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by Chris Ruel and Michael Wessler



Oracle® 12c For Dummies®

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Oracle 12c For Dummies®

Visit www.dummies.com/cheatsheet/oracle12 to view this book's cheat sheet.

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Introduction

Welcome to the exciting world of Oracle 12c database administration! Few things are as exciting as starting a new journey, and you certainly have a thrilling ride ahead of you. Luckily, the authors of this book, your guides in this adventure, can help smooth out any bumps in the road and point out the things you want to see. With decades of combined Oracle experience managing hundreds of databases for many clients, we hope to make understanding the Oracle database a fun, enlightening experience.

Oracle is a large company with a diverse portfolio of software and hardware. It seems like every other week Oracle releases some new product or acquires another company. Don't let the overwhelming nature of the big picture discourage you. This book imparts the fundamental knowledge of database administration. An Oracle career is a constant learning process. Establishing a solid understanding of the building blocks behind the database engine will vault you into a successful Oracle career.

The foundation of almost all of Oracle's products is the database, and Oracle databases are the best in the world. Understanding how Oracle databases work and how to manage them successfully is the first step to opening an awful lot of doors. Starting at this level is key. After reading this book, you will be well on your way to an interesting career filled with challenges and plenty of opportunity.

Every year we see companies grow and accumulate data at a staggering rate, and that rate is accelerating. Relational database theory first came out in the early

1970s, and database design and technology continue to evolve and become more powerful every year. Oracle is at the forefront of this evolution, and the knowledge of Oracle 12c that you gain from this book puts you in the driver's seat for your database career. Hop into your high-performance Oracle ride for an exciting journey!

About This Book

Oracle 12c For Dummies focuses on the tenets of Oracle database administration in the Oracle 12c environment. Not only do we cover many of the features released with the 12c version of the database, but we also explain the fundamental building blocks database administration. Many of these concepts and techniques apply to past versions of Oracle and almost certainly to future releases. Our goal is to make you a *smarter* and more *functional* DBA by explaining Oracle technology from the perspective of folks who manage Oracle software for a living.



Sometimes we refer to directories and file locations on both Linux/UNIX and Windows. Essentially the two can be interchanged with a couple of things in mind. For example, here is an ORACLE_BASE value that you might come across on Linux/UNIX:

```
$ORACLE_BASE: /u01/app/oracle
```

In Windows, /u01 is much like a drive letter. They call it a *mount point* in Linux/UNIX.

Also, variables in Linux/UNIX are frequently prefixed with a dollar sign. Furthermore, the slashes are in opposite directions for each operating system. On

Linux/UNIX, you use a *forward slash*, /. In Windows, you use a *back slash*, \. Lastly, Windows encapsulates the variable in percent signs. The same previous setting might look like this in Windows:

```
%ORACLE_BASE%: C:\app\oracle
```

We give examples of both environments throughout this book.

Who Are You?

People who find themselves needing or wanting a skill set for Oracle databases come from all backgrounds. You might be an application developer, a system administrator, or even a complete newbie. Many of the folks that we come across in this industry became a *database administrator* (DBA) by accident. One day, your company finds itself without a DBA, and the next thing you know, that's you! One trick is to be ready. Above all else, learn on your own and *think* rather than just react.

Icons in This Book

You see these icons throughout this book. They're a heads-up for different situations. These are items we wished someone told us when we were learning Oracle.



Warnings, if not heeded, will cause you to lose data or maybe even your job.



Remembering these bits of information can help you in the long run. And even the short run. Even on a brief walk.



Tips can save you time, energy, resources, or your weekend. We realize all these items are in short supply.



Technical Stuff icons indicate things we think are interesting and want to share with you, but you can skip them if you'd rather get straight to the nitty-gritty.

Beyond the Book

We've provided additional information about Oracle online to help you on your way:

✓ **Cheat Sheet:** Check out

www.dummies.com/cheatsheet/oracle12c to grab some handy reminders for syntax and commands you'll use on a regular basis. We also include some tips for items to monitor to ensure you don't get caught by surprise.

✓ **Online articles:** On several of the pages that open each of this book's parts, you'll find links to what the folks at *For Dummies* call Web Extras, which expand on some concept we've discussed in that particular section. You'll find them at

www.dummies.com/extras/oracle12c. There we've provided information to help you upgrade databases with the Database Upgrade Assistant (DBUA), gather database statistics to improve performance, and use Automatic Storage Management (ASM).

Where to Go from Here

Dive in and get started! Keep an open mind and try not to get overwhelmed. Like any skilled profession, it isn't always easy, but you can do it. We think you'll find it rewarding. This book is written so you can avoid the "too-much-information" reaction. Look at each section as a piece of a big puzzle, and you will soon see how everything starts to take shape. And remember to have fun!

Part I
**Getting Started with
Oracle 12c**



For Dummies can help you get started with lots of subjects. Visit www.dummies.com for more great content online.

In this part . . .

- ✓ New to databases? New to Oracle? Find out how databases and Oracle fit into the modern IT infrastructure in [Chapter 1](#).
- ✓ A solid foundation is the best way to start any project. [Chapter 2](#) helps you understand the architecture behind the Oracle software, which goes a long way toward helping you be a successful database administrator.
- ✓ [Chapter 3](#) shows you how an Oracle database fits in a typical IT application environment. You also find out about the requirements you need to meet before installing Oracle database.

Chapter 1

Discovering Databases and Oracle 12c

In This Chapter

- ▶ Defining databases
 - ▶ Getting to know Oracle databases
 - ▶ Identifying when using Oracle 12c is appropriate
 - ▶ Understanding database administration
-

Welcome to the exciting world of databases, specifically Oracle 12c. Oracle is a recognized hardware and software giant on par with Microsoft in terms of size and influence. Oracle Corporation made its reputation and initial wealth with database technology and is still a recognized leader in databases. Many information technology (IT) professionals would agree Oracle databases provide the most advanced and capable means of storing, accessing, and managing data in the world today. As you read this book, you find out why many professionals hold that belief.

In this chapter, we explain what databases are, how they work, and why they're a core component of any computer system. Next, we introduce Oracle databases and guide you on when to use Oracle 12c. Finally, we examine database administration and what a database administrator's (DBA) role entails.

Discovering Databases

Since the earliest days of *information technology* (that's data processing for you old-timers), data has been at the heart of everything computers do. Users input data; and programs process, analyze, and perform calculations on the data. Then data output occurs. Notice a common theme? Everything relates to data! As technology increasingly becomes a part of daily life, you can expect almost every aspect of your life to have a data element associated with it.

Data comes from different sources in various formats. Every year, new types of data are created as technology evolves. Consider this partial list of data sources:

- ✓ Order information from your favorite online shopping application
- ✓ Trouble ticket information entered into a computer by a person in a call center
- ✓ Financial data including calculations for interest, taxes, and investments generated by banks and investment companies
- ✓ Multidimensional scans captured by complex medical imaging equipment
- ✓ Inventory data captured by tracking products by their RFID tags and point of sale information
- ✓ Images, videos, and audio files uploaded to social media and video sharing websites

The amount of data in the world is growing at an explosive rate. Consider the number of online sales transactions every day in addition to the Twitter tweets and Facebook posts from smartphones. Additionally, almost every retail sale is tied to an automated sales tracking and inventory control system. Almost anything

you do that involves interaction, communication, or commerce generates data.

The size and number of data elements created are also increasing as technology evolves. Pictures, sound files, and videos take far more space on computer disk storage than simple text data (letters and numbers). Scientific and medical devices, such as satellite images and MRI scans, are common examples of how large data is generated rapidly and are part of peoples' lives.

Defining a database

All this data needs to reside somewhere; specifically, within a *database*. Databases are complex software programs that catalog and provide access to data. Although the data is usually stored on a disk storage system, the database software manages how that data is stored and managed.

Businesses use databases to store their data because the size and complexity of their data often exceed what can be stored on a spreadsheet. Most business and scientific activities, and many social activities involving technology will require the creation, access, updating, or deleting of data at some level. It is database software that allows these activities occur in a fast, efficient manner.

Databases provide these primary functions:

- ✓ **Storage:** Data must be kept within a computer system, usually disk storage, so that the data is available when needed. Disk storage technologies can vary, but they must be fast and large and are often expensive and complex.
- ✓ **Organization:** Data must be stored in a logical manner on disk so it can be found quickly and efficiently. Compare an organized desk and file cabinet

with a child's messy bedroom; where would you prefer to work?

- ✓ **Access:** Finding the requested data in a fast and efficient manner and returning that data to the requestor is a key function of databases.
- ✓ **Security:** A database determines who can access the data and what they can do with that data. Security must be established and enforced.
- ✓ **Adding, updating, and deleting:** After data is added to the database, it can be modified and deleted. The database software manages the complex rules for how data is manipulated.
- ✓ **Safekeeping:** Databases keep data safe and available when failures occur such as a disk drive crashing. Backup and recovery are the processes used by databases to ensure data is not permanently lost if there is a failure.

Here's the general process:

1. You open the database and enter your data.
2. The database determines how best to store and catalog that data in a secure manner on the computer system's disk storage.
3. When you (or a computer application) want to access, update, or delete that data, the database checks your security permissions and then implements your request in the fastest manner based on the rules that have been defined.



Databases can look more like full operating systems (OSs) than simple applications you start and stop. Advanced databases (such as Oracle) have users, detailed security privileges, network configuration settings, performance tuning for memory, CPU, and disk options, and robust backup and disaster recovery (DR) options.

Examining how databases work

Databases have evolved over the years but have stabilized into the *relational model*. A relational database management system (RDBMS) stores data in logical structures called *tables*. A table is a logical container of similar data. A *table definition* is the set of rules or characteristics for each row of data stored in table. When data is loaded into a database, it is loaded as rows within one or more tables based on the characteristics of the data.

Each row of unique data exists only once in a table. For example, there will only be one row of data for each individual customer in a table. Each row is identified by its *primary key*, which is a unique identifier for that specific row. This uniqueness is a fundamental component of the relational aspect of databases. In [Figure 1-1](#), each customer exists as a single row in the CUSTOMER table as identified by its unique primary key (CUST_ID) and is defined by *columns* specific to that table.

Tables are joined together by connecting the primary key of one table to a related table where it is defined as a *foreign key*. You implement relationships between tables by joining a row of one table to one or more rows in another table. (Remember: This is a relational database).