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Oracle GoldenGate 11g Handbook

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This book is dedicated to my wife Carrie, and my five kids: Felicia, Sarah, Jared, Jacob, and Elizabeth. Also to my newly expected little girl whom we suspect we will call Amelia, and Bennett, our fun little goldendoodle. I'm also thankful to my father who has always inspired me, and even though I might not always be good at showing it, I'm thankful to God for the good life he's given me.

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It was my intent when I started this project so long ago that this would be THE guide to Oracle GoldenGate. I wanted it to be more than just an introduction; I wanted it to be a book that you referenced all the time, with pages marked and dog-eared and worn from use. I want all my books to be that way. Even though this book has been a challenge, I believe you will find that the contents within do, in the end, meet my initial objective: This is THE guide to Oracle GoldenGate.

As such, there are many people to acknowledge, or this book would never have been written and would not be the book it is. A book this comprehensive and aggressive requires a lot of help. I've had help from so many people. So, special thanks go to the following. First, thanks most of all to the additional contributors to this work. This is a long list that includes (alphabetically): Mack Bell, Scott Black, Dennis Heisler, Venkatesh Kalipi, Paul Longhurst, Gene Patton, Amardeep Sidhu, and Eric Yen. All of these folks provided content for some portion of this book in varying amounts. If you read something you like, then they probably had some part in it. If you read something you don't like, I am probably the one who wrote that part.

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of credit and probably thinks she is a book widow already (especially since I'm starting my next book on the heels of this one). Bennett, my new friend (a little white-haired goldendoodle) also deserves thanks. He's a friendly two-year-old jumping furry ball of fun.

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In writing these acknowledgments, I hope I didn't leave anyone out. I don't believe I have, but I apologize if I've missed anyone and I hope you will forgive me.

Introduction

When I think about databases, sharing data, and really analyzing enterprise data, I sometimes think of the *Rime of the Ancient Mariner* by Samuel Taylor Coleridge. I had to learn parts of this poem in junior high (which was no small feat for my little brain). As I thought about what to write in this introduction, the first part of the *Rime* came to me. I include it here, for it seems to apply to the dilemma of data, data sharing, and the question of distributed data. The first part of the *Rime* goes like this:

> "Day after day, day after day,
> We stuck, nor breath nor motion;
> As idle as a painted ship
> Upon a painted ocean.
>
> Water, water, every where,
> And all the boards did shrink;
> Water, water, every where,
> Nor any drop to drink."

The water to me can also represent our oceans of data, and it's everywhere. Enterprises are adrift in data, stuck in it as the hours progress. Data in different places, different platforms... data that can't truly be drunk because so often it sits inaccessible in the middle of an ocean (or if you prefer, alone on its own island) and because of its sheer volume. Day after day the data collects, and yet, we could do more with it if we were just free of the constraints that confine that data.

These constraints include physical constraints such as different database vendors with their various impedances, silos (or islands if you prefer) of data, the sheer volume

of data, and distances between various data centers. Logical constraints exist, too. These include differences in how data is logically stored (such as in tables), what the data actually means (for example, in one system the volume of some item might be defined using liters, and the definition of the volume in another system might be in gallons).

There are other problems to solve, real-time data processing and data warehousing, high availability, and disaster recovery. Data swirls around all of these problems. Indeed, as with the mariner, these problems become the albatross hung around our neck, weighing us down. Often this albatross is of our own doing, a result of not thinking and planning ahead. How do we remove this albatross from our necks? How do we stop the grinding death that confronts us as data continues to grow, and how do we figure out how to make the best use of our data? Maybe we can avoid the fate of the mariner—maybe we can find a solution to solve that problem we have created for ourselves and avoid wandering the earth telling our story.

It is our hope that this book will help you in your effort to remove the albatross from around your neck. This book is about a product called Oracle GoldenGate. Oracle GoldenGate can be a very comprehensive solution to the data problems that today's enterprises face. Oracle GoldenGate offers us the ability to collect our islands of data from the still waters and pool them into places where that data can be of even greater use and effect.

With Oracle GoldenGate, you can move data between Oracle and other databases such as DB2 or Microsoft SQL Server. You can create combined data sources (that is, operational data stores), which allow you to store, aggregate, and analyze data in different ways. By bringing all this diverse data together and discovering relationships that were previously obscured, you can develop powerful solutions.

As you will see in this book, Oracle GoldenGate is about more than just moving data between disparate data sources. Oracle GoldenGate provides high availability solutions to protect your data. These solutions also make upgrades and migrations of your database software much easier. With Oracle GoldenGate's features, you can perform near zero-downtime migrations and upgrades (any downtime is dependent on the time it takes to switch your application over to another database).

In this book, you will find a wealth of information on Oracle GoldenGate, and we hope you will find it helps you to make better use of your data, and improve your uptime. You will find a good foundational introduction to Oracle GoldenGate in the first chapter. As we progress, we will lead you through using Oracle GoldenGate step by step, from installing and configuring the product, to configuring various forms of Oracle GoldenGate replication.

Toward the middle of the book, after you have learned how to really use Oracle GoldenGate in an Oracle environment, we will cover setting up and using Oracle GoldenGate in a variety of non-Oracle environments including Oracle MySQL and Microsoft SQL Server. These chapters demonstrate one of the more powerful features of Oracle GoldenGate, its heterogeneous nature.

In the later chapters we will cover topics such as performance tuning, troubleshooting, and monitoring of Oracle GoldenGate. We will also cover various GoldenGate utilities such as the GoldenGate Monitor, Veridata. Finally, we will discuss using Oracle GoldenGate for zero-downtime operations, other GoldenGate integration options (like reading flat files and writing out SQL*Loader compatible files), and then, last but not least, we provide a chapter that highlights the newest features released in Oracle GoldenGate Version 11.2.

Intended Audience

This book is suitable for the following readers:

- DBAs who need to replicate data across Oracle databases.
- DBAs who need to replicate data across heterogeneous database environments.
- DBAs and architects who need to replicate large volumes of data, between various databases, in a widely distributed environment.
- DBAs and architects who need to replicate data over large distances in a very efficient manner.
- Database architects who need to share data across real-time OLTP databases.
- Data warehouse architects who need to design low-latency replicated operational data repositories and stores.

This book is not for the Oracle Database beginner, though it is for the Oracle GoldenGate beginner. To get the most out of this book, you will need a basic understanding of how the Oracle Database software works. You will need to understand how to create basic SQL statements and how to navigate Oracle schemas and create schema objects. With these basic administration skills, you should be able to navigate this book easily.

I hope you enjoy this book and that it helps you in your efforts to improve your enterprise database architecture.