weblogic		2012-11-16 21	
				weblogic		2012-11-16 21	
				weblogic	2012-11-16	2012-11-16 21	0.12

4. Now you'll see the **Cache information** window and all the statistics regarding cache.

Oracle BI Administration Tool	
Cache information	
Number of entries currently in cache: 6 Maximum allowable number of entries in cache: 1000 Amount of space still available for cache storage use: 499 MB Amount of space used on disks containing cache related files: 0 MB Maximum allowable number of rows per cache entry result set: 100000 Number of queries satisfied from cache since startup of Oracle BI server: 0 Number of queries not satisfied from cache since startup of Oracle BI server: 0	
	<u> </u>
Eind Find Again Copy	Close

## How it works...

Whenever queries are executed, these statistics will be refreshed automatically. So you can easily monitor the cache hits from this tool.



Managing Usage Tracking and Enabling the Cache -

# Managing the cache

Managing the cache is very critical in the BI Server. Although it brings many advantages, if it's not managed successfully end users may access old results from the cache.

### How to do it...

1. We need to purge the cache whenever the data warehouse is refreshed or updated. We can achieve this by defining the **Cache Persistence Time** value. This setting is on the **General** tab of the Physical table. If you set it as one day, then the lifetime of this table in the cache will be a maximum of one day.

Physical Table - D1_PRODUCTS	<u>- 0 ×</u>
General Columns Keys Foreign Keys	
· · · · · ·	
Name: D1_PRODUCTS	
Iable Type: Physical Table	
Use Dynamic Name	
Browse-	
✓ ⊆acheable	
C Cache never expires	
Cache persistence time	•
Hint:	
Descripti <u>o</u> n:	
	A
	Ŧ
OK Cancel H	telp
For Help, press F1	



2. The second method is more popular. You'll need to create a job that will execute the script as follows:

SAPurgeAllCache()

When you run this script, either by using **Job Manager** or manually from Presentation Services, the entire cache will be cleaned up and all the cache entries will be deleted. To open **Job Manager**, click on the **Manage** menu list and select the **Jobs** menu item.

🗊 Filter View	10	View						¢ - c
A Loos     Running Jobs     By User ID     A No users     By Job ID     By Job ID     By Job ID     A No users     A No users     A No users     A Loos     By Job ID     A No users     A No users		ame Descript		ID Next R	un Time	Last Run Time	Script Type	<b>*</b> =
E 🔡 By Instance ID	Job II	Instance ID	Status	Begn Time	End Time	e Exit Code	Message	

3. Actually, purging the cache is an important task but also seeding the cache is another important task. To seed the cache you'll have to schedule the analyses to be executed according to the schedule. Scheduling of the analyses is going to be made by creating an Agent.

207—

Managing Usage Tracking and Enabling the Cache -

## How it works...

Let's assume that the data warehouse is being refreshed every midnight. Then we'll have to refresh the cache right after the data warehouse is updated. First of all, we're going to purge the cache. Then the next step will be seeding the cache by creating Agents. You are going to select dashboard pages or analyses in the agent configuration to run these reports during non-business hours. This task will seed the cache.



In this chapter, we will cover:

- Constructing the analysis
- Exploring the table view properties
- ► Formatting the table view
- Filter types and creating the filters
- Using the selections
- Adding column prompts

# Introduction

In this chapter, we're going to cover how to construct the analysis in Presentation Services. We've already discussed the back-end side of the BI Server. Now we're going to learn how to use the presentation tables that are stored in the BI repository.

After building the BI repository, it's time to execute queries against the organized data by using a set of graphical tools. OBIEE enables end users to construct web-based reports easily. We don't have to install anything on the computers to construct analysis. We're just going to log in to Presentation Services and access the Analysis Editor.

So we're going to create a simple analysis and then explore the default properties of the analysis. Formatting techniques are going to be covered in this chapter and we'll also learn how to eliminate some rows from the result set by using filters, selections, and column prompts. This will allow end users to create their own reports and focus only on certain business data.

# **Constructing the analysis**

The Analysis Editor allows users to create and modify the analyses. These analyses are going to be the building blocks of the dashboards. The analyses can be saved into the Presentation Catalog and can be published in the dashboards. They are reusable presentation objects.

We're going to learn how to construct the analyses in this recipe. Also some of the advanced features are going to be covered in the next chapter.

#### How to do it...

 When we first access Presentation Services, you'll see Create section. Clicking on Analysis in the Create section will pop up the Select Subject Area pane. You're going to select one of the existing subject areas that you're interested in. Also, you can click on the New button on the toolbar to access the Analysis link. So you can access Analysis Editor in both ways.





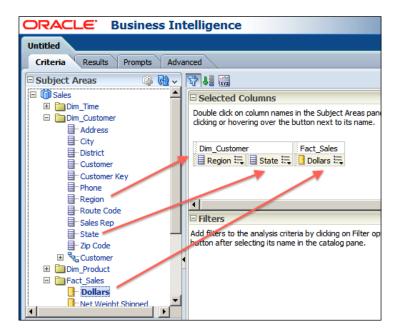
2. After you click on the Sales subject area, Analysis Editor is going to be opened as it's displayed in the following screenshot. You'll see the Subject Areas pane on the left-hand side in the Criteria tab. It contains the list of the presentation tables that are already defined in the Oracle BI repository. You'll find the Selected Columns pane next to the Subject Areas pane. You'll drag-and-drop the presentation columns onto this pane. There are also Catalog and Filter panes below the screen. The Catalog pane displays the presentation objects that you can use in this analysis. The Filters pane shows the existing filters, if there are any.

ORACLE' Business Int	telligence	Search	All
Untitled			Home Ca
Criteria Results Prompts Adva	nced		
Subject Areas <sup>™</sup> Notes         Image: Solution of the second secon	Selected Columns Double click on column names in the Subject Areas pa clicking or hovering over the button next to its name.		and-drop columns to rec
1	[4]	SELECTED C	OLUMNS PANE
SUBJECT AREA PANE	Filters Add filters to the analysis criteria by clicking on Filter of button after selecting its name in the catalog pane.	ption for the specific column in the Selected Column	1s pane, or by dicking or
		Add Fi	ilters Here.
Catalog to be a figure of the second		FILTER	S PANE

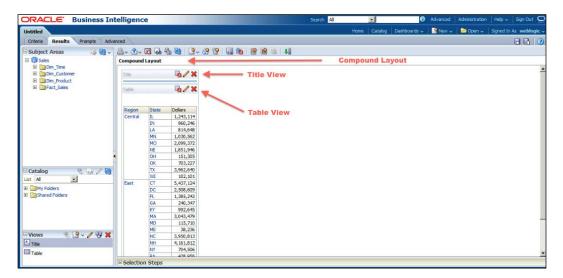
- 3. For this demonstration, we'll use two dimension columns and one measure column. We can easily drag-and-drop these three columns from the **Subject Areas** pane to the **Selected Columns** pane one-by-one.
  - The Region column
  - The State column



• The Dollars column



 After selecting columns, we're going to click on the **Results** tab. The query is going to be executed and it'll display the result set. It creates one **Compound Layout** for this analysis and adds the **Title** and the **Table** view automatically.



-212

5. Now, we're going to check the properties of the columns. There are different kinds of actions that we can perform. When you click on the button next to the column name, you'll see that the menu list is displayed. You can change the sort order of the data from this menu. If you have already sorted the data based on one column, you can still add secondary and subsequent sort order rules on the other columns. There are also many attributes that you can define in **Column Properties**.

ORACLE Business In	telligence	
Untitled		
Criteria Results Prompts Adva	anced	
Cublect Areas     Cublect Areas       State     Cublect Areas       Cublect Areas     Cublect A	Selected Columns	

6. After you click on the **Column Properties** option from the opened menu list, it'll display the **Style** tab in the **Column Properties** window. You can change the type, size, and color of the font in the **Font** section. Also the cell alignment rules are defined in this tab.

Style		ta Format Con	ditional Format	Interaction	Write Back	
Im 12					1	
Font						
Family I	Default (System) 📃		Size	]		
Color	✓ Style Defau	t (System) 💌	Effects Default	(System) 💌		
Cell						
Horiz	ontal Alignment Defaul	: (Left) 🔻	Background Co	olor 🖌		
Ve	rtical Alignment Defaul	: (Top) 💌	Ima	age		
🔽 Wra	p Text					
Border						
Position	Default (System) 💌	Border Style D	efault (System) 💽	-		
		Border Color	Y			
∃ Additio	nal Formatting Optio	15				
E Custon	n CSS Style Options (H	TML Only)				
	Colum	n Properties	of Region			
Help					ve as Default 🗸	or locat



7. Then we click on the **Column Format** tab to change column properties. By default, column name is retrieved from the repository, but if you want to use a different name, then you'll have to select the **Custom Headings** checkbox and change the value of the **Column Heading** attribute. We can also hide this column from the analysis by selecting the **Hide** checkbox. If you want to display repeated values in the analysis, you can select the **Repeat** option box.

Column Properties	(
Style Column Format Data Format Conditional Format Inter	raction Write Back
Headings     Folder Heading     Dim_Customer       Column Heading     Custom Headings     Contains HTML Markup       Value Suppression     1       XX     XXX     XX       XXX     XXX     XXX       Suppress     0     Repeat	Ang Ang 3
Help	Save as Default V OK Cancel

8. You can also change the data type format in the **Data Format** tab. By default, it retrieves the format settings from the repository. We can easily change this format type depending on the business requirements, by selecting the **Override Default Data Format** checkbox.

Verride Default I Treat Text A Custom Text Forma	s Plain text	
		*



9. We can also define conditional formatting on a column to display the data in different colors based on their values. Conditional formatting will be defined in the **Conditional Format** tab. The condition of a column can be based on either the same column values or the other column values. When you click on the **Add Condition** button, you will see all the columns in the analysis.

Column Properties	×
Style Column Format Data Format Conditional Format Interaction Write Back	_
Add Condition > Region State Dollars	
Help Save as Default V OK Cancel	

10. You can also configure the interaction rules in the **Interaction** tab. There are two kinds of interactions. One is based on the column name and the other is based on the column values. Default interaction is set to **Default (Drill)**. Obviously, this drill interaction depends on the hierarchies. Even though the default interaction is drill, if there's no hierarchy, then this drill interactivity is going to be inactive.

Column Properties	×
Style Column Format Data Format Conditional Format Interaction	ion Write Back
Column Heading Primary Interaction Default (Drill)	
Value Primary Interaction Default (Drill) Default (Drill) None Dril Action Links Send Master-Detail Events	
Help	Save as Default V OK Cancel



11. By default, the write-back feature is disabled in the analysis. It requires additional settings in the repository so that this cannot be enabled in the tab right now. But if you want to allow end users to change the values in the analyses and store the new values in the database, you can enable the write-back feature. This is done by enabling the write-back feature in the repository and then selecting the **Enable Write Back** checkbox.

Co	lumn Properties	×
	Style Column Format Data Format Conditional Format Interaction Write Back	
	Enable Write Back	

#### How it works...

When you create the analysis, it uses the default options. It creates one compound layout and adds the title and table views. So all the additional formatting options should be defined by the end users. These options will be saved in the analysis so wherever they're published, these options will also be available.

The formatting options will be applied during runtime. When you execute a query, the result set will be retrieved from the database and then all these options will be applied.

#### There's more...

The options we covered in this recipe are all related with the column properties. These options can be copied and used in another analysis easily. So you don't have to perform the same tasks on the other analysis. It's recommended to create some analyses just to store these formatting options and we can reuse them when needed.

# **Exploring the table view properties**

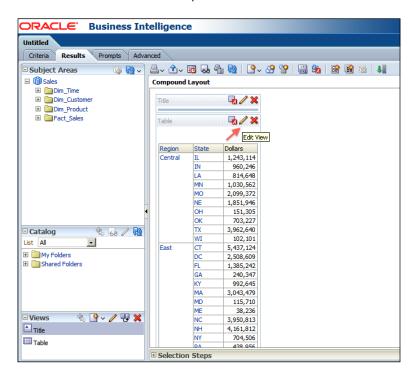
We already noticed that the **Title** and **Table** views are added to **Compound Layout** when the Analysis is first created. According to business requirements, we may need to modify the **Table** view properties. For example, Subtotals and Grand Totals are not displayed in the default layout. Some additional modifications can be performed in the **Table** views:

- Table prompts
- Sections
- Subtotals and Grand Totals
- Excluded columns



### How to do it...

 We're going to create a simple analysis and click on the **Results** tab in the Analysis Editor. You will see that the **Title** and the **Table** views are added by default. You'll need to click on the Pencil icon to open the table view editor.



- When the table view editor is opened, you'll see the Layout section below the Results section. The results will be automatically previewed according to the settings that you've changed. The Layout section is divided into four parts:
  - **D** Table Prompts
  - Sections



- Table Columns and Measures
- Excluded

	State	Dollars		
Region Central	IL	1,243,114		
	IN	960,246	Results	
	LA	814,648		
	MN	1,030,562		
Layou	t			
)rag/dro	o measures.	columns and h	ierarchies to determine table layout.	
Table P	rompts 🛽	1 XYE		
Drop He	ere for Page	s		
<b></b>				
Section	S Σ XYZ			
D op He	ere for a Sec	tioned Report		
1				
Table 🖁	YZ			
-				
-		asures Σ 📰		
	ins and Me	asures Σ 📰		
Colum Dim_	ins and Me Customer		Fact_Sales	
Colum Dim_	ins and Me Customer			

3. We're going to drag the Region column on to the **Table Prompts** section in **Layout**. You'll notice that the preview will be refreshed and a prompt will appear in the result section. It will show the prompt as a drop-down list and distinct Region column values will appear in this list.

2	ı~ î	)~ 🗛   🕂   🕅   🤔 😭   🧱 🦣   🛄 🛃 🚛
COL	Regio	Central Central
Sta	te	Donars
IL		1,243,114
IN		960,246
LA		814,648
MN		1,030,562
MO		2,099,372
🗆 Li	ayout	c
Dra	g/drop	measures, columns and hierarchies to determine table layout.
Та	ble Pr	rompts D
	Dim_Cu	ustomer
	Regi	ion 🖳
Se	ctions	s 🗵 🖼
D	rop Hei	re for a Sectioned Report
Та	ıble 🔤	2
c	olum	ns and Measures 🗵 📅
	Dim_C	Customer Fact_Sales
	-	

-218-

4. Also Subtotals and Grand Totals can be added to the analysis. You'll need to click the Total icon in the corresponding section. To close the table view editor, click on the **Done** button.

<u></u>	9 🔂   🖓   9	💡   🧱 🎭	1		
🗆 Layout					
Drag/drop measures, o	columns and hierard	hies to determ	ine table layout.		
Table Prompts <b>D</b>	XYZ				
Drop Here for Pages					
Sections D XX		Gra	and Total		
Drop Here for a Sect	ioned Report	/	nu rota		
Table 📰					
Columns and Mea	sures <b>E</b> xyz				
Dim_Customer		Fact_Sales			
	🗏 State 🖏 മ	Dollars			
/ L			-		
Excluded	After				
Drop Here to Exc	Format Labels				
Diopricie to exc	Format Values				
			Regio	n Total	

5. After the totals are added to the analysis, they will appear in the analysis. In this example, we have already added the subtotals for the Region column.

Intitled Criteria Results Prompts Advance	ed						
Subject Areas			a 🕲 💽 v d	9 69	🔛 💁	8	
A	Compound						
Dim_Customer      Dim_Product	Title		<b>B</b> /X				
Fact_Sales	Table		<b>₽</b> 3/X	t			
	Region	State	Dollars				
	Central	IL	1,243,114				
	1.00000000	IN	960,246				
		LA	814.648				
		MN	1,030,562				
		MO	2.099.372				
		NE	1.851.946				
		OH	151,305				
1		OK	703,227				
Catalog 🐁 🚲 🧷 🚱		TX	3,962,640				
st Al		WI	102,101				
My Folders	Central Total		12,919,162				
Shared Folders	East	CT	5,437,124				
New York Control of Co		DC	2,508,609				
		FL	1,385,242				
		GA	240,347				
		KY	992,645				
		MA	3,043,479				
Views 😤 😤 🗸 🥖 😲 🗶		MD	115,710				
Title		ME	38,235				
		NC	3,950,813				
Table		NH	4,161,812				



6. If you want to exclude any column from this **Table** view, you'll just need to drag the column onto the **Excluded** section. You'll see that the column won't be displayed in the **Table** view. In this example, the State column is excluded.

부산 🖓 🔂 🔮 🚷 😨 🖼 🛄 🖬 🚛	
Region Dollars	
Central 12,919,162	
East 24,977,381	
West 25,140,251	
□ Layout	
Table Prompts 🗵 🧱	
Drop Here for Pages	
Sections D 🕅	
Drop Here for a Sectioned Report	
Table 🔢	State column is excluded
Columns and Measures 2	
Dim_Customer Fact_Sales	
Region 🗟 🗵 🛛 Dollars 🗟	
Excluded	
Dim_Customer	

 You'll also see the table view properties button when the table view editor is opened. Clicking on the properties button will pop up the **Table Properties** window. In the **Style** tab you can find the formatting options regarding that table view.

Table Properties	×
Style Write Back	
Paging Controls	Bottom 💌
Rows per Page Display Folder & Column Headings	Only column headings
Enable alternating row "green	bar" styling
Repeat cell values Set alternate format	
Listen to Master-Detail Events	
Event Channels	
	OK Cancel

-220-

8. When you click on the **Enable Write Back** tab in the **Table Properties** window, you will see the write-back features of this view.

Enable Write Ba	dk.	
Temple	ate Name	
Toggle	Table Mode	
Apply Button		
Revert Button		
Done Button		
Button Position	Right -	

### How it works...

The settings that we've made using the table view editor will be specifically related only to that table view. It won't be a reusable object. All these settings will be a part of the analysis definition. So they will be saved into the Presentation Catalog when you save the analysis.

# Formatting the table view

Business users will need to focus on crucial data in the analysis, so displaying formatted data is very important. One analysis may consist of hundreds of rows but users should be able to focus only on important ones from the point of business view. In this section, we're going to enable **conditional formatting** in the analysis. We'll use these columns in the sample analysis:

- ► The Region attribute column
- ► The State attribute column
- ▶ The Dollars measure column

We are going to enable conditional formatting on the Dollars column. We'll also change the sort order of the result set.



#### How to do it...

 We're going to create a sample analysis with the mentioned columns. Then we'll need to open the **Column Properties** of the Dollars column. We'll click on the **Add Condition** button in the **Conditional Format** tab. All available columns will be displayed. The condition of the Dollars column values may be dependent on another column's value. But we're going to use the Dollars column's values to format the values. So select the Dollars column.

Column Properties	×
Style Column Format Data Format Conditional Format Interaction	Write Back
Add Condition > Region State Dollars	
Help Save as	Default V OK Cancel

2. The **New Condition** window will pop up and we'll define a condition. There are many operators that we can use for this condition. For this example, we're going to use the **is less than** operator. We can set any value in the **Value** textbox according to business requirements. We'll set it as 15000000. Then we'll click on the **OK** button.

New Cond	lition	×
Column Operator	Dollars is less than	•
Value	15000000	
	Add More Options 🗸 Clear All	
Help		OK Cancel

222

3. Right after we click on the **OK** button, the **Edit Format** window will pop up. We can define the **Font**, **Cell**, or **Border** formatting options in this window. We'll only change **Background Color** to red. So if the Dollars column's value is less than 15000000, then it'll be displayed with a red background color. Then click on the **OK** button.

Edit Format
Style Data Format
Font
Family Default (System) 🔽 Size
Color Y Style Default (System) F Effects Default (System)
Cell
Horizontal Alignment Default (System) 🔽 Background Color 📕 🗹 🖛
Vertical Alignment Default (System) 🔽 Image
✓ Wrap Text
Border
Position Default (System) 💌 Border Style Default (System) 💌
Border Color
Additional Formatting Options
E Custom CSS Style Options (HTML Only)
Help OK Cancel

- 4. We're going to add the next two conditions as the first one. After adding the other two conditions click on the OK button. According to our scenario if the Dollars column's value is:
  - Less than 15000000, then show it with red color
  - Between 15000001 and 25000000, then show it with yellow color



Greater than 2500000, then show it with green color

Column Properties	×
Style Column Format Data Format Conditional Format	Interaction Write Back
1. Dollars is less than 15000000 🛐 Value 12	13 💹 🗙 💌
2. Dollars is between 15000001 and 25000000 🛐 Value 12	23 🛃 🗵 💌 🛋
3. Dollars is greater than 25000000 🔽 Value 12	23 🛃 🗶 🛋
Add Condition > Clear All	
Help	Save as Default V OK Cancel

5. Business users will need to see the currency symbol in the analysis. So we're going to change the data format in the Data Format tab of the Dollars column. Select the Override Default Data Format checkbox and select the Currency option from the Treat Number As drop-down list. Then click on the OK button to close the Column Properties window.

<b>Column Properties</b>		×
Style Column F	ormat Data Format Conditional Format Interaction Write Back	
Override Default	Data Format	
Treat Numbers As	Currency	
Currency Symbol	\$	
Negative Format	Minus: -123	
Decimal Places	2 •	
	Use 1000's Separator	
Help	Save as Default - OK Can	rel

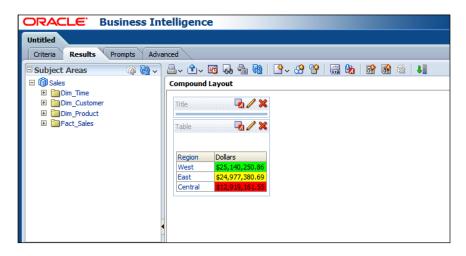
-224

6. We're going to change the sort order of the result set based on the Dollars column values. Click the More Options icon next to the Dollars column to see the menu List. Then click on the **Sort** menu item and select the **Sort Descending** option. After configuring the sort order rule, click on the **Results** tab to see what the analysis looks like.

Selected Columns						
Double click on column names in the Subject Areas pane to add them to the analysis. Once added, drag-and-drop columns to re clicking or hovering over the button next to its name.						
Dim_Customer Fact_Sale	Dim_Customer Fact_Sales					
🗎 Region 🗮 🗏 State 🗮 🚺 Dollars	:=,			_		
	¢	Sort	>		Sort Ascending	
	fΟ	Edit fo	ormula		Sort Descending	
•	XYZ	Colum	nn Properties		Add Ascepting Sort	
🗆 Filters	Ŷ	Filter			Sort Descending Add Descenaing Sort	
Add filters to the analysis criteria by clickir	×	Delete	e		Clear Sort	he, or by clicking o
button after selecting its name in the cata	log p	ane.			Clear All Sorts in All Columns	
					Add Filter	s Here.

## How it works...

You'll see that the result set is ordered by the Dollars column values in descending order. Also, the Dollars column values are conditionally formatted. Their background colors are formatted based on the values.





#### There's more...

Conditional formatting enables users to focus on crucial business data. But the conditions that we used in this scenario are based on static values. So they should be maintained as time passes. This will increase the maintenance cost. It's better to use variables to make them dynamic values. Another solution is using the **Key Performance Indicators** (**KPI**). We're going to cover the KPI definitions in *Chapter 9, Measuring Performance with Key Performance Indicators*.

# Filter types and creating the filters

When we create any analysis in OBI, the query will be generated by the BI Server and executed against the database. Regarding the selected columns, all rows will be retrieved. End users should only see the data that they are interested in. So we're going to create the filters in the analyses to eliminate some rows from the result set.

We're going to create another sample analysis that includes the following columns:

- ▶ The Region attribute column
- The State attribute column
- The Units Ordered measure column
- The Units Shipped measure column

#### How to do it...

1. We're going to click on the more options icon next to the Region column to access the menu list in the **Criteria** tab. Select the **Filter** menu item from the list.

ORACLE Business Intelligence			
Untitled			
Criteria Results Prompts Advanced			
🗆 Subject Areas 🛛 🖓 🙀 🗸			
	Selected Columns Double click on column names in the Subject Areas pane to add them to the analysis. dicking or hovering over the button next to its name. Dim_Customer Fact_Sales Region  State State State Cunits Ordered State Cunits Shipped Cuni		
Region Total Dollars     Vear Total Dollars     Total Year Percentage     Month Ago Dollars	Column Properties     Column Properties     Filters     Filter     Add filters to     X     Delete     g on Filter option for the specific column in button after selecting in the catalog pane.		

226

The New Filter window will pop up and we're going to select one of the operators from the Operator drop-down list. In this scenario, we're going to use the is equal to / is in operator in the filter. When you click the Value textbox, it will show the available values. Select the East value and click on the OK button to close the New Filter window.

New Filter	×
Column Region Operator is equal to / is in Value Central Central Central Fast ons V Clear All Protect West Search Convert this filter to SQL	•
Help	OK Cancel

3. Then click on the **Results** tab to see the result set that consists of only the East Region values.

	Sy Try	10 Gb	a 🔁 i 💁 6	8 😚   調 🏤	I
Subject Areas 🧔 🖓 🗸	Compound				
Comparison     Contract      Contract	Title			₲∥	×
E Fact_Sales	Table				×
	Region	State	Units Ordered	Units Shipped	
	East	СТ	285,217	281,151	
	Percent of the second s	DC	103,564	100,276	
		FL	53,924	52,400	
		GA	9,345	8,592	
		KY	42,552	40,528	
	•	MA	153,439	150,501	
		MD	5,186	4,862	
talog 🐁 🐻 🖉 🚱		ME	1,359	1,271	
		NC	205,647	202,184	
All 💽		NH	200,828	198,382	
My Folders		NY	28,824	27,991	
Shared Folders		PA	18,835	17,966	
		RI	28,602	27,655	
		TN	54,017	52,544	
		VA	291	278	
		VT	5	5	



- 4. Instead of selecting the values, we can also select other options by clicking on the Add More Options button in the Edit Filter window. The Edit Filter window is going to pop up when you edit the existing filter in the Criteria tab. You can use an SQL Expression or an existing variable. But unfortunately, the variables won't be displayed automatically. You'll need to write the variable name manually. Besides these options, you may be interested in calling the database functions. There are three ways to call the database functions directly:
  - The EVALUATE function: Used for scalar and analytic calculations

```
Syntax: EVALUATE('DB_Function(%1)', Expressions)
```

 The EVALUATE\_AGG function: Used for aggregate functions with group by clauses

Syntax: EVALUATE_	_AGGR ( 'DB_	_Aggregate_	_Function(%1)',
Expressions)			

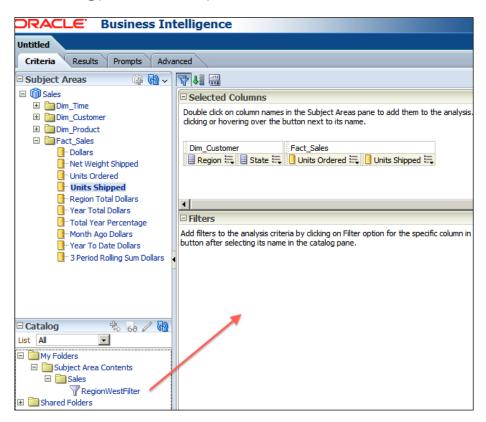
• The EVALUATE\_PREDICATE function: Used for functions with a return type of Boolean

Syntax: EVALUATE\_PREDICATE('DB\_Function(%1)', Expressions)

Edit Filter		×			
Column R	egion 📝				
Operator	Operator is equal to / is in				
Value	ast	•			
	Add More Options ~ Clear All				
Protect Fi	Protect Fi SQL Expression				
Convert t	Session Variable				
	Repository Variable				
	Presentation Variable				
Help		OK Cancel			



5. If you have already saved a filter, you can also use this filter in any analyses. You can see the list of saved filters from the **Catalog** pane. We'll drag-and-drop the filter from the **Catalog** pane to the **Filters** pane in the **Criteria** tab.



- 6. When you drag-and-drop the saved filter, RegionWestFilter, the Apply Saved Filter window will pop up so that we can configure the settings of the saved filter. There are two checkboxes that are specified below. Without selecting any checkbox, just click on the OK button.
  - **Clear all existing filters before applying**: By selecting this checkbox, all existing filters will be deleted from the analysis.

229

Apply contents of filter instead of a reference to the filter: If you don't select this checkbox, there will be a link between the analysis and the saved filter. If you change the filter content in a future time, the analysis is also going to be affected. But if you select this checkbox, the definition of the filter will be copied to the analysis and there won't be any reference to the saved filter.

Apply Saved Filter	×
Filter Location and Contents	
Filter Location	
/My Folders/Subject Area Contents/RegionWestFilter	
Contents of Filter	
Region is equal to / is in West	
Filter Options	
Choose one or more of the following options to control how the filter sh	hould be applied to the analysis.
Clear all existing filters before applying	
$\square$ Apply contents of filter instead of a reference to the filter	
Нер	OK Cancel

## How it works...

After adding the saved filter, click on the **Results** tab and check the result. You'll only see the West values in the Region column.

This time, the BI Server is going to generate the SQL query with a WHERE criteria. So the data that will be retrieved from the database will be eliminated based on this criteria.

ite			-
able		nanana m	<b>B</b> .
Region	State	Units Ordered	Units Shipped
West	AZ	22,327	21,515
	CA	684,452	669,475
	ID	20,568	20,117
	NM	92,770	90,107
	NV	53,854	51,641
		CC 004	65,017
	OR.	66,881	00/02/
	OR. UT	103,423	100,727



#### There's more...

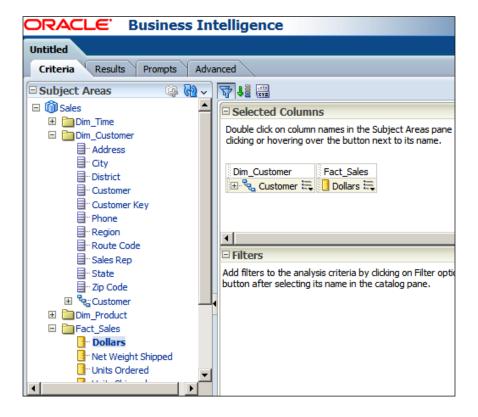
These are the examples of filter definitions. These filter definitions are not going to be changed by the end users once these analyses are published in the dashboards. Sometimes we'll need to create some analyses that will allow end users to interact by selecting a value from a drop-down list. These settings will be implemented by adding **Column Prompts** in the analyses at the end of the chapter.

# **Using the selections**

When the analysis is constructed, it'll show all the data as it's in the database. We can implement some filters or grouping options in the analysis after the data is aggregated.

In order to make the demonstration, we're going to use a new analysis that consists of these columns. You can see this in the following screenshot.

- The Customer hierarchy column
- The Dollars measure column





How to do it...

1. After constructing the sample analysis, click on the **Results** tab. We'll see that this time, **Compound Layout** consists of the **Title** and **Pivot Table** views. This happened because we have selected a hierarchy column instead of selecting an attribute column.



2. When you expand the **Selection Steps** pane in the **Results** tab, you'll see that the **ALL** members option will be displayed by default. Click on the **Then, New Step** link and navigate to **Add Groups or Calculated Items** | **New Group**.

<u></u> ⊸ 🗘 - 💀	😼 🐁 🔞   💁 🔗 😚   🚟 🧞			
Compound Layout				
Title Pivot Table				
	Dollars			
Customer				
<ul> <li>Customer</li> <li>Total</li> </ul>	\$63,036,793.10			
Central	\$12,919,161.55			
± East	\$24,977,380.69			
± West	\$25,140,250.86			
Selection St List: ALL Measures Fact_Sales - D Dim_Custome	vollars			
<ul> <li>1. Start with a</li> </ul>				
2. Then, New Step     Select Members				
	Add Groups or Calculated Items	Select Existing Groups and Calculated Items		
	Apply a Condition	New Group		
	Select Members based on Hierarchy	/ New Calculated Item		

-232

3. The **New Group** window will pop up. You can select the members to create a new group. We're going to select the West and the East values. You can use West & East as the group name. Then click on the **OK** button.

New Group			1
Display Label West & East Values From Dim_Customer.Customer  Available	ě	Selected	
Dim_Customer.Customer  Customer Total  Custom	Move Move Remove Remove	All	
Format		ОК	Cancel

## How it works...

When you see the result set, you'll notice that a new member is added as a group into the **Pivot Table** view. It's called as West & East and it shows the total Dollars value based on the two regions.

233—

These selection steps are very useful when you want to display comparable report values in the analyses.

<u>a</u>	≟- 1				
	ompound Layo				
		u.			
1	Title	<b>L</b> a / 🗙	K		
	Pivot Table	😼 🧷 🗙	<b>K</b>		
		Dollars			
	Customer				
	Customer	\$63,036,793.10			
	Total				
	🕀 Central	\$12,919,161.55			
	🗄 East	\$24,977,380.69			
	🗄 West	\$25,140,250.86			
	🗆 West & East	\$50,117,631.55			
	🗄 East	\$24,977,380.69			
	🗄 West	\$25,140,250.86			
╏└			_ /		
	o.l				
	Selection Ste	ps			
Li	st: ALL	•			
M	leasures				
	Fact_Sales - Dollars				
D	Dim_Customer - Customer				
	1. Start with all members				
6	2. Then, Add 🛛	/est & East			
↓	3. Then, New S	tep			

## There's more...

Instead of adding a new group, we could also remove an existing member from the **Pivot Table** view. Both are supported. For example, if we had removed the West value from the **Selection Steps** pane, it would only show the Central and the East values.

-234

# Adding column prompts

When it comes filtering data dynamically, it'll be good to allow end users to select the values from a drop-down list. We can achieve this by using **Column Prompts**. To demonstrate the column prompts, we're going to use a new analysis that consists of four columns as you'll see in the following screenshot:

ORACLE' Business Intelligence				
Untitled				
Criteria Results Prompts Adva	anced			
Criteria       Results       Prompts       Adva         Subject Areas       Image: Construct and the second	Anced  Selected Columns  Double dick on column names in the Subject Areas pane to add them to the and cicking or hovering over the button next to its name.  Dim_Customer  Region  State  City  Dollars  City  Fitters  Add filters to the analysis criteria by dicking on Filter option for the specific colubutton after selecting its name in the catalog pane.			
E Shared Folders				

235

## How to do it...

1. After creating the sample analysis, click on the **Prompts** tab. Click on the Add Prompt icon and go to **Column Prompt** | "**Dim\_Customer**"."Region".

		68	<b>+</b> , ⊞ / ×
Type Page	Prompt For	"Dim_Customer"."Region" "Dim_Customer"."State" "Dim_Customer"."City" "Fact_Sales"."Dollars" More Columns	Column Prompt > Variable Prompt Image Prompt

2. The **New Prompt: Region** window will pop up on the screen. Set the **Label** value as Choose a Region and don't change any settings in the windows. Just click on the **OK** button.

New Prompt: Reg	ion 🛛 🗶
Prompt For Column	Region 🜃
Label	Choose a Region
Description	×
Operator	is equal to / is in
User Input	Choice List
Options	
Choice List Values	All Column Values
	Include "All Column Values" choice in the list  Limit values by All Prompts  Enable user to select multiple values Enable user to type values Require user input
Default selection	None
Choice List Width	O Dynamic 💿 120 Pixels
Set a variable	None
Help	OK Cancel

-236

3. You'll see that the new column prompt is created. Create one more column prompt that's based on the State column this time. But in this one, we're going to select the **Limit Values by** checkbox and select the **Choose a Region** column prompt. This setting will make the State values be populated based on the Region column values. Click on the **OK** button again.

New Prompt: Sta	te
Prompt For Column	State 🜃
Label	Choose a State
Description	*
	<b>v</b>
Operator	is equal to / is in
User Input	Choice List
Options	
Choice List Values	All Column Values
	Include "All Column Values" choice in the list     Limit values by Choose a Region     Enable user to select multiple values     Enable user to type values     Require user input
Default selection	None
Choice List Width	C Dynamic 💿 120 Pixels
Set a variable	None
Help	OK Cancel

4. As a result you'll see two column prompts in the **Prompts** tab.

Criteria Results Prompts Advanced		
Definition		
Add prompts for users when they run this analysis.		
Prompt Label	Туре	Prompt For
Page 1	Page	
Choose a Region	Column value	Region
Choose a State	Column value	State
Display		
Page 1		
Choose a Region		
Choose a State		
OK Reset		



## How it works...

1. When an analysis has a column prompt in its definition, it doesn't show the result set immediately. Instead, it shows the column prompts to the end users. The users should select the values from the drop-down lists.

ORACLE	Business Intelligence	×
Choose a Region	East 🗨	
Choose a State		
	OK Reset	

2. After selecting the values, they should click on the **OK** button in order to see the result set based on their selections.

ORACLE		Busin	Business Intelligence		
Region	State	City	Dollars		
East	NY	Rochester	704,506		



# 8 Adding Views to Analyses and Advanced Features

In this chapter, we will cover:

- ► Adding the pivot table view
- Adding the graph view
- Adding the gauge view
- Adding the legend view
- Adding the column selector view
- Adding the view selector view
- Configuring the master-detail view settings

# Introduction

End users will like to see different kinds of reports in the dashboards. They will be interested in interactions on the reports. Table and title views may not satisfy their business requirements. So we're going to see how to add different views into the compound layouts in this chapter.

We're going to add the pivot table view, graph view, gauge view, and so on into the analyses to improve the functionality of the reports. You'll also find the customization steps of these new views.

Adding Views to Analyses and Advanced Features

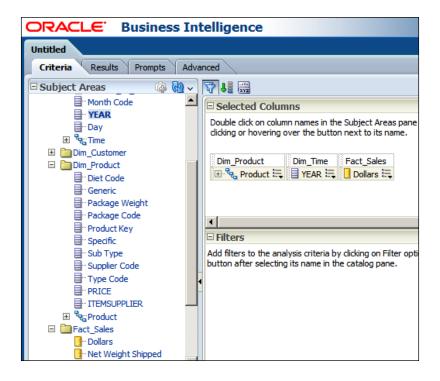
One of the most important features that we're going to cover is the master-detail view setting. After setting up the master-detail view configuration, end users will be able to see the interaction between the two views inside the analysis. This feature will let BI developers create small number of analyses, so the maintenance cost will be also reduced.

### Adding the pivot table view

We're going to add a pivot table view into the analysis. Normally, when you add an attribute and a measure column in the **Criteria** tab, the title and table views are added to the compound layout of the analysis. But if you've already created a hierarchy column in the repository, you have an option to select that column. If a hierarchy column is added, then the compound layout will consist of the title and pivot table views.

#### How to do it...

- 1. We're going to add these columns into the analysis in the Criteria tab as shown in the following screenshot:
  - Product: Hierarchy column
  - YEAR: Attribute column
  - Dollars: Measure





 When you click on the **Results** tab, you'll see that two views are automatically added to the **Compound Layout**. As usual the **Title** view is added. You'll also find the **Pivot Table** view.



3. We need to click on the Edit View (pencil sign) button, to open the pivot table view editor so that we can customize the default pivot table view content. By default, the Product and YEAR columns are added to the **Rows** section and the Dollars measure column can be found in the **Measures** section.

Dollars           Product         YEAR           Product         1,998           1,999         15,288,202	
□ Layout	
Pivot Table Prompts D BB	
Sections D 📰	
Drop Here for a Sectioned Report Pivot Table	
	Columns D
	Measure Labels
Rows D	Measures
Dim_Product     Dim_Time       Seproduct     Image: Seprement of the second se	Fact_Sales



Adding Views to Analyses and Advanced Features \_\_\_\_\_

4. We're going to drag-and-drop the YEAR column from the **Rows** section to the **Pivot Table** prompts area to have a drop-down list that will show the distinct values of the YEAR column.

≞~ 1~~~ 6.   9   10   39 19   55 10   55   55   55   55   55   55	
YEAR 1,998 -	
Dollars	
Product	
Product 47,748,591 Total	
🗆 Layout	
Dim_Time	
Sections D	
Drop Here for a Sectioned Report	
Pivot Table	
	Columns D
	Measure Labels
Rows D III	Measures
Dim_Product	Fact_Sales

5. Another option is to show the YEAR column values in the **Columns** section below the Measure Labels column. You can simply drag-and-drop the YEAR column into the **Columns** section.

-242-

Cha	oter 8
-----	--------

<b>≜</b> ~ €~ 6	- UP   🕅	88	📰 🦣 🛛		
li⊒v ⊡v 68	- <del>.</del>	001 111		비년 48	
	Dollars				
	1,998	1,999			
Product					
	47,748,591	15,288,202			
🗆 Layout					
Drop Here for Pa	ages				
Sections <b>S</b>					
Drop Here for a	Sectioned Re	port			
Pivot Table					
					Columns D
					Measure Labels
					Dim_Time
Rows <b>E</b>					Measures
Dim_Product					Fact_Sales
Re Product	2				Dollars

6. After adding the YEAR column into the section, we'll configure the pivot table view to show the Grand Total for the rows. Click the Totals After button and select the **After** option from the menu list.

≞~ <b>î</b> ~ 6	, III I 🔂	8 😚	🗃 🧤   🎞 🛃 ,	<b>,</b> a   <b>16</b>	
	Dollars				
	1,998	1,999			
Product					
	47,748,591	15,288,202			
Grand Total	47,748,591	15,288,202			
Layout					
Drop Here for P	ages				
Sections D	YZ				
Drop Here for a	Sectioned Rep	ort			
Pivot Table	1				
					Columns D
					Measure Labels
					Dim_Time
2					
Rows 🌄 📰					Measures
	one				
	efore				Fact_Sales
10 F	fter				Dollars
	ormat Labels				
	ormat Values				
E Selection St	eds				

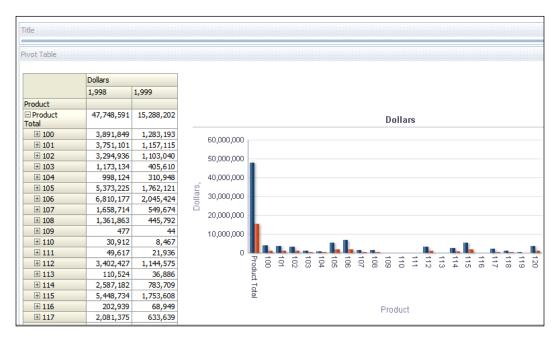


Adding Views to Analyses and Advanced Features

7. You can also add a graphic next to the pivot table. Click on the Graph Pivoted Results button in the view editor.

<u></u>	L   U   🔂	8 😚	XYZ 🛃		Position Right	▼ XY2	📊 Bar 🗸 🖢	📙 Default (Vertical)	)~
Graph Piv	voted Resu	ilts	-			D	ollars		
				60,000,000					
				50,000,000					
	Dollars		]	40,000,000			-		
Product	1,998	1,999	Dollars,	30,000,000			-		
	47,748,591	15,288,202	ă	20,000,000					
Grand Total	47,748,591	15,288,202							
				10,000,000					
				0 L		Produ	ct Total		
						Pro	duct		

8. When you expand the Product Total column, you'll see that the graphics will be automatically refreshed and it will display the bar graphic based on type code column values.





#### How it works...

We've created an analysis that consists of two views. As usual the first one is the title view and the second one is the pivot table view. If you use attribute columns when you're constructing the analysis, table view is automatically added to the view. But if you've used hierarchy columns in the **Criteria** tab, then the pivot table view will be added instead of the table view. In our scenario we have used hierarchy columns. One of the important features of the pivot table views is that we can easily navigate to finer levels by expanding the hierarchy. Pivot table views allow end users to access the finer levels in the same view without navigating to any other page. Instead of drilling down, you expand the members in the hierarchy.

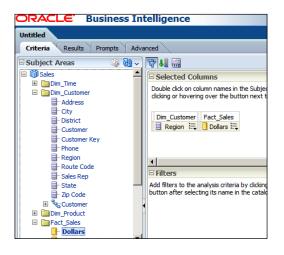
We can also add the attribute columns into the **Columns** sections instead of the **Rows** section to have a different way of presenting the reports.

## Adding the graph view

Although table and pivot table views are very useful views in the analyses, they might not satisfy all the business requirements. Business users may be interested in some visual effects in the reports. To support this requirement, we're going to add graph views into the compound layout. This will enable end users to focus on the business data easily. There are also other types of graphical views and we're going to discuss them after this recipe.

#### How to do it...

- 1. We're going to demonstrate this feature with a two-column analysis. So add one attribute and one measure column in the **Criteria** tab.
  - Region: Attribute column
  - Dollars: Measure column



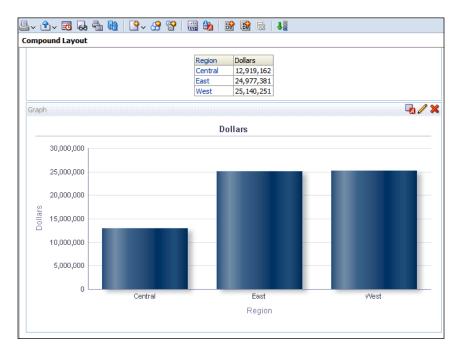


Adding Views to Analyses and Advanced Features -

To see the result set, just click on the **Results** tab. As usual, the **Title** and the **Table** views are added to **Compound Layout**. Click on the New View button and go to **Graph** | **Bar** | **Default (Vertical)** from the menu list.

💁 🗘 💀 🐻 🖓		88		📰 🔮		2 2	2   <b>1</b> 3			
Compound Layout		Title								
		Table								
Title 🚽 🖉 💥		Pivot Tab	ole							
T-11-	16	Graph	>			Bar >			Default (Vertical)	
Table 🛛 🖓 📈		Gauge	۶		⊧≃	Line			Vertical	
	9	Funnel	۶		2	Area			Horizontal	
Region Dollars		Мар				Pie			Stacked Vertical	
Central 12,919,162	1	Filters			i k	Line-Bar	>		Stacked Horizontal	
East 24,977,381 West 25,140,251		Other Vie	ws	>	⊧≈	Time Serie	es Line	-		
					6	Pareto				
						Scatter				
					-	Bubble				
					٩	Radar				

3. You'll see that the **Graph** view is added into the **Compound Layout** section below the table view.





4. We have to open the view editor in order to customize the default graphic. Once the graph view editor is opened, you'll see similar properties that we've already discussed in the pivot table view. Now we're going to learn how to implement conditional formatting in the graph view. Clicking on the Graph View Properties button in the view editor will cause the **Graph Properties** window to pop up. After accessing the **Style** tab, click on the **Style and Conditional Formatting** button.

Graph properties	×
General Style Scale Titles and Labels	
Graph Data	
Style Default 💽 Style and Conditional Formatting	A
D 3D	
Plot Area	
Background	
Gridlines 💿 Default 🔿 Specify	
Major Grid 📃 Horizontal Lines 🔲 Vertical	Lines
Color Y	
Minor Grid 🔲 Horizontal Lines	
Color Y	
Legend	
Background 🛛 🗹 Transparent	
Border	
Canvas Colors and Borders	
Background 🛛 🗹 Gradient	
Border	
Нер ОК С	Cancel

247—

Adding Views to Analyses and Advanced Features —

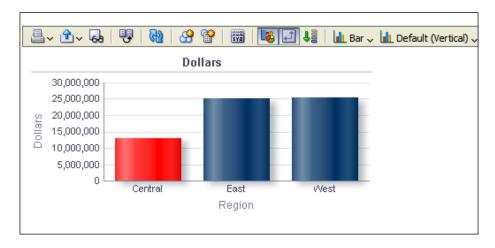
5. The **Style and Conditional Formatting** window will pop up. There are two tabs named **Style Formatting** and **Conditional Formatting**. Click on the **Conditional Formatting** tab, and then click on the **Add Condition Format** button and select the Dollars column in the menu list.

Style and Conditional Formatting
Style Formatting Conditional Formatting
Dollars Region
No conditional formats applied
Add Condition Format >  Dollars
Begion
Help OK Cancel

6. You're going to select the **is less than** operator in the **New Condition** window and set a value of say 15000000. Also, changing the background color of the cell will enable end users to focus on the important data. You can add multiple conditions but we're going to use only one condition in our sample scenario.

Style and Conditional Formatting	×
Style Formatting Conditional For	rmatting
Dollars Region	
1 Dollars is less than 15000000	<b></b>
Add Condition Format > Clear All	
Help	OK Cancel





7. When you're done in the view editor, you'll see that the bar graphic is conditionally formatted.

#### How it works...

Different graph view types can be used in the analyses and you can also add multiple graph views into the existing analysis. The default **Bar** type is **Vertical Bar**. You have other options in bar graphics such as **Horizontal Bar**, **Stacked Vertical Bar**, and **Stacked Horizontal Bar**.

You may also use different graphic options other than **Bar** such as **Line Graphics**, **Area Graphics**, **Pie Graphics**, and so on. The complete list is available when you click on the New View button and select the **Graph** menu option.

You've already seen how to add a graph view into an existing analysis that consists of title and table views. When you use table and graph views in the same compound layout, there will be an interaction between these two views. If the Drill Down feature is enabled on the column values in the table view, then end users may drill down to the finer levels. At that time, graph view is going to be refreshed automatically and that finer level data will be displayed in the graphic.

# Adding the gauge view

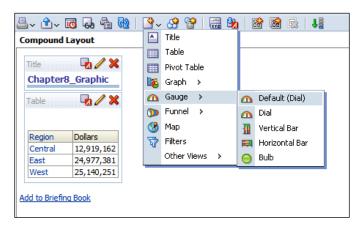
Another type of view is the gauge view, which can be easily added to the analysis. This type of view is also very useful to improve the visual appearance in the dashboards. They display the results in gauges such as **Dial**, **Bar**, and **Bulb** style gauges. They are very useful in displaying performance against the goals and gauge views are very effective in displaying single data value.



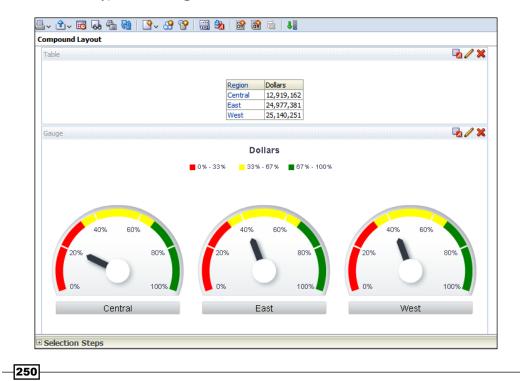
Adding Views to Analyses and Advanced Features

#### How to do it...

- 1. We're going to create another analysis that consists of two columns. After displaying the result, click on the New View button and go to **Gauge** | **Default (Dial)**.
  - Region: Attribute column
  - Dollars: Measure column



2. The dial type of the Gauge view will be added below the Table view.



3. To customize the gauge view, click on the Edit View button of the **Gauge** view. This will pop up the view editor. You can easily change the size of the gauges that are created based on the Region column values. Select the **Medium** option from the drop-down list to resize the gauges.

🕘 - 🗘 - 👴   🐺   🖓   🤔 😭   🥅   🗖 🗐 🔍 48   🗛 Def	ault (Dial) 🗸 💷 2D 🧹 Medium 💌
Dollars	Fit to Canvas Small Medium
📕 0 % - 33 % 🗧 33 % - 67 % 📕 67 % - 100 %	Large Custom
(33%67%) 0% (33%67%) 0% (33%67%)	67%
🗆 Layout	
Drag/drop measures, columns and hierarchies to determine gauge layout	
Gauge Prompts	
	Drop here for gauge prompts
Sections 🧱 🔲 Display as Slider	
	Drop here for a sectioned report
Gauge	
Rows	Measures

- 4. The threshold values are calculated automatically but if you want to specify these values manually, you can easily specify values in the **Settings** section by clicking on the Threshold values button. You'll have some options regarding threshold values:
  - Dynamic: This is the default option
  - Custom Value: You can set the value explicitly
  - Variable Expression: You can use presentation or repository variables



Adding Views to Analyses and Advanced Features —

• **SQL Query**: An SQL query may populate the threshold values automatically during runtime

				a h
	î₿	🕰 Default (Dial) 🗸	, ⊑ 2D ,   [[	Medium 💽 Width
🗆 Layout				
Drag/drop measures, columns and hierarchies to determine gauge la	avout			
Gauge Prompts			6	
		Drop r	here for gauge p	rompts
Sections 🗱 🔲 Display as Slider				
		Drop he	re for a sectione	ed report
Gauge				
Rows				Measures
Dim_Customer				Fact_Sales
				Dollars
Excluded		Dollars		:
		Dynamic	o exclude from t	his view only
Settings		Custom Value		
		Variable Expression		
Gauge Set: Dollars		SQL Query		
Goal   Goal  High values are desirable  C	× ۱	Remove		
Threshold	÷	Add Above		
High	+	Add Below		R. 1
Low Dynamic	R	Threshold		
values	-14	Threshold		i 🕹 📕
т				

- 5. Clicking on the gauge view properties button will pop up the **Gauge Properties** window. You can set the property values specified as follows:
  - General
  - □ Style
  - □ Scale
  - Titles and Labels

-252-

Gauge Propert		
General	Style Scale Titles and Labels	
Gauges Per Row	3	
-		
Legend Location	Default (Top) 💌	
	Listen to Master-Detail Events	
	Event Channels	

#### How it works...

Having many gauges in the analysis may cause loss of focus. You'll need to set the number of gauges carefully. You can achieve this by using gauge prompts to have a drop-down list, so that end users may select the value that they're interested in. Also you can easily change the gauge type. Gauge views have three types, other than the default type:

- ▶ Dial: Default option
- Vertical Bar
- ► Horizontal Bar
- ▶ Bulb

# Adding the legend view

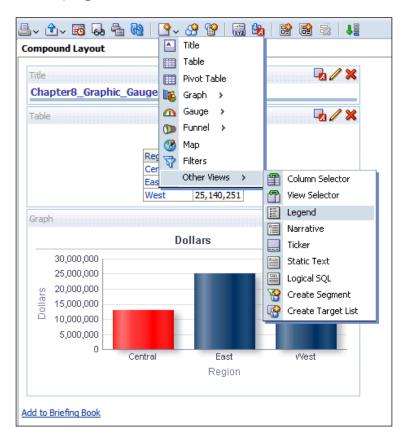
When you use the gauge and graph views in the analyses, you'll also have to inform the end users about the meaning of the colors that are used in these views. Otherwise it may cause confusion. The technical solution for this business challenge is using the legend views.



Adding Views to Analyses and Advanced Features

#### How to do it...

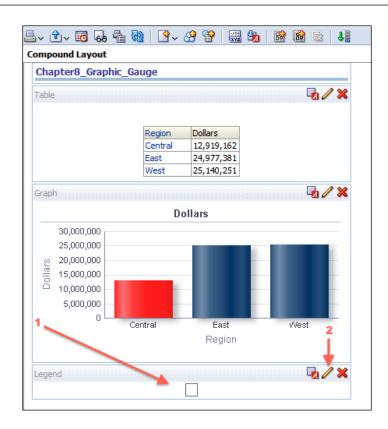
1. We're going to use an analysis that consists of three views in this demonstration, title, table, and graph views. As you can see in the screenshot, conditional formatting is implemented in the graph view. We're going to click on the New View button and go to **Other Views** | **Legend**.



2. The **Legend** view is going to be added below the **Table** view. It doesn't display any information by default. So to edit the content of the legend, click on the Edit View button.

254





3. When the view editor is displayed, just click on the **Add Caption** button so that there will be two captions. In our scenario, we need only two because we've used only two colors in the graph view. Also enter a value in the **Title** textbox.

Criteria Results Prompts Advanced
Legend
🚇 🗸 🏦 🗸 😼 🛛 💆 🛛 Captions Right 🔽 🛛 Legend items per row 🛛 🔽 🖓
Title Graphic Legend
Items Caption A Sample Text  1.  2.  Add Caption  Graphic Legend



Adding Views to Analyses and Advanced Features \_\_\_\_\_

4. Set description values in the **Caption** textboxes and then you'll need to click on the Format Text button to select the proper color.

Criteria Results Prompts	Advanced		
🥒 Legend			
<b>₽~ 1~ 8</b>   <b>9</b>   2	Captions Right -	Legend items per row	2 💽 🛛 🏂
Title Graphic Legend	M		
Items Caption 🛃	Sample Text		
1. Warning		M 🗙 💌	
2. OK		Format Text	
Add Caption			
Graphic Legend			
Warning OK			

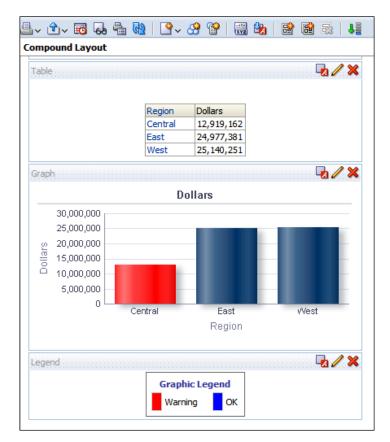
5. The **Format Text** window will pop up so that you can make necessary changes to format the legend data. We're going to only set the background color in this scenario.

Format Text	3
Im 12	
Font	
Family Default (System)	Size
Color Style Default (System)	Effects Default (System)
Cell	
Horizontal Alignment Default (System) 💌	Background Color
Vertical Alignment Default (System) -	Image
✓ Wrap Text	
Border	
Position Default (System) 💌 Border Style	Default (System) 💌
Border Color	Y
Additional Formatting Options	
E Custom CSS Style Options (HTML Only)	
Help	OK Cancel



#### How it works...

After customizing the legend content, you'll see the **Legend** view below the **Table** view. You can also change the order of these views by just a drag-and-drop.



## Adding the column selector view

When you start publishing the analyses in the dashboards, you'll notice that there won't be so much free space in the dashboards. While some users are interested in a report that consists of the Type Code and the Dollars columns, maybe others will be looking forward to seeing a similar report that consists of the Year and the Dollars columns. You won't be able to create many analyses and display them in the dashboard.

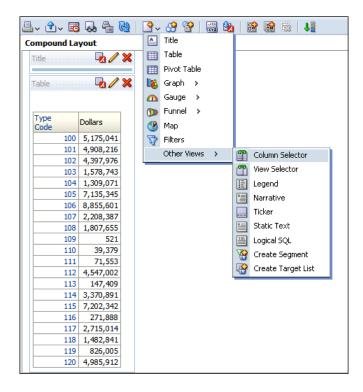
So we're going to use the column selector view for this business challenge.



Adding Views to Analyses and Advanced Features

#### How to do it...

1. Create an analysis that consists of the Type Code and the Dollars column. Then click on the New View button and navigate to **Other Views** | **Column Selector**.

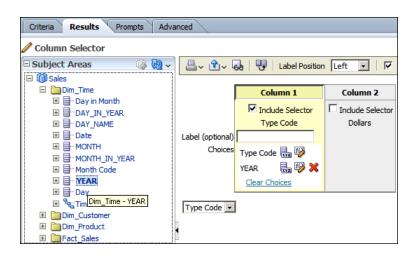


2. The **Column Selector** will be added below the **Table** view. Click on the Edit View button to open the view editor. Select the **Include Selector** checkbox for Column 1, that is Type Code.

📇 🗸 🏠 V 🚱   📑   Label Position   Left 💽   🔽 Automatically refresh when a new column is selected						
	Column 1	Column 2				
Label (optional)	Include Selector Type Code	Dollars				
Choices	Type Code 🔜 🖗					
Type Code 💌						



3. Then double-click on the YEAR column on the subject areas pane. This will add the YEAR column to the **Column 1** part. Repeat the same task for the Region column in the Dim Customer presentation table.



4. Close the View Editor. You'll see that **Column Selector** will appear below the **Table** view. Drag the **Column Selector** and drop it between the **Title** and the **Table** views. It displays the default column in the drop-down list.

<b>≜</b> ~ Ĉ~ ፼	6 🔒	<u>8</u>   🗳 ~	8
Compound La	yout		
Title	•	×	
Column Select	or 🗖 🥖	×	
Type C	Code 👤		
Table	- <b>1</b>	×	
Type Code	Dollars≏▽		
100	5,175,041		
101	4,908,216		
	4,397,976		
	1,578,743		
104			
	7,135,345		
106			



Adding Views to Analyses and Advanced Features -

#### How it works...

Now the analysis displays Type Code column values in the table. When you select the YEAR column from the drop-down list, the table view will get automatically refreshed and it'll display the YEAR column.

4	- 🗈 - 🗷	60	4	60	}~	œ	P	
Со	mpound La	ayout						
Ţ	itle	-		×				
C	olumn Selec	tor 🖵	1	×				
	YEAR	•	•					
T	able		1	×				
	YEAR	Dollars	5					
	1,998	47,74	8,591	L				
	1,999	15,28	8,202	2				

Or you can also select the  ${\tt Region}$  value from the drop-down list to display the  ${\tt Region}$  and the Dollars columns in the analysis.

<u></u> ⊿~ (	<u>°</u> ~ E	69 69	4	କ୍ର	~ 🔗	P
Comp	ound L	ayout				
Title		4	1	×		
Colun	nn Sele Regio	ctor 🛃		×		
Table		4	1	×		
Reg	jion	Dollar	s			
Cer	ntral	12,91	9,163	2		
Eas	t	24,97	7,38	1		
We	st	25,14	0,25	1		

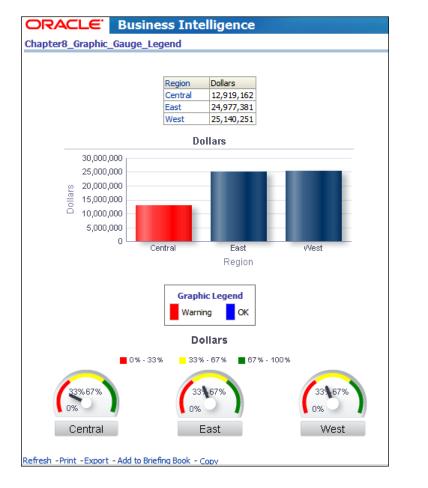


# Adding the view selector view

You can add new views; as many as you want. But again, when it comes to publishing these views in the dashboards, you'll have some difficulties with fitting them in the dashboards. You can easily use the view selector view to enable end users to select one of the existing views.

#### How to do it...

- 1. In this scenario, we're going to use an analysis that consists of four views:
  - Table view
  - Graph view
  - Legend view
  - Gauge view



261—

Adding Views to Analyses and Advanced Features -

⊾- û- छ 💀 🐴 🔞	<b>\</b>	. 🔗 🕯	<b>9</b>	🔛 🏠		📸 🗟 👪	
Compound Layout		Title					
		Table					
Title		Pivot Ta	able		111		- <u>-</u>
Chapter8_Graphic_Gauge	16	Graph	>				
Table	Δ	Gauge	>				- <u>-</u> / ×
	٦	Funnel	>				
	3	Мар				1	
	A	Filters			167		L
		Other V	'iews	>		Column Selector	
		West		25,140,	۲Ì	View Selector	
Graph					E	Legend View	Selector 🖊 💥
			Dal	lars		Narrative	
			DU	lais		Ticker	-
30,000,000					A	Static Text	-
					50L	Logical SQL	
					8	Create Segment	
a 10,000,000					R	Create Target List	
5,000,000							
0	Ce	ntral		Ea	et	West	-
	Ce	nu on		Rec		V VESL	
				1100	,		
Legend							- <b>1</b> / X
augusta (					1111		
1		Gra	nhi	Leaen	d		

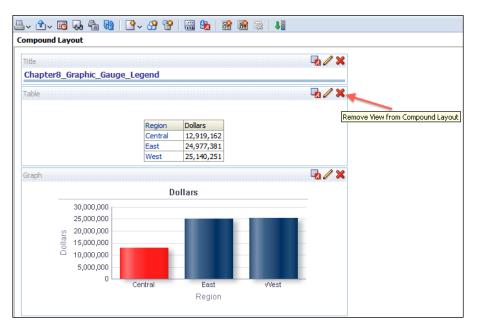
2. In the **Results** tab, click on the New View button and navigate to **Other Views** | **View Selector**.

3. Once **View Selector** is added, click on the Edit View button to open the view editor. Then enter Select a View in the **Caption** textbox. Select all the existing views in the **Available Views** list and click on the right arrow button. So all the views will be displayed in the **Views Included** list.

ORACLE <sup>®</sup> Business Intelligence
Chapter8_Graphic_Gauge_Legend
Criteria Results Prompts Advanced
View Selector
€,
Caption Select a View
Caption Position Left
Available Views Views Included
Title Pivot Table Gauge:2 None Table Graph Gauge Legend
Rename Select a View Table
Region Dollars
Central 12,919,162 East 24,977,381
West 25,140,251

-262

4. Close the view editor and remove all the views from the **Compound Layout** by clicking on the Remove View from Compound Layout button, except for the **View Selector** view.



#### How it works...

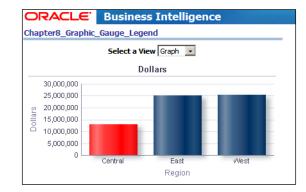
The only view that will be displayed in the **Compound Layout** is the **View Selector** view. So end users may select the views that they're interested in. Select the **Table** value from the drop-down list and you'll notice that a table will be displayed.

≜v ûv 💀 😽	🔒 🔂   🖸	}~ अ	<b>P</b>	XYZ	2			
Compound Layout								
male	Ļ	. / 🖌	1					
		9 🖉 🔦						
Chapter8_Grap	hic_Gauge_l	Legend						
			-					
View Selector		h 🖉 🗙						
Select a Vi	ew Table	1						
Sciectari								
Dester	Dellera							
Region	Dollars							
Central	12,919,162							
East 24,977,381								
West	25,140,251							
TTCDC	23,140,231							



Adding Views to Analyses and Advanced Features -

Then select **Graph** from the drop-down list so that a graph alone will be displayed.

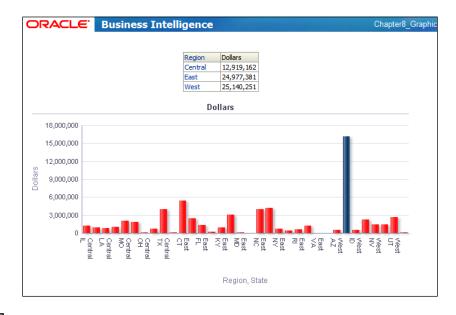


## **Configuring the master-detail view settings**

Business users may be interested in interaction between two views in the analysis. Whenever they click on a value in the table view, the view below it will be refreshed automatically and the data that the user wants to focus on will be displayed. This can be achieved by configuring the master-detail view settings.

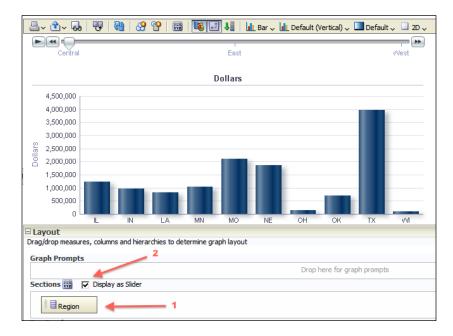
#### How to do it...

1. In this example, we're going to use an analysis that consists of the table and graph views. Graph view displays the Region and the State values.





2. Open the graph view editor to make necessary changes in the detail view. First drag the Region column to the **Sections** area and then select the **Display as Slider** checkbox. At that moment, a slider will appear above the graphic that displays the Region column values.



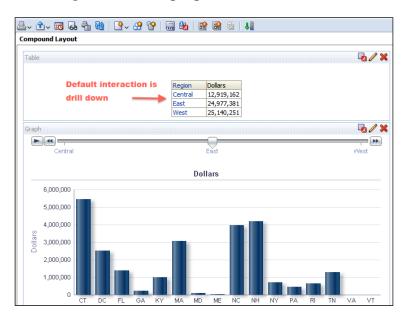
3. Clicking on the graph properties button will pop up the **Graph Properties** window. Select the **Listen to Master-Detail Events** checkbox and set a value for the **Event Channels** textbox, ChRegion.

Graph properties	×
General St	yle Scale Titles and Labels
Canvas Width	640 Pixels
Canvas Height	330 Pixels
Legend Location	Default (Right) 💌
Zoom and Scroll	Enable for Horizontal Axis
	Enable for Vertical Axis
	Listen to Master-Detail Events
	Event Channels ChRegion
Animate grap	oh on Display
Help	OK Cancel

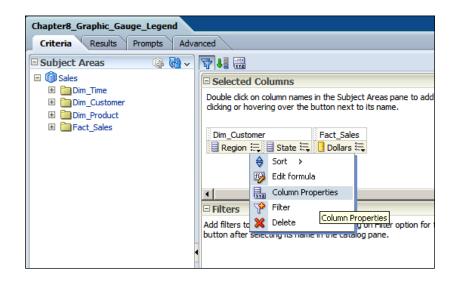


Adding Views to Analyses and Advanced Features -

4. Close the graph view editor and check the analysis in the **Results** tab. You'll see that a slider appears above the graphic. The **Table** view also shows the list of regions. But by default, the interaction of the column values is set to drill down. If you click on a value in the Region column it's going to drill down to a finer level.



5. Now we're going to change this default interaction type. Go to the **Criteria** tab and click on the More Options button. Then select the **Column Properties** option in the Region column.





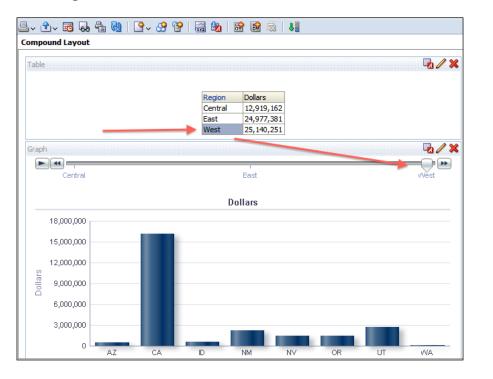
267—

6. Change the **Primary Interaction** value to the **Send Master-Detail Events** and enter a value for the **Specify channel** textbox, ChRegion. (This value should be exactly same as the one you've already entered in the graph view properties.)

lumn Properties	
Style Column Fo	mat Data Format Conditional Format Interaction Write Back
Column Heading Primary Interaction	Default (Drill) 💌
Value	
Primary Interaction	Send Master-Detail Events 💌
Specify channel	ChRegion

#### How it works...

To test this configuration, go to the **Results** tab. You will see that the Region column values are not displayed as hyperlinks. After clicking on the West value, you'll see that the value in the slider will focus on the West value and the **Graph** view will only display the state values from the West region.



# **9** Measuring Performance with Key Performance Indicators

In this chapter, we will cover:

- Creating the KPIs and the KPI watchlists
- Creating the scorecards
- Creating the objectives
- Creating the initiatives
- Adding the perspectives
- Building the strategy trees and maps

# Introduction

Publishing the analytical reports in the dashboards will not satisfy the business requirements always. Business users will be interested in some reports so that they can compare their values. You also need to display the reports that will enable users to focus on only the most critical business entities. Sometimes this can be achieved by using the conditional formatting feature. But the defined threshold values are going to be static values. As time passes, you'll need to reset these values, so it has a maintenance cost. To solve these business challenges, you can use Key Performance Indicators (KPI). They can be used to measure the productivity of an organization relative to its objectives.

KPIs are widely used in OBIEE 11g and you can easily publish these KPIs in the dashboards by creating KPI watchlists.

Measuring Performance with Key Performance Indicators -

Key Performance Indicators are also building blocks of strategy management. In order to implement balanced scorecard management technique in an organization, you'll first need to create the KPI objects. Then you're going to create the scorecards and use the KPIs.

We're going to cover KPIs, KPI watchlists, and also scorecards in this chapter. You'll also learn how to create strategy trees and maps at the end of this chapter. After implementing these features, you're going to easily measure the performance of the organization.

## **Creating the KPIs and the KPI watchlists**

We're going to create Key Performance Indicators and watchlists in the first recipe. There should be comparable measure columns in the repository in order to create KPI objects. The following columns will be used in the sample scenario:

- Shipped Quantity
- Requested Quantity

#### How to do it...

1. Click on the **KPI** link in the **Performance Management** section and you're going to select a subject area.

ORACLE Business Intelligence				
Home				
Create Analysis and Interactive Reporting Analysis   Dashboard   More ~ Published Reporting Report   Report Job   More ~ Actionable Intelligence Agent   Action	Recent         Dashboards         My Dashboard - page 1         Open   Edit   More ~         QuickStart - Details         Open   Edit   More ~			
Performance Management Scorecard   <u>KPI</u>   KPI Watchlist	Others Chapter8_Graphic_Gauge_Leg Open   Edit   More y			
Marketing Segment   Seg a business measure (i.e.: Pro Costs) evaluated against a ta Browse/Manage Sales Forecasts or Budgets).	(KPI) represents the result of duct Sales or OperationalMaster_Detail			
All Content ✓ My Analyses My Reports	Chapter8_Graphic Open   Edit   More 🗸			

270

The KPI creation wizard has five different steps.



2. The first step is the General Properties section and we're going to write a description for the KPI object. The Actual Value and the Target Value attributes display the columns that we'll use in this scenario. The columns should be selected manually. The Enable Trending checkbox is not selected by default. When you select the checkbox, trending options will appear on the screen. We're going to select the Day level from the Time hierarchy for trending in the Compare to Prior textbox and define a value for the Tolerance attribute. We're going to use 1 and % Change in this scenario.

	General Properties	Dimensionality
General Proper	ties	
A KPI is based on comp	aring actual and target performance. Define the source of	factual and target values for this KPI.
Description	A sample KPI about order management	A
Business Owner	weblogic	
Actual Value	"Fact_Sales". "Shipped Quantity"	▼ f <sub>x</sub>
Target Value	"Fact_Sales". "Requested Quantity"	✓ f <sub>x</sub>
Data Format	(987,654,321.99) 🥒	
Enable trending		
Compare to prior	"Dim_Time". "Day"	
Tolerance	1 % Change	

271—

Measuring Performance with Key Performance Indicators \_\_\_\_\_

3. Clicking on the **Next** button will display the second step named **Dimensionality**. Click on the **Add** button to select Dimension attributes.

General Properties Dimensionality S	
Dimensionality	
Define dimension values for the KPI or allow each dimension to be prompted by the user.	
Define KPI value for	
Dimension	Value
Add Remove	

 $\label{eq:select_the_Region} \text{ Select the } \text{Region column in the } \textbf{Add New Dimension} \text{ window.}$ 

Add New Dimension	×
"Sales"	
😑 🝈 Sales	1
🕀 🛅 Dim_Time	1
Dim_Customer	
- Address	
<b>⊡</b> City	
- Customer	
Customer Key	
- Phone	
Er Region	
Route Code	
Sales Rep	1
⊒ Zip Code	
🕀 🎭 Customer	
🗉 🛅 Dim_Product	
Fact_Sales	1
Help OK Cancel	



5. After adding the Region column, repeat the step for the YEAR column. You shouldn't select any value to pin. Both column values will be **<is prompted>**. Clicking on **Next** button will display the third step named **States**.

Dimensionality Define dimension values for the KPI or allow each dimension to be prompted by the user.						
	efine KPI value for					
	Dimension	Value				
	"Dim_Customer". "Region"	<is prompted=""></is>				
	"Dim_Time". "YEAR"	<is prompted=""></is>				
	Add Remove					

- 6. You can easily configure the state values in this step. Select the **High Values are Desirable** value from the **Goal** drop-down list. By default, there are three steps:
  - **OK**
  - Warning
  - Critical

States KPI state is determined by comparing the actual ("Fact_Sales"."Shipped Quantity") and target ("Fact_Sales"."Requested Quantity") values. For each KPI state, define a label, color, and icon. Determine state ranges by defining threshold values between each state.					
State Properties Goal High Values are Desirable High Values are Desirable Low Values are Desirable Target Value is Desirable Color II	Icon Actions				
ок	<ul> <li>Keine</li> </ul>	greater than 100%	Thresholds 🔽 define as % of target value		
Warning	A 🗞	between 90% and 100%	100 😴 %		
Critical	×	less than 90%	90 👻 %		
If KPI returns No Data No status 💌					



Measuring Performance with Key Performance Indicators -

7. Then click on the **Next** button and you'll see the **Related Documents** step. This is a list of supporting documents and links regarding to the Key Performance Indicator.

	General Properties	Dimensionality	States	Related Documents
Related Documents				
Related docs description goes	; here.			
Name Location				
Add Edit Remo	ove			

8. Click on the **Add** button to select one of the options. If you want to use another analysis as a supporting document, select the **Catalog** option and choose the analysis that consists of some valuable information about the report.

Add a related document	×
Name Type Catalog  Catalog  Catalog  Link	Browse
Help	OK Cancel

9. We're going to add a link. You can also easily define the address of the link. We'll use the http://www.abc.com/portal link.

		General Properties	Dimensionality			
	Related Documents Related docs description goes here.					
Name	Location					
Company Portal	http://www.abc.com/portal					
Add Edit	Remove					



- 10. Click on the **Next** button to display the **Custom Attributes** column values. To add a custom attribute that will be displayed in the KPI object, click on the **Add** button and define the values specified as follows:
  - Number: 1
  - □ Label:Dollars
  - Formula: "Fact\_Sales"."Dollars"

Custom A Manualy creat	Attributes te custom columns for the KPI.		Back Next Finish Cancel
Number	Label	Formán	
	1 Dolars	[Fact_Sales"."Dollars"	2
-	0		
Add	Remove		

11. Save the KPI object by clicking on the **Save** button.



Measuring Performance with Key Performance Indicators -

Right after saving the KPI object, you'll see the KPI content.

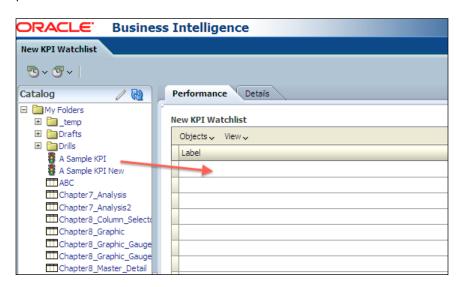
Sampl	e KPI New						
Region	YEAR	Actual	Target	Status	Variance	% Variance	Dollars
Central	1,998	400,896.00	413,864.00	<u> </u>	12,968.00	3	9,717,408.31
	1,999	128,691.00	132,799.00	Δ	4,108.00	3	3,201,753.24
East	1,998	887,109.00	906,744.00	<u> </u>	19,635.00	2	18,989,128.06
	1,999	279,477.00	284,891.00	<u> </u>	5,414.00	2	5,988,252.63
West	1,998	778,430.00	799,672.00	A	21,242.00	3	19,042,054.91
	1,999	245,516.00	250,092.00		4,576.00	2	6,098,195.94

12. KPI objects cannot be published in the dashboards directly. We need KPI watchlists to publish them in the dashboards. Click on the **KPI Watchlist** link in the **Performance Management** section to create one.

ORACLE Business Intelligen	ice
Home	
Create	Recent
Analysis and Interactive Reporting	Dashboards
Analysis   Dashboard   More 🗸	My Dashboard - page 1
Published Reporting	Open   Edit   More -
Report   Report Job   More 🗸	QuickStart - Details
Actionable Intelligence	Open   Edit   More 🗸
Agent   Action	
Performance Management	Others
Scorecard   KPI   KPI Watchlist	ABC
Marketing	Open   Edit   More 🗸
A KPI Watch List is KPIs regardless of	; to view and monitor the performance of their source.
Duouuso / Manago	Open   Edit   More 🗸

-276

13. The **New KPI Watchlist** page will be displayed without any KPI objects. Drag-and-drop the KPI object that was previously created from the **Catalog** pane onto the KPI watchlist list.



14. When you drop the KPI object, the **Add KPI** window will pop up automatically. You can select one of the available values for the dimensions. We're going to select the **Use Point-of-View** option. Enter a **Label** value, A Sample KPI, for this example.

Add KPI		×
KPI Name "Dim_Customer", "Region" "Dim_Time", "YEAR" Label	A Sample KPI Use Point-of-View Use Point-of-View A Sample KPI	<b>•</b>
Help		OK Cancel



Measuring Performance with Key Performance Indicators -

15. You'll see the dimension attributes in the Point-of-View bar. You can easily select the values from the drop-down lists to have different perspectives. Save the KPI watchlist object.

ORACLE Busines	s Intelligence
New KPI Watchlist	
🕲 ~ 🎯 ~ 📔 "Sales"."Dim_Cu	ustomer"."Region" <sub>♥</sub> "Sales"."Dim_Time"."YEAR" <sub>♥</sub>
Catalog 🥒 🕅	Performance Details
My Folders  Comp	New KPI Watchlist
🗉 🛅 Drafts	Objects 🗸 View 🗸
Drills     A Sample KPI	Label
A Sample KPI	🚦 A Sample KPI
ABC	
Chapter 7_Analysis	
Chapter 7_Analysis2	
Chapter8_Graphic	
Chapter8_Graphic_Gauge	
Chapter8_Graphic_Gauge	
Chapter8_Master_Detail	
Chapter8_View_Selector	

## How it works...

KPI watchlists can contain multiple KPI objects based on business requirements. These container objects can be published in the dashboards so that end users will access the content of the KPI objects through the watchlists.

When you want to publish these watchlists, you'll need to select a value for the dimension attributes.

#### There's more...

The Drill Down feature is also enabled in the KPI objects. If you want to access finer levels, you can just click on the hyperlink of the value you are interested in and a detailed level is going to be displayed automatically.

## **Creating the scorecards**

Scorecard is a strategy management tool that will help you to measure the productivity of the organization. It has four different components to build up a scorecard:

 Strategy: This is the objective of the organization. There can be multiple objectives in the same organization depending on the divisions.



- Initiatives: These are the time-specific tasks or projects. You'll use initiatives to support the objectives.
- Scorecard Documents: These documents will contain supporting information about the strategy management.
- Perspectives: These are different point of views of the organization. There are four different types of perspectives by default. You can add more depending on the organization requirements. These four perspectives were proposed by Robert S. Kaplan and David P. Norton.

#### How to do it...

1. Click on the Scorecard link in the Performance Management section.

ORACLE Business Intelligen	ice
Home	
Create	Recent
Analysis and Interactive Reporting	Dashboards
	My Dashboard - page 1 Open   Edit   More 🗸
Actionable Intelligence	QuickStart - Details Open   Edit   More 🗸
Performance Management Scorecard   KPI   KPI Watchlist	Others ABC
Segmen Segmen Strategic objectives and initiatives in	support of their
Corporate strategy and monitor their Browse/Mailtime.	
📄 All Content ✔ 🏣 My Analyses	Chapter8_View_Selector Open   Edit   More 🗸
My Reports	

279—

Measuring Performance with Key Performance Indicators \_\_\_\_\_

2. The **New Scorecard** window pops up. Enter a name for the scorecard. If the **Use Default Perspectives** checkbox is selected, default perspectives will be loaded into this scorecard. Then click on the **OK** button.

New Scorecard		×
Choose a name and location	for the new Scorecard	
Name	Sample Scorecard	
Description	Demo	* *
Location	/My Folders 💽 🔁	
Use Default Perspectives?		
Help		OK Cancel

3. The scorecard editor will pop up in the screen. Only the default perspectives will be loaded into this scorecard. Save this scorecard object.

ORACLE Business Intellig	ence			Search Al		•	D
Sample Scorecard					Home	Catalog	Dashboards 🗸
5~ <b>6</b> ~							
🗆 Strategy 📑 🥒 💥 👬 🛼	Overview						
E Sample Scorecard							
	Sample Scorecare	d			Getting St	tarted	
	Sample Sco	orecard			Overview		
	a sumple set				Glossary Of Ter	ms	
	Score		0		How Do I?		
🗆 Initiatives 🔄 🥖 💥	Conc	0 33 6	100	,			
A Initiatives	Children	0 55 0	, 100		Scorecard	Breadth	
<u>e principe e s</u>	Objectives	OK () WARNING () CRI	TICAL ()				
		OK () WARNING () CRI	TICAL ()				
	Descendants						
		OK () WARNING () CRI					
□ Scorecard Documents 💽 🗸 🥢 »	KPIs	OK () WARNING () CRI	IICAL ()				
□ Scorecard Documents 🏼 🖓 🗸 🧷 🔹	Perspective					Financial Non-financi	
	Business Owner	weblogic				Unassigned	
	Assessment Formula	Worst Case					
				Go to this objective			
Perspectives     Perspectives							
Customer						Internal External	
Internal Process						Unassigned	
Learning and Growth							
Catalog							

-280-

## How it works...

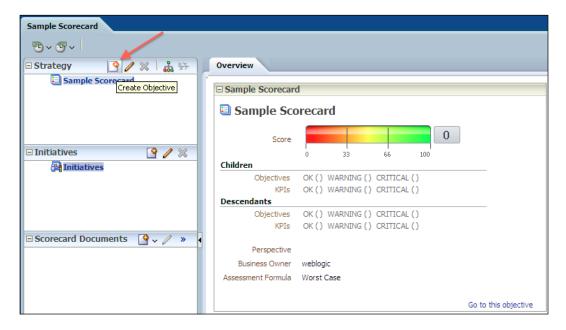
Scorecards consist of objectives, initiatives, documents, perspectives, and KPIs. Key Performance Indicators and supported documents should be designed and created before you start working on scorecards. The rest of the definitions are the features of the scorecard.

## **Creating the objectives**

The performance management strategy of an organization is broken into objectives. Objectives of an organization should be defined in the scorecards. You can create multiple objectives that can be defined depending on business requirements.

#### How to do it...

1. Click on the Create Objective icon to define the objectives.



281—

Measuring Performance with Key Performance Indicators -

- Overview New Objective 🔒 🛛 🔀 New Objective Status Description Type Objective Analytics Parent Objective Sample Scorecard 0 Score Actions + / × 100 66 Link Text Action State Equals Children Objectives ctives OK () WARNING () CRITICAL () KPIs OK () WARNING () CRITICAL () Descendants Objectives OK () WARNING () CRITICAL () KPIs OK () WARNING () CRITICAL () Perspective Undefined Ŧ Assessment Formula Worst Case -Indicator Type Undefined -**Objectives & KPIs** Objects 🗸 View 🗸 Label Status Trend Actual Target Variance % Variance Change % Change
  - Enter the name of the objective as Improve the Profitability. We're also going to change the **Perspective** to **Financial**.

Overview New Obj	jective	
- 8		
Improve the P	Profitability	_
Description		
Analytics		
Score		
Children	0 33 00 100	
Objectives	OK () WARNING () CRITICAL ()	
KPIs	OK () WARNING () CRITICAL ()	
Descendants		
-	OK () WARNING () CRITICAL ()	
KPIs	OK () WARNING () CRITICAL ()	
Perspective	Financial	_
Assessment Formula	Worst Case	
Indicator Type	Undefined	



2. The **New Objective** tab will pop up, so we're going to define the properties of the objective starting with the name. Enter the name of the objective.

283—

3. Now we're going to define the measure in the scorecard. Drag-and-drop the KPI object from the **Catalog** pane to the **Objectives & KPIs** list.

	0	bjectives & KPIs				
		Objects 🗸 View 🗸				
□ Scorecard Documents 🏼 🖓 🗸 🧷 🔺		Label	Status	Trend	Actual	Target
		🚦 A Sample KPI	<u> </u>		2,720,119.00	2,788,062.00
	Χ					
Perspectives						
🗆 Catalog 🛛 🖓 🗸 🕅						
E Drafts						
🕀 🖿 Drills	E	Collaboration				
Sample Scorecard				Durin		blasta
A Sample KPI A Sample KPI New		lo Comments	+ 🗞 🗞	Busin	iess Owner we	blogic
				Relat	ed Document	

4. The new objective will look like the following screenshot:

Improve the Profitability       Status (WARNING Description         Description       Type Objective         Improve the Profitability       Type Objective         Score       0         33       66         Score       0         Objectives       Sample Scorecard         Actions       1         WARNING () CRITICAL ()       1         KPIs       OK () WARNING () CRITICAL ()         KPIs       Objectives & KPIs         Objectives & KPIs       State Equals	Overview Improv	e the Profitability								×
Description       Type Objective         Image: Score or 333 66 100       50         Children       50         Objectives Sample Scorecard         Actions         Image: Score or Score										
Children     Children     Objectives OK () WARNING () CRITICAL ()     KPIS OK () WARNING () CRITICAL ()     KPIS OK () WARNING () CRITICAL ()     Perspective     Financial     Assessment Formula     Worst Case     Indicator Type     Undefined		rofitability								•
Score     50       Objectives     OK () WARNING () CRITICAL ()       KPIs     OK () WARNING () CRITICAL ()       Descendants     Indicator Type       Objective     Financial       Worst Case       Indicator Type										
Score     50       Children     0       Objectives     OK () WARNING () CRITICAL ()       KPIs     OK () WARNING () CRITICAL ()       Descendants     0       Objectives     OK () WARNING () CRITICAL ()       Perspective     Financial       Perspective     Financial       Indicator Type     Undefined	Analytics									
Children     Actions       Objectives     OK () WARNING () CRITICAL ()       Merison OK () WARNING () CRITICAL ()       Descendants       Objectives     OK () WARNING () CRITICAL ()       Perspective       Financial       Assessment Formula       Worst Case       Indicator Type       Undefined				Paren	t Objective Sa	mple Scorecard				
Children     ILink Lext     Action     State Equals       Objectives     OK () WARNING () CRITICAL ()     Image: State Equals       Descendants     Objectives     OK () WARNING () CRITICAL ()       Verspective     Financial     Image: State Equals       Assessment Formula     Worst Case     Image: State Equals       Indicator Type     Indicator Type     Image: State Equals	Score			Actio	15					+ / ×
KPIs       OK () WARNING (I) CRITICAL ()         Descendants       Image: Comparison of the second sec	Children	0 33 66 100		Link	Text			A	ction 5	State Equals
Descendants     Image: Construction of the second sec		OK () WARNING () CRITICAL ()								
Objectives     OK () WARNING () CRITICAL ()       KPIs     OK () WARNING (1) CRITICAL ()       Perspective     Financial       Assessment Formula     Worst Case       Indicator Type     Undefined		OK () WARNING (1) CRITICAL ()								
KPIs     OK ()     WARNING (i)     CRITICAL ()       Perspective     Financial     Image: Constraint of the second										
Perspective Financial  Assessment Formula Worst Case Indicator Type Undefined										
Assessment Formula Worst Case Indicator Type Undefined	KPIs	OK () WARNING (1) CRITICAL ()								
Assessment Formula Worst Case I Indicator Type Undefined I	Perspective	Financial 🔹								
	Assessment Formula									
Objectives & KPIs	Indicator Type	Undefined								
	Objectives & KPIs									
Objects v View v Summary: 🖋 OK (0) 🛕 WARNING (1) 🔂 CRITICAL (0)	Objects View V						Summary: q	🖋 ОК (0) 🛕 WA	RNING (1)	() CRITICAL (0)
Label Status Trend Actual Target Variance % Variance % Variance % Ohange	Label		Status	Trend	Actual	Target	Variance	% Variance	Change	% Change
Image: A Sample KPI         A         2,720,119.00         2,788,062.00         67,943.00         2.44%	暮 A Sample KPI				2,720,119.00	2,788,062.00	67,943.00	2.44%		

Measuring Performance with Key Performance Indicators -

## How it works...

You can create multiple objectives in the scorecard. Every objective will focus on a particular perspective. Here's the sample scorecard that consists of multiple objectives.

🗆 Strategy 🛛 🔮 🥒 🐰 🍰 🐎	Overview			
A Sample Scorecard      A O Improve the Profitability	Sample Scorecard	1		□ Getting Started
A Sample KPI	🔲 Sample Sco	precard		Overview Glossary Of Terms
A Sample KPI New     A g Improve the Customer Loyalty     A g A Sample KPI 2	Score			How Do I?
	Children	0 55 66 100		Scorecard Breadth
	Objectives	OK () WARNING (2) CRITICAL ()		
🗆 Initiatives 📑 🥖 💥	KPIs Descendants	OK () WARNING () CRITICAL ()		
🚰 Initiatives	Objectives	OK () WARNING (3) CRITICAL ()		
	KPIs	OK () WARNING (3) CRITICAL ()		
3	Perspective			Financial Non-financial
	Business Owner	weblogic		Unassigned
	Assessment Formula	Worst Case		
□ Scorecard Documents   >			Go to this objective	
				Internal External Unassigned

## **Creating the initiatives**

In this strategy management framework, initiatives are time-based action projects that are needed to support the organization to be successful in its strategy. You can create many initiatives to achieve the objectives. Initiatives are tied to the objectives and have significant importance on being successful in the organization's goals.

#### How to do it...

1. Click on the Create Initiative button to create it from the beginning.

ः Strategy 📑 🧨 💥 🍰 💥	Overview	
□ ▲ □ Sample Scorecard □ ▲ ☑ Improve the Profitability	Sample Scorecare	d
🕀 🛕 💽 Improve the Customer Loyalty	🗉 Sample Sco	precard
	Score	
	Children	
	Objectives	OK () WARNING (2) CRITICAL ()
🗆 Initiatives 🛛 🔍 🕺	KPIs	OK () WARNING () CRITICAL ()
	Descendants	
Treate Initiatives	Objectives	OK () WARNING (3) CRITICAL ()
	KPIs	OK () WARNING (3) CRITICAL ()
-	Perspective	
	Business Owner	weblogic
	Assessment Formula	Worst Case



2. The **New Initiative** page will pop up. Enter the name of the initiative. In our scenario, it will be Upgrade the database. You can set the **Start Date** and **Due Date** and you can also define the actions to achieve this initiative successfully.

Overview Upgrad	e the database						
🛃 Upgrade the	database						s
Description							
Analytics							
			Parer	nt Initiative Ini	tiatives		
Score	50				3/04/2013		
	0 33 66 100			Due Date 03			
Children			Comp	letion Date			
	OK () WARNING () CRITICAL () OK () WARNING (1) CRITICAL ()		Actio			5	
Descendants				Text			Ad
Initiatives	OK () WARNING () CRITICAL ()		- Li ik	- Text			
KPIs	OK () WARNING (1) CRITICAL ()						
Perspective	Undefined		_				
Assessment Formula							
Priority	Worst Case						
Priority	Medium						
Initiatives & KPIs							
Objects 🗸 View 🗸						Summary: 🗨	🥒 OK (0) <u> A</u> WAF
Label		Status	Trend	Actual	Target	Variance	% Variance
🗿 A Sample KPI				2,720,119.00	2,788,062.00	67,943.00	2.44%

#### How it works...

These time-based tasks will be helpful to achieve the objectives and the goals of an organization. One initiative may support multiple objectives.

#### There's more...

The progress of the initiatives can also be monitored and measured. The measuring will be dependent on KPI objects.

## Adding the perspectives

Different divisions can concentrate on different point of views of the organization. There are four default perspectives as originally proposed by Kaplan and Norton. You can also define a different perspective to measure the productivity.

Financial: This perspective is used to measure financial effectiveness of an organization



Measuring Performance with Key Performance Indicators -

- **Customer**: This perspective focuses on the customer and it's used to measure customer satisfaction
- ▶ Internal Process: It refers to the quality of the internal processes
- Learning and Growth: This perspective is related to both individual and corporate self-improvement

Perspectives	
🚫 Financial	
🚫 Customer	
🚫 Internal Process	
Cearning and Growth	

## How to do it...

Clicking on the New Perspective icon in the **Perspectives** pane will pop up the New Perspective tab. Then enter the name of the perspective.

Initiatives 🔮 🥢 💥	
<ul> <li>□ ▲ ∰ Initiatives</li> <li></li></ul>	Perspective Name New Perspective
	Description
∃ Scorecard Documents 🛛 🖓 🗸 🧷 »	Objectives, Initiatives & KPIs
	Objects 🗸 View 🗸
	Label
🗆 Perspectives 🛛 🔮 🧷 💥	
C Financial	
Customer New Perspecti	ive
O Internal Process	
O Learning and Growth	

-286-

#### How it works...

You can associate these perspectives with any objectives so they will be used with the organization's objectives. The list named **Objectives**, **Initiatives & KPIs** will display the dependent objects. You can easily find where they are used.

## **Building the strategy trees and maps**

Strategy maps display the objectives and KPIs that have been defined in the scorecard. The parent-child objective hierarchy will also be displayed in the map. Strategy maps are very useful to see the progression in the organization.

#### How to do it...

1. Click on the View Strategy Tree icon in the **Strategy** pane, after selecting the objective or the scorecard.

Sample Scorecard			
ⓑ √ ⓒ √ Sales"."Dim_Customer"."	Regi	on" <sub>▼</sub> "Sales"	."Dim_Time"."YEAR" 🗹 Sales"."Dim_Product".
🗆 Strategy 🛛 🔮 🥒 💥 🔛	0	Overview Sample	Scorecard
Image: Sample Scorecard       Image: Sample Scorecard       Image: Sample Scorecard       Image: Sample Scorecard       Image: Sample Scorecard	ategy	Tree	
🛕 🗿 A Sample KPI	3	Sample Score	ecard
A Reduce the Costs	D	escription	
🗄 🛕 💽 Improve the Customer Loyalty			
	E	Analytics	
□ Initiatives 🔮 🥒 🗙		Score	
A A Initiatives     A A Degrade the database		Children	
🖻 🔼 🚑 opgrade the database		Objectives	OK () WARNING (2) CRITICAL ()
		KPIs	OK () WARNING () CRITICAL ()
		Descendants	
🖃 Scorecard Documents 🛛 😭 🗸 🧷 🚿		Objectives	
		KPIs	OK () WARNING (3) CRITICAL ()
		Perspective	Undefined
		Assessment Formula	Worst Case



Measuring Performance with Key Performance Indicators \_\_\_\_\_

Improve the Profitability	Overview Sample Scorecard Strategy Tree: Sample Scorecard	× ?
Sample Score: 50 Score: 50		
▲ Score: 50       □         ♦ A Sample KPI       ●         ▲ Score: 50       □	Diagram Details	
2,720,119:00 (2:44%)	Improve the Profitability         Improve the Customer Loyalty         Improve the Customer Loya	2

The **Strategy tree** tab will be displayed. You can see the parent-child hierarchy in the screenshot.

2. Click on the **Details** tab and you will see detailed measures of the existing KPIs.

Overview Sample Scorecard Strategy Tree: Sample S	corecard							
🖥 🖥   💐   🍭 Q								
Diagram Details								
Name Strategy Tree: Sample Scorecard Description Objectives & KPIs	Business Oi	wner webk	ogic		<b>Q</b>			
Objectives & KPIS						Summary: 🎻 Oł	( (0) 🛕 WARNIN	G (3) 🕕 CRITICAL (0)
Label	Status	Trend	Actual	Target	Variance	% Variance	Change	% Change
🖃 🐼 Sample Scorecard	4							
Improve the Profitability	<u> </u>							
Related Documents Name								Location

-288-

- Diagram Details E, Score: 50 ▲ 🐼 Improve the Φ Score: 50 E, Score: 50 E, ▲ ▲ 8 ¢ 8 2,720,119.00 (2.44%) E, Score: 50 E, 2,720,119.00 (2.44%) ▲ ▲ Δ E, Value 2,720,119.00 Value 2,720,119.00 📊 Value 2,720,119.00 Target 2,788,062.00 Variance 67,943.00 % Variance 2.44% Target 2,788,062.00 Variance 67,943.00 % Variance 2.44% Change Change % Change Score 50 % Change Score 50
- 3. Go back to the **Diagram** tab and expand the KPI details to see the contents of the KPI and to access to the measure values.

## How it works...

Strategy trees and maps will be very useful to see the bigger picture of the organization. End users can access these strategy trees and maps in the dashboards. This communication tool enables easy strategic communication.

289—

In this chapter, we will cover:

- Creating the dashboards
- Using the Dashboard Builder
- Exploring the properties of dashboard objects
- Adding catalog objects to the dashboards
- Creating the dashboard prompts

## Introduction

All the BI objects will be published in the dashboards. It's quite important to have well designed dashboards. We're going to discuss how to build and configure dashboards in this recipe.

End users are going access to dashboards to see the results of the analyses. Every user who is connected to Presentation Services can access their private dashboards and also we can create shared dashboards that will be common to a group of users.

Dashboards consist of the **dashboard pages**. When you create a dashboard, one dashboard page is created by default. For instance, we can create a dashboard named Sales and the dashboards pages can be created based on the location as follows:

- New York Sales
- ▶ London Sales
- Paris Sales

Also, interactivity in the dashboards will be needed. End users will be asked to prompt a value to change the content of the analyses that are already published. Dashboard prompts are also going to be covered.

## **Creating the dashboards**

First step will be the creation of a new dashboard in Presentation Services. After creating a blank dashboard, we're going to configure its properties. Dashboards are stored as all the other catalog objects in Presentation Services. The difference is that they're the container objects. You can easily publish some other catalog objects in them.

#### How to do it...

1. To create a dashboard, click on the **Dashboard** link in the **Create...** pane.



- The New Dashboard dialogue box will pop up. Enter the name and the description values as shown in the screenshot and then click on OK after selecting the Add content later (Create empty dashboard) option box.
  - Name: Sales
  - Description: A Sample Dashboard

292

After clicking on **OK**, it's going to display the home page of Presentation Services.

New Dasht	poard	×
Choose a na	me and location for the new dashboard	
Name	Sales	
Description	A Sample Dashboard	
Location	/Shared Folders/Sample Lite/Dashboards	
Content	O Add content now 💿 Add content later (Create empty dashboard)	
Help	OK Cance	1

3. Let's create another dashboard but this time we are going to select the **Add content now** option box and click on **OK**.

New Dasht	ooard
Choose a na	me and location for the new dashboard
Name	Sales
Description	A Sample Dashboard
Location	/Shared Folders/Organization Reports/Dashboards
Content	$\odot$ Add content now $C$ Add content later (Create empty dashboard)
Help	OK Cancel

293—

4. Now, it's going to display the Dashboard Builder. The Dashboard Builder is used to modify the content of the dashboards. We're not going to add any catalog or dashboard objects now. Just close the Dashboard Builder and navigate to the home page.

ORACLE	Business Intelligence		Search All		•
Financials				Home	Catalog
page 1					
Dashboard Obje     Column     Section     Alert Section     Action Link     Action Link Menu     Link or Image     Embedded Content					
Text Folder Catalog			Drop Content F	lere	
Shared Folders					

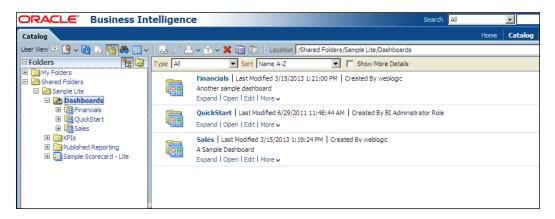
## How it works...

We have created two sample dashboards without any content. You can see that the new dashboards appear in the **Dashboards** menu. They are already saved as catalog objects in the Presentation Service's repository. Saving the dashboards into the shared folders enables them to be shared by all the users, depending on the permissions. Dashboards are also catalog objects. You can set permissions on them.

Search All	•	Advanced Administration	stration	Help ∽	Sign Out	õ
Ноте	Catalog	Dashboards 🗸 📔 🤷 New 🗸 🛛 🔁 Op	ben v 🛛	Signed In	As <b>weblo</b> g	jic v
Sales - page 1 Open   Edit   More ↓		Most Recent(Financials - page 1) My Dashboard Sample Lite Financials QuickStart Sales				
QuickStart - Published Reporting Open   Edit   More ↓	I	QuickStart - Details Open   Edit   More 🗸				

294

The Sales and Financials dashboards can be found in the catalog folders. These new dashboards are shared dashboards. End users are going to access them according to their privileges.



#### There's more...

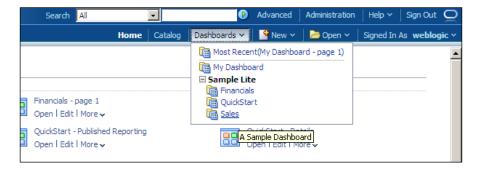
These new dashboards are empty and don't contain any kind of catalog objects. We'll need to modify the content and also we are going to design the dashboards in the following section.

## **Using the Dashboard Builder**

The Dashboard Builder is a tool that will be used to modify the dashboards. We're going to learn how to access the Dashboard Builder and also we're going to explore the properties of the dashboards.

#### How to do it...

1. Click on the Sales dashboard from the **Dashboards** menu to navigate to the Sales dashboard.





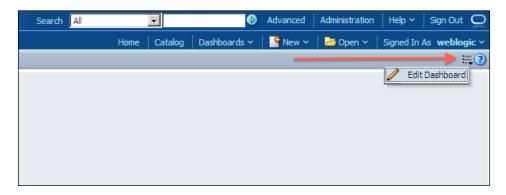
2. The Sales dashboard is going to be displayed on the screen and you'll see that there's no content in it.



3. There are two ways to open the Dashboard Builder. If the dashboard doesn't contain any object, you can click on the **Edit** link to navigate to the Dashboard Builder.

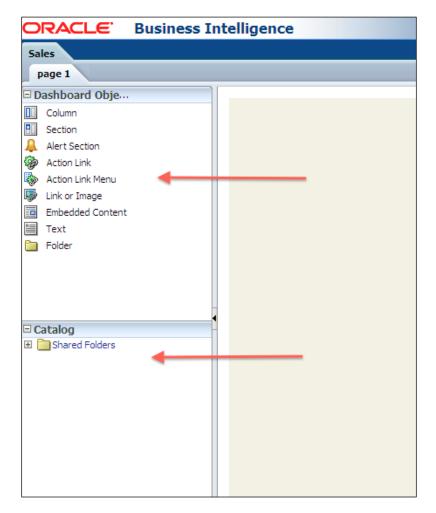


4. If there are objects already published in the dashboard then you can click and expand the properties menu and then select the **Edit Dashboard** link.





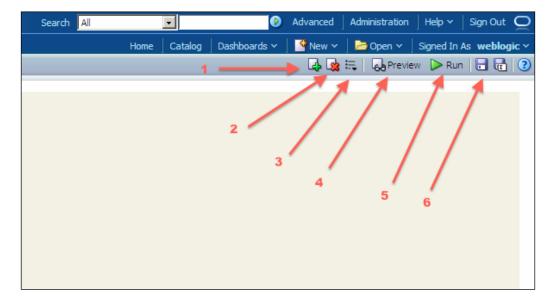
- 5. After using one of the methods, Dashboard Builder will be displayed. You will see that there are two panes in the left section:
  - **Dashboard Objects**: These are the objects that can be used in the dashboards to extend the functionality of the dashboard.
  - **Catalog**: These are the objects that we have created, such as analyses and KPIs. They are reusable objects.



- 6. There are also different buttons on the toolbar:
  - □ 1 This button adds a new dashboard page
  - 2 This button deletes the current page



- 3 This icon opens the tool's list
- 4 The **Preview** button gives you a preview of the dashboard page
- **5** The **Run** button runs the project
- 6 The Save icon will save the project



7. By default, there's only one page in the dashboard and it's called Page 1. Click on the **Add Dashboard Page** button to create a new page.

Search All		D	Advanced   Administration	│Help ∽ │Sign Out  〇
	Home Catalog	Dashboards 🗸	🛛 🚰 New 🗸 📄 🗁 Open 🗸	Signed In As <b>weblogic</b> ~
			👝 🞝 🏂 🗮 🛛 🖓 Previe	ew 🕨 Run  🖥 🗖 🧿
		/	Add Dashboard Page	

8. The **Add Dashboard Page** dialogue box will pop up. Write the name of the new page as New York Sales. Then click on the **OK** button. Repeat the same task for the following pages:

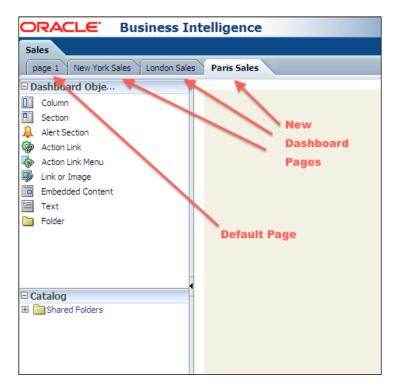


- London Sales
- Paris Sales

Add Dashboard I	Page	×
Page Name	New York Sales	
Page Description		
Help	OK Cancel	

## How it works...

We've created three additional dashboard pages so there are four pages right now, as displayed in the following screenshot. They're displayed as tabs. Whenever you want to modify one of the pages, you'll just need to click on the tab and then you can make any kind of modification.



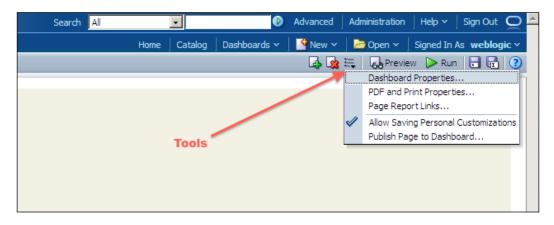


## Exploring the properties of dashboard objects

Now we're going to explore additional properties and features of dashboard objects to make customizations. End users may ask to change the order of the dashboard pages or they may be interested in changing the name of the pages. These customizations will be covered in this recipe.

## How to do it...

1. Click on the Tools icon on the toolbar. There are five menu items in the list. Click on the **Dashboard Properties...** menu item in the list.



2. The **Dashboard Properties** window will pop up. Select the Page 1 tab from the pages list.

-300

t properties for the Dashboard. De	ete, rename, and reorder Da		
eneral Properties			
Shared Folders/Sample Lite/	Dashboards/Sales		
Style Default (bl	afp) 💌		
A Sample D	ashboard	<b>A</b>	
Description		<b>*</b>	
-			
Filters and Variables 🥒			
Filters and Variables 🥖 Dashboard Report Links 🥖			
Dashboard Report Links 🥖			
Dashboard Report Links 🥖 ashboard Pages	cancel will not undo operat	ions in this section.	
Dashboard Report Links 🥖	g Cancel will not undo operat	ions in this section. i 💯 🕼 🗶 🖓	XYE
Dashboard Report Links 🥖 ashboard Pages	g Cancel will not undo operat Hide Page		XYZ
Dashboard Report Links 🖉 ashboard Pages Except for Hide and Reorder, clicking		₽₽₽₽	
Dashboard Report Links ashboard Pages Except for Hide and Reorder, clicking Pages	Hide Page	En Show Add To Briefing Book	
Dashboard Report Links ashboard Pages Except for Hide and Reorder, clicking Pages page 1	Hide Page	Em 2 C & C	
Aashboard Report Links ashboard Pages Except for Hide and Reorder, clicking Pages page 1 New York Sales	Hide Page	Environmental Show Add To Briefing Book	

3. Once the  ${\tt Page}~1$  tab is highlighted in the list, click on the Rename button.

Pages	Hide Page	Show Add To Briefing Book
page 1		
New York Sales		
London Sales		
Paris Sales		



4. The **Rename** dialogue box will pop up. Write the new name of Page 1 and click on the **OK** button.

Renan	ne	×
Name	Region Sales Preserve references to old name of this item.	]
Help	OK Cance	el

5. You can also change the order of the pages in the dashboard by clicking on the Move selected items down button next to the pages list. Then click on **OK** to navigate to the Dashboard Builder page.

Dashboard Pages								
Except for Hide and Reorder, clicking Cancel will not undo operations in this section.								
	im 🚱 🖪 🗶 💽 🐼							
	Pages	Hide Page	Show Add To Briefing Book					
	Region Sales							
	New York Sales							
	London Sales			~				
	Paris Sales			<b>∑</b>				
	Мо	ve selecte	d items down					
He	p		OK C	ancel				

6. Click on the **Save** button to save the changes.

Search All	-	D	Advanced Administration	n ∣Help ∽ ∣Sign Out 📿
	Home Catalog	Dashboards 🗸	New 🗸 🛛 🗁 Open 🗸	Signed In As weblogic v
			👍 🏩 🗮 🛛 🖓 Prev	iew 🕨 Run F 🛃 📀
				Save
				Dave

-302-

7. Then click on the **Run** button to navigate to the dashboard. This will cause the Dashboard Builder to be closed.

Search All	•	Ø	Advanced	Administration	Help ~	Sign Out 🝳
	Home Catalog	Dashboards 🗸 🚽	New 🗸	🔁 Open 🗸	Signed In	As <b>weblogic</b> ~
		🖓 Sav	ved 👍 🎎	🗮 🔒 Previe	ew 🕨 Rur	n 🔒 🖬 🥝
					× -	

## How it works...

Once the dashboard is saved, the Sales dashboard is going to be displayed. Now, you will see that there are four dashboard pages. All of the dashboard pages don't contain any kind of catalog object as yet.

ORACLE I	Business Intelligence	
Sales		
Region Sales Nev	w York Sales London Sales Paris Sales	



## Adding catalog objects to the dashboards

Now we're going to learn how to add objects into the dashboards. There are two types of objects that we can publish in the dashboards:

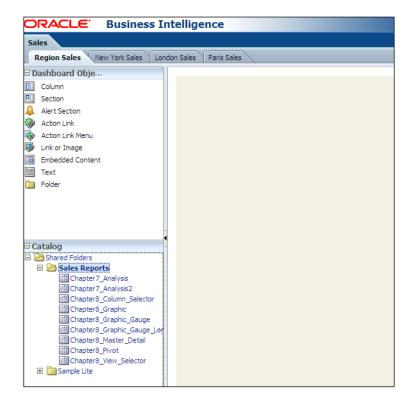
- Dashboard objects
- Catalog objects

Dashboard objects are used to publish additional information or actions in the dashboards. For example, if end users want to navigate to the company portal frequently, you can publish the company's web address in the dashboard. Or if an integration is needed between OBIEE and a third party application, we can create action links that will call a web service.

Catalog objects are the objects that are created by the BI developers, such as analyses and KPIs.

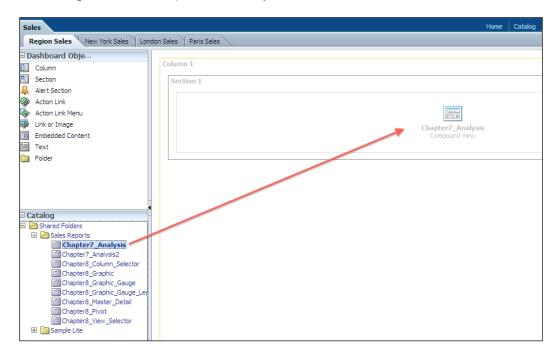
#### How to do it...

1. Navigate to the Dashboard Builder page and you will see that there's no content in the Regional Sales dashboard page.





 Drag-and-drop one of the analyses from the **Catalog** pane to the dashboard content area. When you drop it, you'll see that two dashboard objects are automatically created. The **Column** and **Section** objects are automatically created because they are used to organize the web to publish the analyses.



305—

3. Then drag-and-drop another analysis to the same section, below the first analysis. Now the Regional Sales dashboard page consists of two analyses.

Sales	Home   Catalog
Region Sales New York Sales Lon	don Sales Paris Sales
Dashboard Obje	
Column	Column 1
E Section	Section 1
🐥 Alert Section	
🎲 Action Link	
🍪 Action Link Menu	
link or Image	Chapter7 Analysis
Embedded Content	Compound View
Text	
🛅 Folder	
🗆 Catalog	Chapter7_Analysis2 Compound View
Shared Folders	
Chapter?_Analysis Chapter?_Analysis Chapter?_Analysis Chapter?_Analysis Chapter8_Craphic Chapter8_Graphic_Gauge Chapter8_Graphic_Gauge_Lee Chapter8_Vaster_Detail Chapter8_Vivet Chapter8	

4. Then simply drag the Column, Section, and Folder objects one by one next to the first Column object. Your work is going to look like the following screenshot. Then click in the Properties button of the folder object.

ORACLE Business Intelligence	Search
Sales	
Region Sales New York Sales London Sales Paris Sales	
Dashboard Obje	
Column Column 1	
Section Section 2	
Alert Section	- 9.0
🎲 Action Link	XYZ 💥
🗞 Action Link Menu	Properties
Link or Image     Folder 1	rioperaes
Embedded Content	
Text Text	
Folder	
🗆 Catalog	



5. The **Folder Properties** dialogue box will pop up. Click on the **Browse** button to select a folder that will be published in the dashboard. Select the **Expand** checkbox and click on the OK button. Then save the dashboard.

Folder Properties	×
Folder VShared Folders/Sales Reports	Browse
Help	OK Cancel

## How it works...

After saving and running the dashboard, your work will look like the following two screenshots. The dashboard page is divided into two columns. You'll see that the folder you have configured is displayed on the first column and it's expanded.

ORACLE Business Intelligence								
Sales								
Region Sales New York Sales London Sales Paris Sales								
🖃 🗁 Sales Reports								
🛗 Chapter7_Analysis								
Chapter 7_Analysis2								
Chapter 8_Coolding_Selector								
🔛 Chapter8_Graphic_Gauge								
Chapter8_Graphic_Gauge_Legend								
Chapter8_Master_Detail								
Chapter8_Pivot								



Two analyses are displayed in the second column. When the end users access the dashboard page, all of the analyses will be executed and the result set will be displayed.

Search	All		•	Ø	Advanced	Administration	Help ~	Sign Out	Q
		Home	Catalog	Dashboards 🗸	New 🗸	🔁 Open 🗸	Signed In	As weblog	jic ∨
								÷	?
Chap	ter7	Analysis							
		- /							
				Region Do	llars				
					5,140,250.86				
					4,977,380.69				
				Central \$1	2,919,161.55				
Chap	ter7	Analysis2							
					Dollars				
				Customer	001010				
				Customer Total	\$63.036.793.	10			
					\$12,919,161.				
				🗄 East	\$24,977,380.	69			
				🕀 West	\$25,140,250.				
				🗆 West & East	\$50,117,631.				
				± East	\$24,977,380.				
				± West	\$25,140,250.8	86			
							powere		LE.

## There's more...

Design of the dashboards is very important. It shouldn't contain many analyses and other objects at same time. Users should be able to focus on the information easily. We're going to discuss the best practices of dashboard design in *Chapter 11*, *Oracle BI Best Practices*.

-308-

## **Creating the dashboard prompts**

Dashboard prompts enable end users to interact with the analyses. Based on the values that are prompted, all the analyses are going to filter the results. These interactions are very useful and will be needed in the organizations frequently.

In order to gain the benefit of the dashboard prompts, we'll need to create analyses that have filters defined. Also, the filter criteria should match the criteria that were used in the dashboard prompts.

To demonstrate the dashboard prompts, we're going to create two analyses that consist of these columns:

- ▶ Region
- ▶ State
- ▶ Dollars

We're going to use the Region column as a filter. The analyses are as follows:

> The first analysis contains the Region is prompted filter

Selected Columns							
Double click on column names in the Subject Areas pane to add clicking or hovering over the button next to its name.							
Dim_Customer Fact_Sales							
📄 Region 🏣 📄 State 🇮 📋 Dollars 🇮							
Filters							
Add filters to the analysis criteria by clicking on Filter option for button after selecting its name in the catalog pane.							
W Region is prompted							



> The second analysis contains the Region is equal to / is in East filter

Ξ;	Selected Columns						
Double click on column names in the Subject Areas pane to clicking or hovering over the button next to its name.							
	Dim_Customer Fact_Sales						
	📄 Region 🗮 📄 State 🗮 📙 Dollars 🗮						
	Filters						
	filters to the analysis criteria by clicking on Filter optic ton after selecting its name in the catalog pane.						
Y	<sup>®</sup> Region is equal to / is in East						

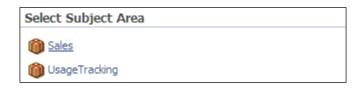
## How to do it...

1. Click on the Dashboard Prompt link in the Create pane.



-310

2. Click on the **Sales** subject area.



3. Click on the New button and select the Column Prompt option in the menu list.

Home	Catalog	Dashboards 🗸	New 🗸 🛛	눰 Open 🗸	Signed In As weblo	gic 🗸
			-		-	?
	Туре	Prompt For	Description	Require	Column Prompt Variable Prompt	
	Page				Image Prompt	
 					A	

311—

Creating and Configuring Dashboards -

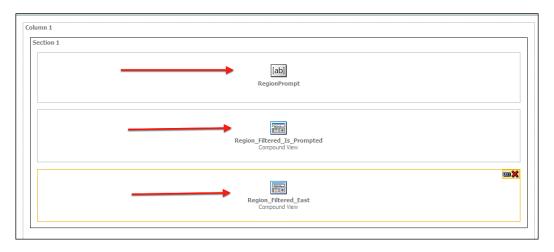
- Select Column × ≁ Columns 🖃 🎁 Sales 🗄 🛅 Dim\_Time 🖃 🛅 Dim\_Customer - Address City - District - Customer Customer Key - Phone Region Route Code Sales Rep - State E. Zip Code 🗄 🎭 Customer 🗉 🛅 Dim\_Product 🗄 🛅 Fact\_Sales OK Cancel Help
- 4. The **Select Column** dialogue box will pop up. Select the Region column and click on the **OK** button.

5. Write the **Label** value in the **New Prompt: Region** dialogue box and deselect the **Enable user to select multiple values** checkbox. Click on the **OK** button and save the dashboard prompt in a shared folder.

-312

ew Prompt: Reg	ion
Prompt For Column	Region 🔟
Label	Choose a Region please
Description	×
Operator	is equal to / is in 🔹
User Input	Choice List
Options	
Choice List Values	All Column Values
	Include "All Column Values" choice in the list
	Limit values by All Prompts
	Enable user to select multiple values
	Enable user to type values
	Require user input
Default selection	None
Choice List Width	O Dynamic 💿 120 Pixels
Set a variable	None

6. Then add the dashboard prompt and the two analyses into a dashboard page. Your work will look like the following screenshot. Save the dashboard.





Creating and Configuring Dashboards -

#### How it works...

1. The dashboard prompt and two analyses are published in the dashboard. When you first access the dashboard, a prompt will appear above the analyses. We've configured the dashboard prompt without a default value. So the analyses on the dashboard are not going to be affected at first.

Choose a Regior	n please	Apply Reset
Region	State	Dollars
Central	IL	1,243,114
	IN	960,246
	LA	814,648
	MN	1,030,562
	MO	2,099,372
	NE	1,851,946
	OH	151,305
	OK	703,227
	TX	3,962,640
	WI	102,101
East	CT	5,437,124
	DC	2,508,609
	FL	1,385,242
	GA	240,347
	KY	992,645
	MA	3,043,479
	MD	115,710
	ME	38,236
	NC	3,950,813
	NH	4,161,812
	NIV	704 506

2. But when the user selects a value from the dashboard prompt and clicks on the **Apply** button, the analyses will filter the data based on the selected value.





hoose a	Region	please Cer	Apply Rese	▼ et
R	egion	State	Dollars	
C	entral	IL	1,243,114	
		IN	960,246	
		LA	814,648	
		MN	1,030,562	
		MO	2,099,372	
		NE	1,851,946	
		OH	151,305	
		OK	703,227	
		TX	3,962,640	
		WI	102,101	

## There's more...

If the defined filters in the analyses are set as protected, then the dashboard prompts will not affect the result set. In our scenario we have created the filters without the protected setting so that the dashboard prompt filters all the data in the analyses.

# **11** Oracle BI Best Practices

In this chapter, we will cover:

- Best practices of the Physical layer
- Best practices of the Business Model and Mapping layer
- Best practices of the Presentation layer
- Best practices of the analyses and the dashboards
- Performance and security tips

## Introduction

The implementation process of Oracle Business Intelligence Enterprise Edition 11g should be very well planned and designed not to have a failed project. Every single step of this implementation is very crucial and any kind of mistake is going to impact the other dependent tasks. We should always focus on business requirements and also analyze technical features of the product in order to see the gap. We need to start with the business requirements and then we are going to drill down to the technical features. We're not going to discuss how to analyze the business needs in this book. Instead, technical details are going to be discussed.

In this chapter, we're going to cover the best practices of the OBIEE 11g. You will find useful recommendations about every layer of the implementation starting from the Physical layer of the repository to the dashboards.

Also you will find useful tips about performance and security in this chapter.

Before starting this recipe, we assume that the data warehouse is already designed and implemented.

Oracle BI Best Practices -

## **Best practices of the Physical layer**

You've already learned that building the Physical layer of the repository is the first step in OBIEE 11g implementation and hence all the initial steps are not going to be covered. You are going to find the best practices of the Physical layer in this recipe. We're going to discuss the common mistakes in the Physical layer and learn how to have a successful implementation of this layer.

#### How to do it...

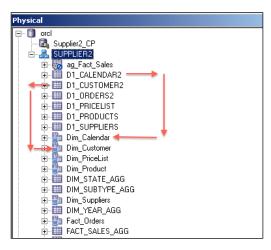
1. Instead of creating the Physical layer objects manually, use the **Import** option from the **File** menu. Otherwise, we might make mistakes while specifying all the details about the physical tables.

Import Metadata - Select Metadata O	bjects		
Select Data Source     Select Metadata Types	Select the metadata objects you want t Eind: [ Data source view:	to import into the physical layer of the repository.	
Z Select Metadata Types		Repository View:	
3 Select Metadata Objects	E  CORCL B  APEX_030200 B  APPQ0SSYS	▲      ▲     ▲     ▲     ▲     ■	
4 Map to Logical Model	⊡ – 🚠 BI ⊡ – 💑 CTXSYS	3	
5 Publish to Warehouse	B-B DBSNMP B-B DEV_BIPLATFORM B-B DEV_BIPLATFORM B-B DEV_MDS B-B EXFSYS B-B FLOWS_FILES B-B IX B-B IX B-B IX B-B OLAPSYS B-B OLAPSYS B-B ORDATA B-B ORDSYS B-B OWBSYS B-B OWBSYS B-B OWBSYS B-B DUDUC		
	🔽 Show complete structure	Show complete structure	
Help		Back Next Einish	Cancel
For Help, press F1			1.

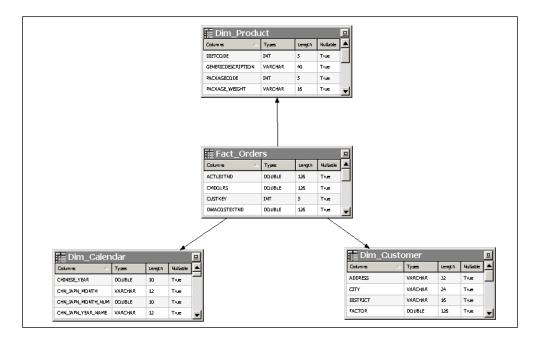
-318

319—

2. Circular joins shouldn't be used in the repository. Create aliases for each physical table to avoid the circular joins. You may create more than one alias for a single physical table.



3. Be sure that physical joins exist in the Physical layer. Although it's possible to import the foreign key relations from the database automatically, we have to be sure that foreign keys exist. If not, we will have to create physical joins in the Physical layer. These relations are going to be used during generation of the physical SQL statements. Open the Physical Diagram and check the relations.



Oracle BI Best Practices -

4. Configure the **Features** settings in the **Database** window. If the database doesn't support some of the features, we can easily disable them in the **Features** tab of the database properties window.

Feature		Value	Default 🔺
LEFT_OUTER_JOI	N_SUPPORTED		<u> </u>
RIGHT_OUTER_JC	IN_SUPPORTED		
FULL_OUTER_JOI	N_SUPPORTED		V
NESTED_OUTER_J	OIN_SUPPORTED	V	V
UNION_SUPPORTE	Ð		
UNION_ALL_SUPP	ORTED		
COUNT_SUPPORT	ED		
COUNT_DISTINCT	<b>—</b>		
COUNT_STAR_SU	PORTED		
SUM_SUPPORTED			
AVG_SUPPORTED			
MIN_SUPPORTED			
MAX_SUPPORTED			<b>N</b>
FIRST_SUPPORTE			
LAST_SUPPORTED			
RANK_SUPPORTED			
PERCENTILE_SUPP			
MOVING_AVG_SUP			
TOPN_SUPPORTED			- <u>-</u>
			to defaults

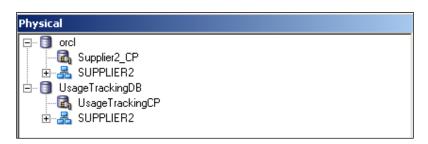
5. Set the value of the **Maximum Connections** settings in the **Connection Pool** properties. We have to measure the performance of the database before changing this value. If there's no bottleneck in the database then it will be better to increase the default value. The default value is set to **10**.

-320-

#### Chapter 11

Connection Pool - Suppli	er2_CP		
General Connection Sci	ipts 🛛 XML 🗍 Write Back	Miscellaneo	us
<u>Name:</u> Supplier2_CF			Permissions
<u>C</u> all interface:	Default (OCI 10g/11g)		
Maximum connections:	10 🛨		_
<u>R</u> equire fully qualifier	d table names		
D <u>a</u> ta source name:	orcl		
Shared logon			
<u>U</u> ser name:	supplier2	Password:	•••••
Enable connection p	ooling		
<u>T</u> imeout:	5		(minutes) 💌
🔽 Use multithreaded c	onnections		
Parameters supporte	d		
Isolation level:	Default		▼
Description:			

6. Create separate databases and connection pools for security, as displayed in the following screenshot:



#### How it works...

The Physical layer is the first layer that we're going to configure. All the others depend on this layer. Obviously having a well-designed data warehouse model will make the implementation easy. The star schema or the snowflake schema models should be considered in the design phase. Whenever a business user runs an analysis, the Physical layer objects will be used to access the data.

321—

Oracle BI Best Practices -

## Best practices of the Business Model and Mapping layer

The Business Model and Mapping layer is responsible for the business rules and it depends on the Physical layer objects. The BI server is going to generate SQL statements based on the BMM layer objects. Obviously, the objects defined in this layer may positively improve the performance. We have to design all the BMM layer objects carefully. Here are the some types of the objects that are used in this layer:

- Logical dimension tables
- Logical fact tables
- Logical table sources
- Logical dimensions
- Calculated measure columns

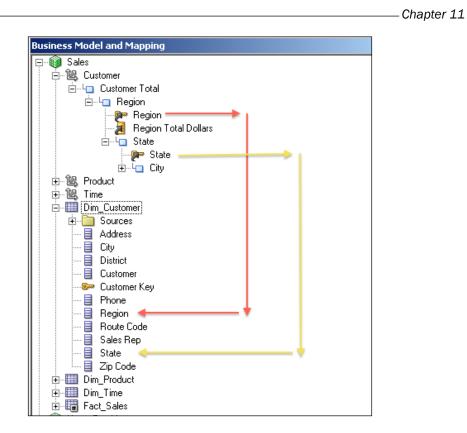
#### How to do it...

1. Although the BMM layer objects are transparent to the end users, one should create logical dimension and fact tables with meaningful names and use prefixes to distinguish them from each other.

Business Model and Mapping	
🖃 🔞 Sales	
🗄 🛍 Customer	
主 🗟 Product	
📄 🗄 📲 🛍 Time	
📃 🕀 🎹 Dim_Customer	
😟 🖽 Dim_Product	
😟 🖽 Dim_Time	
🛨 📲 Fact_Sales	
🗄 📲 UsageTracking	

2. Ensure that the levels of hierarchies are set to logical columns correctly. All the dimension levels should be mapped with the logical table columns. In the case of unmapped levels, business users are going to have issues when they drill down through that level.





3. Set the aggregation rule for each logical measure column in the fact tables. Otherwise, the output of the analysis is not going to be an aggregated (summary) result set.

Logical Column - Dollars		
General Column Source	Aggregation Levels	
Based on dimensions		
Default aggregation rule:	Sum	•



Oracle BI Best Practices -

4. Ensure that logical joins are created. We can check them by using the Business Model Diagram. Logical joins are going to be created automatically based on the physical joins that are defined in the Physical layer.

Colume         Type         Length         Nullable           Address         VARCHAR         22         Tue         Day         Day         Day         Day         Day         Tue           Gry         VARCHAR         24         Tue         Day         Tue         Day	🔚 Dim_Cu	ustomer									🔚 Dim_Time				
Ciry       VARCHAR       24       Tue         Discuic       VARCHAR       15       Tue         Castome       VARCHAR       12       Tue         Castome       VARCHAR       12       Tue         Fact_Sales       0086.6       00       0086.6       00       Tue         Castome       VARCHAR       12       Tue       0       Tue         Dialos       00086.6       20       Tue       0       Tue         UNIS Ordered       00086.6       20       Tue       0       Tue         UNIS Singed       00086.6       20       Tue       0       Tue       0         Dim <product< td="">       Colume       Yame       Length       Nullable       0       UNIS       0       UNIS         Secode       NT       5       Tue       Length       Nullable       0       UNIS       UNIS       UNIS       UNIS       UNIS       UNIS</product<>			Length	Nullable								Турез	Length	Nullable	
District       VARCHAR       16       Tue         Castome       VARCHAR       12       Tue         District       District       District       District       District         District       Types       Length       Mullable       District	Address	VARCHAR	32	True							Day in Month	DOUBLE	10	True	
Castome       VARCHAR       32       Tue         Fact_Sales       Image: Calume Calu	Gly	VARCHAR	24	True							DAY_IN_YEAR	DOUBLE	10	True	
Fact_Sales         Calumine       Types         Dallars       DOUBLE         Dallars       DOUBLE         Weight Stripped       DOUBLE         Unice Ordered       DOUBLE         Unice Stripped       DOUBLE         Unice Stripped       DOUBLE         Dime       Vision         Dime       Vision         Germic       VARCHAR         Pacturge Weight       VARCHAR         Vance       True	District	VARCHAR	15	True							DAY_NAME	VARCHAR	12	True	
Colume       Types       Length       Nullable         Dollors       DOUBLE       20       True         Met. Weight, Shipped       DOUBLE       20       True         Unice Ordered       DOUBLE       20       True         Unice Shipped       DOUBLE       20       True         Unice Shipped       DOUBLE       20       True         Unice Shipped       DOUBLE       20       True         Columne       Yppes       Length       Nullable         Germic       VARCHAR       40       True         Package Weight,       VARCHAR       16       True	Customer	VARCHAR	32	True	T						Date	DATETIME	0	True	-
Columns     Types     Length     Mullate       Dies. Code     INT     5     Tue       Gemeinc     VARCHAR     40     Tue       Pactage Weight     VARCHAR     16     Tue						Calumins Calumins Calumins Net Weight, Shipped Units Ordered	Types DOUBLE DOUBLE DOUBLE	20 20 20	True True True						
Columns     Tryms     Length     Mullable       Dies. Code     TMT     5     Tute       Gemeinc     VARCHAR     40     Tute       Partuage Weig/K.     VARCHAR     15     Tute						-									
Dies. Code     IMT     S     True       Generic     VARCHAR     40     True       Pactage Weigitk     VARCHAR     15     True							1			믝					
Generic VARCHAR 40 True										J≜					
Pactage Weight VARCHAR 15 True															
								-							
						Package Weight	VARCHAR INT	16 5	True						

5. If any change is needed in the logical join attributes, for instance, if the business requirements need to have outer joins, change the **Type** property from **Inner** to **Outer**.

Logical Join - Relationship_2004:3121343036221	
Name: Relationship_2004:3121343036221 Business model: Sales	
	<b>T</b> -LI
Table:	Table:
Fact_Sales	Dim_Time
<u>C</u> olumn:	C <u>o</u> lumn:
Name Type Operator:	Name Type 🔺
Dollars DOU	✓ Day DOUB
Net Weight Shipped DOU	🛛 🧭 Day in Month 🔋 🛛 DOUB
Driving table: None Type:	Inner
Cardinality	*
⊙ N ○ 0,1 ○ 1	○ 1 ● 0,1 ○ N
Expression:	



6. Set the number of elements in the dimension hierarchies. This setting will affect the query performance. It doesn't need to be accurate but at least it should reflect the actual ratio. The BI server decides the usage of the aggregate tables by checking this value. If there are two aggregate tables that can satisfy the logical query, then the BI server is going to use the aggregate table that contains the smaller number of elements.

Logical Level - Month		<u>_     ×</u>
General Keys Preferred Drill Path		
Name: Month		
Number of elements at this level: 38 (1 for dimension total)		
<u>Gr</u> and total level		
Supports rollup to higher level of aggregation		
	5	×
Child Jevels:		<u> </u>
La Day		

#### How it works...

The BMM layer contains objects that are going to be used by the BI server during query generation. Whenever an analysis is executed, the request is going to be sent to the BI server. The BI server is going to convert the logical SQL statement to the physical SQL statement based on the definitions of the BMM layer objects.

We can improve the performance of the queries by creating well-designed business models in this layer. If we don't, or if we make mistakes in this layer, the analysis is not going to produce an accurate result set.

#### There's more...

Use the global consistency check tool to find out if there are warnings or errors in the repository. Global consistency check is automatically triggered when you try to save the repository. You can also access it from the **File** menu.

**Oracle BI Best Practices** 

## **Best practices of the Presentation layer**

The Presentation layer holds the subject areas, presentation tables, and presentation columns. They are all exposed to the end users through the Presentation Services (web user interface). All the objects in this layer depend on the BMM layer objects.

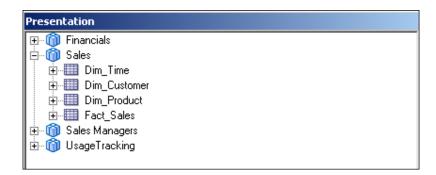
Subject areas should be created based on **Roles**. We should always think from the user perspective when it comes to designing the subject areas. We can also set the permissions on the objects so that every user logged in to Presentation Services won't be able to access them.

#### How to do it...

1. Create role-based subject areas based on the business requirements. You can see the sample design in the following screenshot:



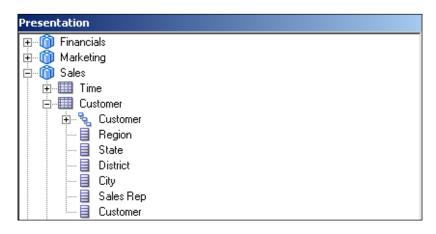
2. We should list the dimension tables first, and then the fact tables will be at the bottom of the list. Also it's better to have the time presentation table first in the order.



3. By Default, Presentation Table names are inherited from the BMM Layer. Use meaningful names for the **Presentation Tables** and write a description for each of them in order to assist the end users instead of using the default names.

Presentation Table - Time	
General Columns Hierarchies Aliases	
· · · · · ·	
<u>N</u> ame: Time	Permissions
Custom display name VALUEOF(NQ_SESSION.CN_	Sales_Time)
Custom description VALUEOF(NQ_SESSION.CD_	Sales_Dim_Time)
Description:	
Time Dimension Table displays time attributes.	<u> </u>

4. Avoid using many presentation columns in the presentation tables. This will cause end users to lose concentration. Try to use a small number of columns in these tables. It will be good to set up the order of the columns as well.



#### How it works...

All the subject areas defined in the Presentation layer will be displayed in the user interface. When a business user tries to access the Analysis Editor, the subject area selection page will be prompted to pop up in the screen. Subject areas will be displayed as a list based on the user's privileges. If the user hasn't been granted with the read privilege then that subject area is going to be hidden in the list.



Oracle BI Best Practices

#### There's more...

We can also configure the security settings at the table and column level. Although the users have sufficient privileges to see the subject areas, they might not see all the presentation tables or the presentation columns. This behavior depends on the **Permission** settings at the proper level.

## Best practices of the analyses and the dashboards

The queries that are executed against the data warehouses cause a large amount of database processing. Every time we access an analysis, the query is going to be generated by the BI server and it's executed against the database. Let's assume that a dashboard contains many analyses that will cause intensive calculations. When the business users access that dashboard, all the analyses will run. This will impact the performance. We should not publish many objects in the main dashboards. The users should see the results as quickly as possible. We can achieve this by publishing summary result sets in the main dashboards. If they are interested in the finer granular levels, they can drill down or navigate to another analysis that contains the details.

#### How to do it...

1. Create the dashboards based on the roles or the functionality area.

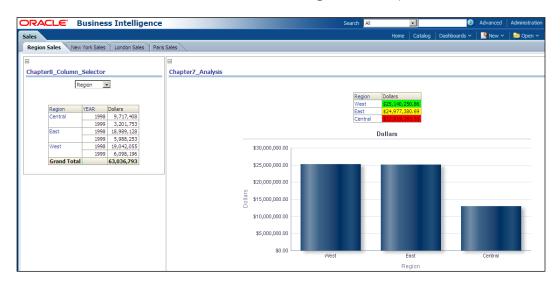
Home Catalog	Dashboards 🗸 📄 🔮 New 🗸 📄 Oper	n 🗸 📄 Signed In As 🛛 weblogic 🗸
	Most Recent(Sales - Region Sales)	
	🛅 My Dashboard	
	Organization Reports	
	🖷 Financials	
	🛅 Marketing	
	🔚 Sales	

2. Use the Dashboard Pages to divide the content, to enable end users to focus on the data.

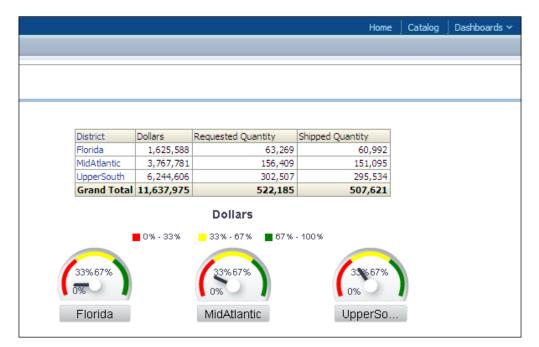




3. Avoid designing dashboards that will generate large result sets. It's going to have a negative impact on the performance. If the users are interested in more details, they could drill down to more detailed levels through the main reports.



4. Try to use fewer columns in the analyses to not lose focus. Simple designs are mostly the best.





**Oracle BI Best Practices** 

#### How it works...

Once the users are logged in to the Presentation Services, their home pages are going to be displayed and all the analyses on the home pages are going to run. So it's better to have simply-designed dashboard pages as home pages. When users navigate to any other dashboard page, the same behavior should be the case. We shouldn't publish many analyses on one dashboard page.

#### There's more...

We can also gain the benefit of the navigation links that are mapped to the analyses. Instead of publishing the analysis, links will be displayed on the pages. Publishing the presentation catalog folders will have a similar positive impact on performance.

## **Performance and security tips**

Business users shouldn't access all of the analyses in Presentation Services. We should set the permissions of the catalog objects so that users can only access the analyses that they need from a business perspective. We can enforce security settings in the repository and also in the Presentation Catalog.

Besides security, query performance is another issue in the BI projects. Whenever analyses run, they should display the results quickly. For instance, generating one result set in an hour is not acceptable. We should tune the performance in such cases to satisfy the business goals.

#### How to do it...

1. Grant only the privileges required for business users in Presentation Catalog. You can set permissions for all of the catalog objects. Just select the required privilege from the **Permission** drop-down list.

-330

#### – Chapter 11

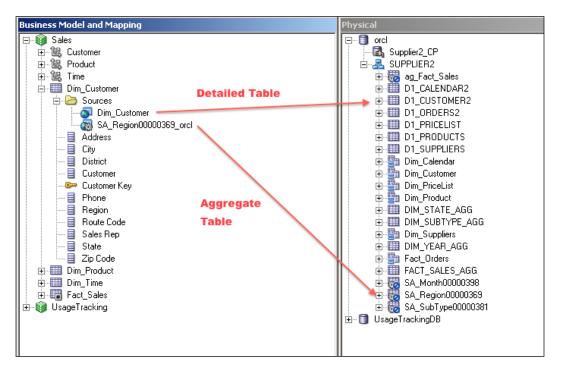
Permission		×	
Location: /Shared Folders/Organization Reports/Da Owner: weblogic			
Permissions	💥 🐴 🦏 🚽	• 🧠 🗸	
Accounts	Permission	Owner	
R Authenticated User	Full Control	0	
🔀 BI Administrator Role	Full Control	0	
🔀 BI Author Role	Full Control Modify Open	0	
🔀 BI Consumer Role	Traverse Full Control	0	
🔀 BI System Role	Custom Full Control	0	
Apply permissions to sub-folders.			
Apply permissions to items within folder.			
Help		OK Cancel	

2. Use data filters for the users to generate a limited result set based on the user needs. This can be achieved in the repository. Open **BI Administrator Tool** and access Identity Manager from the **Manage** menu.

User/Application Role Perm	issions - BIConsumer				<u>_ D ×</u>
Object Permissions Data Filters Query Limits					
Data filters can be set here on logical and presentation layer objects. Applying filter on a logical object will impact all subject areas which use the object. Filters set on presentation objects will be applied in addition to the ones applied on the underlying logical objects.					
Subject Area:	Total Filters: 0	♣ ※			>>>>
Type Layer	Name Click here to add an object and set Ører	Status	D	ata Filter	
	Add Filter				
			OK	Cancel	Help

331—

Oracle BI Best Practices

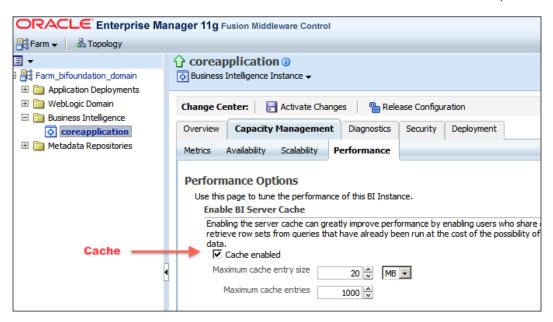


3. Use the aggregate tables to improve the query performance.

4. Whenever business users run the analyses, the query will be generated by the BI server and it's going to be executed at the database level. In order to improve the query performance, we should balance the workload by enabling the cache on the BI server. So when the query is executed for the first time, the result set is going to be cached on the BI server. The result set is going to be generated from the cache in subsequent executions. In order to gain the benefit from this feature, caching should be enabled on the BI server. You can modify this setting in the Enterprise Manager **11g Fusion Middleware Control** window.

-332

#### Chapter 11



#### How it works...

After configuring the security settings, the users will be able to access the required catalog objects. Depending on the permissions, they will see some of the objects. Another important security point is configuring the data level security. What if two different users have read permissions on the same object and they need to see different data depending on their roles? So once the users are logged in to the web interface, catalog permissions will be applied. Then when they run a report, the security settings defined in the repository will be applied.

333—

## The Major Components of OBIEE 11g

In this chapter, we will cover:

- ▶ The major components of OBIEE 11g
- Sample processing of an analysis

## Introduction

OBIEE 11g consists of several major components and it uses the **Fusion Middleware Server** and the **WebLogic Server**. It's important to understand the functions of these components. We're going to use **Enterprise Manager 11g Fusion Middleware Control** to manage the components. The Major Components of OBIEE 11g -

## The major components of OBIEE 11g

After the installation of OBIEE 11g, you can access the **Fusion Middleware Control** from the address http://ServerName:7001/em. The default port of the Weblogic Server is 7001 and it can be updated to any available port by modifying the <listen-port> node of the config.xml file.

	nager 11g Fusion Middleware Control			
📑 Farm 👻 🛛 💑 Topology				
Farm_bifoundation_domain     Application Deployments	<ul> <li>Coreapplication ()</li> <li>Business Intelligence Instance →</li> </ul>			
E Di WebLogic Domain	Change Center: PLock and Edit Confi	Change Center: PLock and Edit Configuration		
Business Intelligence     Coreapplication	Overview Capacity Management Dia	gnostics Security Deployment		
🗄 🚞 Metadata Repositories	System Shutdown & Startup			
R	100%	Up (S)		
	System Comp	onents		
	System Status	Manage System		
	All components are available	🚺 Start 🔲 Stop 🚺 Restart		

We're going to discuss these components in this appendix:

- ▶ BI Presentation Services
- ▶ BI Server
- ▶ BI Scheduler
- ▶ BI Cluster Controller

-336

BI Java Host

	nager 11g Fusion Middleware Control			
Farm → & Topology				
<ul> <li>Farm_bifoundation_domain</li> <li>Application Deployments</li> <li>WebLogic Domain</li> <li>Business Intelligence</li> <li>coreapplication</li> <li>Metadata Repositories</li> </ul>	Coreapplication ③     Susiness Intelligence Instance      ✓			
	Change Center:         P Lock and Edit Configuration           Overview         Capacity Management         Diagnostics         Security         Deployment           Metrics         Availability         Scalability         Performance			
	System Components Availability			
	Start All       Stop All       Restart All       Start Selected       Stop Selected         Name       Status       Host       Port         Image: BI Presentation Services       Image: BI Servers       Image: BI Servers       Image: BI Servers         Image: BI Schedulers       Image: BI Cluster Controllers       Image: BI JavaHosts       Image: BI JavaHosts       Image: BI JavaHosts			

## **Major components**

► BI Presentation Services: This is the user interface that provides the BI data to the web clients. Presentation Services is dependent on the BI server. All of the requests are going to be sent to the BI server. You can have access to Presentation Services from http://ServerName:7001/analytics.

📀 💿 💌 🙋 http://localhost:7001/analytics/saw.dll?bieehome			
<u>File E</u> dit <u>V</u> iew F <u>a</u> vorites <u>T</u> ools <u>H</u> elp			
🚖 Favorites 🛛 👍 💋 Oracle BIEE Home 🖉 Oracle Enterprise Manager 🤌 Oracle WebLogic Server Ad 🖉 Oracle			
Cracle BIEE Home			
ORACLE Business Intelligence			
Home			
Create Analysis and Interactive Reporting Analysis   Dashboard   More ~	Recent Dashboards		
Published Reporting Report   Report Job   More ~ Actionable Intelligence Acent   Action	Sales - Region Sales Open   Edit   More ~ Sales - New York Sales Open   Edit   More ~		
Performance Management Scorecard   KPI   KPI Watchlist Marketing Segment   Segment Tree   List Format	More Dashboards v Others District Sales Open   Edit   More v		



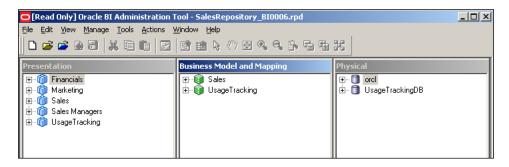
The Major Components of OBIEE 11g -

A repository of Presentation Services is stored on the file system as a folder. A sample path is specified as follows:

```
<ORACLE_INSTANCE>\bifoundation\
OracleBIPresentationServicesComponent\coreapplication_obips1\
catalog\SampleAppLite
```

All of the objects that you're going to create will be stored in the catalog folder.

BI Server: This is the core service of the suite. It is responsible for converting the logical request to a physical SQL statement and executing it on the data warehouse. Its metadata is stored in the repository file that is called an RPD file. We can use BI Administration Tool to modify the content of this RPD file.

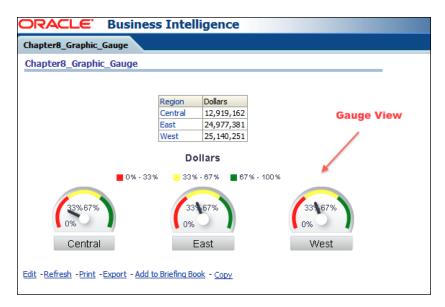


 BI Scheduler: This component is responsible for running scheduled tasks such as agents or scripts. Job Manager Tool can be used to manage the BI Scheduler Service. You can see an example of an agent configuration in the following screenshot.

DRACLE' Business Intelligence
Untitled Agent
Coverview General Normal Priority, Use Specified User's Credentials: weblogic Schedule Not Scheduled Condition Do not use a condition (always deliver content and run actions) Delivery Content <none selected=""> General Schedule Condition Delivery Content Recipients Destinations Actions</none>
When do you want the Agent to be scheduled to run?
Enabled 🔽
Frequency Daily 🔽 Every 1 🗘 Days
Start 04/03/2013 12:18:00 AM 🛛 🖄 Default
Re-run Agent Every 🔲 🔟 Minutes
Until 11:59:00 PM 🖄 Default
End <sup>©</sup> No end date <sup>©</sup> Select end date <u>04/03/2013</u>

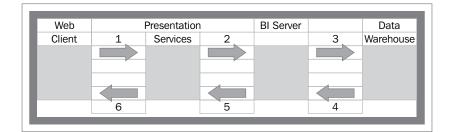


- BI Cluster Controller: This is a component that is responsible for distributing the requests to the BI server instances to load the balance. If you've installed clustered BI servers then this service is going to ensure load balancing.
- BI Java Host: This component is responsible for displaying graphical objects such as gauges and graphs.



## Sample processing of an analysis

When business users log in to Presentation Services and execute one of the analyses, some processing steps are executed in the background. We're going to cover these steps in this recipe.





The Major Components of OBIEE 11g -

#### **Processing steps**

- 1. Web client runs the analysis to display the result set.
- 2. Presentation Services builds the logical SQL statement and forwards this statement to the BI server.
- 3. The BI server converts the statement to a physical SQL statement and executes it on the database.
- 4. The database server generates the result set and sends it to the BI server.
- 5. The BI server forwards the result set to Presentation Services.
- 6. Presentation Services displays the formatted result set so the web client accesses the report result.

ORACLE Business Intelligence			
	Requested	Shipped	
	Quantity	Quantity	
Customer			
Customer	2,788,062	2,720,119	
Total			
🕀 Central	546,663	529,587	
🕀 East	1,191,635	1,166,586	
🗄 West	1,049,764	1,023,946	
Grand Total	2,788,062	2,720,119	

#### There's more...

If the caching option of the BI server is enabled, then the result set is going to be stored in the cache. In the next execution of the analysis, the query will be satisfied from the cache instead of executing the physical SQL statement on the database.

ORACLE Enterprise Manager 11g Fusion Middleware Control			
📲 Farm 👻 🖓 Topology			
<ul> <li>∃ ✓</li> <li>☐ Farm_bifoundation_domain</li> <li>☑ Poplication Deployments</li> </ul>	Coreapplication ③     Business Intelligence Instance      ✓		
WebLogic Domain     Business Intelligence	Change Center: 🛛 📄 Activate Changes 🖉 📲 Release Configuration		
Coreapplication	Overview Capacity Management Diagnostics Security Deployment		
🗄 🛅 Metadata Repositories	Metrics Availability Scalability Performance		
Cache	Performance Options         Use this page to tune the performance of this BI Instance.         Enable BI Server Cache         Enabling the server cache can greatly improve performance by enabling users who share data visibility to retrieve row sets from queries that have already been run at the cost of the possibility of seeing stale data.         ✓ Cache enabled         Maximum cache entry size       20 x         Maximum cache entries       1000 x		
	Global Cache         These settings apply to the cache when the BI server is dustered.         Global cache path         Global cache size         0		

The caching option is controlled in the **Fusion Middleware Control** window, as displayed in the following screenshot:

## Index

#### A

Add New Dimension window 272 Administration | Manage Sessions | View Log 46 After option 243 **Aggregate Persistence Wizard** about 108 using 108-116 working 116-118 AGGREGATE\_PREFIX parameter 108 aggregate tables about 92 creating 92-94 implementing 95-105 working 94, 95, 106, 107 AGO 118 analysis about 328 best practices 329, 330 constructing 210-216 processing steps 340 sample processing 339 application roles about 163 creating 164-166 working 166, 167 Apply button 314

#### В

BI Administration Tool 43, 168, 204 BI Administrator Tool 331 BI Cluster Controller 339 BI Java Host 339 BI Presentation Services 337 BI Scheduler 338 BI Server 338 Browse window 177 Business Model about 15, 135 best practices 322, 323, 325 building 15-20 creating 135-139 working 140, 141 Business Model, Usage Tracking about 191 creating 192-196 working 197

#### С

cache about 201 enabling 202, 203 managing 206-208 working 203 Cache Manager 203 cache statistics gathering 203-205 calculations adding, to fact table 24-30 creating, time series functions used 118-126 Catalog option 274 Catalog pane 283, 305 child key (Member Key) 65 Child Level option 54 Column Format tab 214 Column Prompt option 311 column prompts about 235 adding 236-238 **Column Properties option 266** 

column selector view about 257 adding 258-260 components, Oracle Business Intelligence Enterprise Edition Suite BI Scheduler 8 Oracle BI Server 8 presentation services 8 conditional formatting 221 Connection Pool name 33 Consistency Check Manager about 38 used, for repository validation 38-40 Content tab 147 Customer dimension 48, 75

#### D

**Dashboard Builder 199** dashboard editor about 295 using 295-298 working 299 dashboard objects properties exploring 300, 302 working 303 dashboard pages 291 dashboard prompts using 309-315 dashboards about 328 best practices 328-330 creating 292-295 catalog objects, adding to 304-308 pages 291 dashboards, usage statistics creating 197-199 working 201 data filters about 176 creating 176-178 working 179 Data Filters tab 176 data warehouse 30 DDL script 68 Define another aggregate option 113 Details tab 288 direct database requests 174 Drill Down 63 dynamic variables 30

#### Ε

Edit link 296 Enterprise Manager Fusion Middleware Control window 332 ETL 30, 95 EVALUATE\_AGG function 228 EVALUATE function 228 EVALUATE\_PREDICATE function 228 Extraction, Transformation, and Loading. See ETL

### F

fact table calculations, adding to 24-30 filters creating 226-231 Format Text window 256 Fusion Middleware Control 341

#### G

Gauge Properties window 252 gauge view about 249 adding 249-253 graph view about 245 adding 245-249 working 249 groups about 160 adding, for users 162, 163 creating 160, 162

#### Η

Horizontal Federation about 141

implementing 142-144 working 145, 146

#### 

Import Metadata option 10 Import option 318 Include Selector checkbox 258 initialization block 30 Initialization Block window 32 initiatives about 284 creating 284, 285

#### K

Key Performance Indicators. See KPI KPI about 226, 270 creating 270 watchlists 271-277 working 278

#### L

legend view about 253 adding 254-257 level-based hierarchies about 49 creating 49-63 working 63, 64 level-based hierarchies, attributes ragged hierarchies 49 skipped level 49 time hierarchy 49 level-based measure about 71 creating 71-78 working 78, 79 Levels tab 80 Logical Column window 121 Logical Dimension - Customer window 50 logical dimensions about 47 Customer dimension 48 level-based hierarchies 49 logical-dimension, types 49 Product dimension 49 parent-child hierarchies 49 Time dimension 48

Logical Level option 61 logical table source multiple sources, adding to 20-24 Logical Table Source window 27

#### Μ

major components, OBIEE 11g about 336 BI Cluster Controller 339 BI Java Host 339 BI Presentation Services 337, 338 BI Scheduler 338 BI Server 338 Mapping layer about 15 best practices 322-325 building 15-20 master-detail view settings about 264 configuring 264-267 working 267 MDX about 130 benefits 130 MDX query about 134 clauses 134 measure aggregation 91 Medium option 251 member counts accessing 133, 134 members accessing 133, 134 multidimensional Business Model. See **Business Model** multidimensional data source about 130 importing 130-133 working 133 Multidimensional Expressions. See MDX

#### Ν

New Dashboard dialogue box 292 New Group window 233 New KPI Watchlist page 277 New Objective tab 282

New Prompt: Region window 236 New Scorecard window 280 non-system variable 30

#### 0

OBIEE 11g about 335 major components 336 objectives about 281 creating 282-284 OLAP 130 OLAP Cubes 95 OLTP 129 Online Analytical Processing. See OLAP Online Transactional Processing. See OLTP Oracle Enterprise Manager Fusion Middleware Control 154

Proudly sourced and uploaded by [StormRG]

parent-child hierarchies about 64 creating 65-70 working 70 Parent-Child Relationship Table Settings window 67 parent (Parent Column) 65 PERIODROLLING 119 permissions, on repository objects setting up 167-172 perspectives about 285 adding 286, 287 Perspectives pane 286 physical layer about 318 best practices 318-321 building, in repository 9-14 working 14, 15, 321 pivot table view about 240 adding 240-244 working 245 presentation hierarchies about 82

creating 82, 83 working 84-89 Presentation layer about 35, 326 best practices 326, 327 building 35-37 working 327 Presentation Table 37, 327 Product dimension 49 Prompts tab 237

#### Q

query limits

about 172
configuring 172-174
direct database requests, executing 174

Query Limits tab 175
query performance 330-333

#### R

Region is prompted filter 309 Rename dialogue 302 repository physical layer, building 9-14 uploading 41-46 validating, Consistency Check Manager used 38-40 repository objects permissions, setting up 167 Results tab 46, 266, 267 Roles 326 Run button 303

#### S

Sales Person hierarchy 150 Sales Rep logical level 149 scorecards creating 278-280 working 281 security tips 330-333 security mapping 154 security permissions implementing, ways 154

security settings about 154 configuring 154-156 Selected Columns section 86 selections using 231-233 working 233, 234 shared measures about 79 creating 80 working 82 snowflake schema 20 Sort Descending option 225 static variables 30 strategy maps about 287 building 287-289 strategy trees about 287 building 287-289 Strategy tree tab 288 Subject Area pane 84 subject areas 35 system variable 30

#### Т

Table Properties window 220table viewformatting 221-225table view propertiesabout 216exploring 217-221working 221Time dimension 48time restrictionsspecifying 175working 176time series functionsAGO 118PERIODROLLING 119

TODATE 119 used, for calculation creating 118-126 working 126, 127 TODATE 119 Type property 324

#### U

UDA 131 usage statistics about 181 dashboards, creating 197 Usage Tracking about 182 Business Model, creating 191 enabling 182-190 User Defined Attribute. See UDA users about 157 creating 157, 158 working 159, 160

#### V

```
variables
about 30
creating 31-33
types, repository variables 30
types, session variables 30
working 34
Vertical Federation
about 146
implementing 146-149
working 149-151
view selector view
about 261
adding 261-263
working 263, 264
```

#### W

WebLogic Server Administration console 153

347 —



## Thank you for buying Oracle Business Intelligence 11g R1 Cookbook

## **About Packt Publishing**

Packt, pronounced 'packed', published its first book "*Mastering phpMyAdmin for Effective MySQL Management*" in April 2004 and subsequently continued to specialize in publishing highly focused books on specific technologies and solutions.

Our books and publications share the experiences of your fellow IT professionals in adapting and customizing today's systems, applications, and frameworks. Our solution-based books give you the knowledge and power to customize the software and technologies you're using to get the job done. Packt books are more specific and less general than the IT books you have seen in the past. Our unique business model allows us to bring you more focused information, giving you more of what you need to know, and less of what you don't.

Packt is a modern, yet unique publishing company, which focuses on producing quality, cutting-edge books for communities of developers, administrators, and newbies alike. For more information, please visit our website: www.PacktPub.com.

## **About Packt Enterprise**

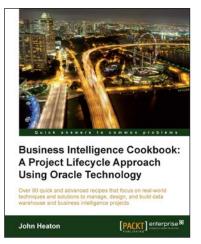
In 2010, Packt launched two new brands, Packt Enterprise and Packt Open Source, in order to continue its focus on specialization. This book is part of the Packt Enterprise brand, home to books published on enterprise software – software created by major vendors, including (but not limited to) IBM, Microsoft and Oracle, often for use in other corporations. Its titles will offer information relevant to a range of users of this software, including administrators, developers, architects, and end users.

## Writing for Packt

We welcome all inquiries from people who are interested in authoring. Book proposals should be sent to author@packtpub.com. If your book idea is still at an early stage and you would like to discuss it first before writing a formal book proposal, contact us; one of our commissioning editors will get in touch with you.

We're not just looking for published authors; if you have strong technical skills but no writing experience, our experienced editors can help you develop a writing career, or simply get some additional reward for your expertise.





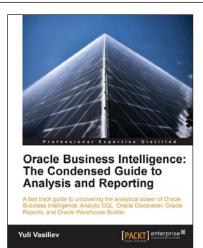
### Business Intelligence Cookbook: A Project Lifecycle Approach Using Oracle Technology

ISBN: 978-1-84968-548-1

Paperback: 368 pages

Over 80 quick and advanced recipes that focus on real-world techniques and solutions to manage, design, and build data warehouse and business intelligence projects

- Full of illustrations, diagrams, and tips with clear step-by-step instructions and real time examples to perform key steps and functions on your project
- 2. Practical ways to estimate the effort of a data warehouse solution based on a standard work breakdown structure.



### Oracle Business Intelligence : The Condensed Guide to Analysis and Reporting

ISBN: 978-1-84968-118-6

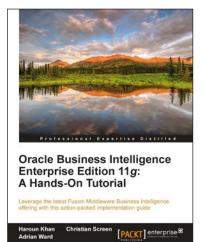
Paperback: 184 pages

A fast track guide to uncovering the analytical power of Oracle Business Intelligence Analytic SQL, Oracle Discoverer, Oracle Reports, and Oracle Warehouse Builder

- 1. Install, configure, and deploy the components included in Oracle Business Intelligence Suite (SE)
- 2. Gain a comprehensive overview of components and features of the Oracle Business Intelligence package

Please check www.PacktPub.com for information on our titles





#### Oracle Business Intelligence Enterprise Edition 11g: A Hands-On Tutorial

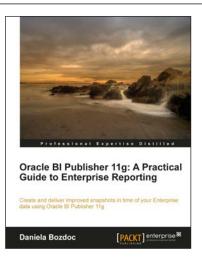
ISBN: 978-1-84968-566-5

ISBN: 978-1-84968-318-0

Paperback: 620 pages

Leverage the latest Fusion Middleware Business Intelligence offering with this action-packed implementation guide

- 1. Get to grips with the OBIEE 11g suite for analyzing and reporting on your business data
- 2. Immerse yourself in BI upgrading techniques, using Agents and the Action Framework and much more in this book and e-book
- 3. A practical, from the coalface tutorial, bursting with step by step instructions and real world case studies to help you implement the suite's powerful analytic capabilities



## Oracle BI Publisher 11g: A Practical Guide to Enterprise Reporting

Paperback: 254 pages

Create and deliver improved snapshots in time of your Enterprise data using Oracle BI Publisher 11g

- 1. A practical tutorial for improving your Enterprise reporting skills with Oracle BI Publisher 11g
- 2. Master report migration, template design, and E-Business Suite integration
- 3. A practical guide brimming with tips about all the new features of the 11g release

Please check www.PacktPub.com for information on our titles