

THIRD EDITION

DATA WAREHOUSING

Concepts, Techniques,
Products and Applications



C.S.R. Prabhu

DATA WAREHOUSING

Concepts, Techniques, Products and Applications

DATA WAREHOUSING

*Concepts, Techniques, Products
and Applications*

THIRD EDITION

C.S.R. PRABHU

*Deputy Director General
National Informatics Centre
Hyderabad*

PHI Learning Private Limited

New Delhi - 110001

2008

DATA WAREHOUSING—Concepts, Techniques, Products and Applications, 3rd ed.
C.S.R. Prabhu

© 2008 by PHI Learning Private Limited, Delhi. All rights reserved. No part of this book may be reproduced in any form, by mimeograph or any other means, without permission in writing from the publisher.

ISBN-978-81-203-3627-8

The export rights of this book are vested solely with the publisher.

Fifteenth Printing (Third Edition) ... January, 2015

Published by Asoke K. Ghosh, PHI Learning Private Limited, Rimjhim House, 111, Patparganj Industrial Estate, Delhi-110092 and Printed by Rajkamal Electric Press, Plot No. 2, Phase IV, HSIDC, Kundli-131028, Sonapat, Haryana.

Contents

<i>Preface</i>	<i>ix</i>
<i>Acknowledgements</i>	<i>xi</i>
1. DATA WAREHOUSING: AN INTRODUCTION	1–7
1.1 Characteristics of a Data Warehouse	1
1.2 Data Marts	1
1.2.1 Types of Data Marts	2
1.2.2 Loading a Data Mart	3
1.2.3 Metadata for a Data Mart	3
1.2.4 Data Model for a Data Mart	4
1.2.5 Maintenance of a Data Mart	4
1.2.6 Nature of Data in a Data Mart	4
1.2.7 Software Components for a Data Mart	4
1.2.8 Tables in the Data Mart	5
1.3 Other Aspects of Data Mart	5
1.3.1 External Data	5
1.3.2 Reference Data	5
1.3.3 Performance Issues	6
1.3.4 Monitoring Requirements for a Data Mart	6
1.3.5 Security in a Data Mart	6
<i>Conclusion</i>	7
2. ONLINE ANALYTICAL PROCESSING	8–29
2.1 Introduction	8
2.2 OLTP and OLAP Systems	9
2.3 Data Modelling—Star Schema for Multidimensional View	10
2.4 Data Modelling—Multifact Star Schema or Snow Flake Schema	13
2.5 OLAP Tools	13
2.5.1 Categories of OLAP Tools	13
2.5.2 Managed Query Environment (MQE)	16
2.6 State of the Market	17
2.6.1 Overview of the State of the International Market	17
2.6.2 Cognos PowerPlay	18
2.6.3 IBI Focus Fusion	20
2.6.4 Pilot Software	22

2.6.5	Arbor Essbase Web	23
2.6.6	Information Advantage Web OLAP	24
2.6.7	Microstrategy DSS Web	24
2.6.8	Brio Technology	24
2.7	OLAP Tools and the Internet	25
2.8	OLAP Tools in the Open Source Domain	27
2.8.1	Pentaho	27
	<i>Conclusion</i>	28
3.	DATA MINING	30–40
3.1	Introduction	30
3.2	From Data Warehousing to Data Mining	30
3.3	Steps of Data Mining	31
3.4	Data Mining Algorithms	35
3.4.1	Database Segmentation	35
3.4.2	Predictive Modelling	36
3.4.3	Link Analysis	37
3.5	Tools for Data Mining	38
	<i>Conclusion</i>	40
4.	DEVELOPING A DATA WAREHOUSE	41–52
4.1	Why and How to Build a Data Warehouse?	41
4.2	Data Warehouse Architectural Strategies and Organizational Issues	42
4.3	Design Considerations	42
4.4	Data Content	43
4.5	Metadata	44
4.6	Distribution of Data	44
4.7	Tools for Data Warehousing	44
4.8	Performance Considerations	45
4.9	Crucial Decisions in Designing a Data Warehouse	46
4.9.1	Various Technological Considerations	47
	<i>Conclusion</i>	52
5.	APPLICATIONS OF DATA WAREHOUSING AND DATA MINING IN GOVERNMENT	53–57
5.1	Introduction	53
5.2	National Data Warehouses	53
5.2.1	Census Data	53
5.2.2	Prices of Essential Commodities	54
5.3	Other Areas for Data Warehousing and Data Mining	54
	<i>Conclusion</i>	57
	CASE STUDIES	59–159
Case Study 1	Data Warehousing in the Tamil Nadu Government	61
Case Study 2	Data Warehouse for the Ministry of Commerce	75
Case Study 3	Data Warehouse for the Government of Andhra Pradesh	96
Case Study 4	Data Warehousing in Hewlett-Packard	117
Case Study 5	Data Warehousing in Levi Strauss	121

Case Study 6	Data Warehousing in the World Bank	140
Case Study 7	HARBOR, A Highly Available Data Warehouse	142
Case Study 8	A Typical Business Data Warehouse for a Trading Company	146
Case Study 9	Customer Data Warehouse of the World's First and Largest Online Bank in the United Kingdom	153
Case Study 10	A German Supermarket EDEKA's Data Warehouse	157
<i>Bibliography</i>		<i>161–167</i>
<i>Index</i>		<i>169–171</i>

Preface

Data Warehousing, Online Analytical Processing (OLAP) and Data Mining represent some of the latest trends in computing environment and information technology applications to large-scale processing and analysis of data.

Data warehouses along with OLAP tools are being increasingly developed to analyse historical or time-series data to identify past patterns or trends which may be useful in forecasting the future. In addition, the unknown associations and relationships of data items in data-intensive areas can be found out by using various data mining techniques, resulting in knowledge discovery in the data.

This book clearly describes data warehousing concepts at an introductory level. The currently available software tools used for design and development of data warehouses are compared and contrasted. For readers interested in developing data warehouses for their organizations, the text offers practical guidelines that can help architect data warehouses. For applications in government sectors such as agriculture, rural development, finance and commerce, the book identifies the broad directions and enumerates the steps involved in developing data warehouses for decision support purposes. The real data warehouse implementations already performed successfully in government sectors are presented as Case Studies.

The book in the present third edition (after a successful second edition) is organized into five chapters with some of the chapters enhanced and enriched. Chapter 1 highlights the fundamental concepts of data warehousing and data marts, besides covering issues related to creation, maintenance and refreshing of data marts. Chapter 2 analyses the design methodology of OLAP tools and how they differ from online transaction processing (OLTP), star schema, snow flake schema and also gives an overview of various currently available OLAP tools. With open source platforms becoming popular, open source data warehousing and OLAP tools (such as Pentaho) have been added in this chapter. Chapter 3 elucidates with suitable examples the concepts and techniques used in data mining. In addition, in Chapters 2 and 3 some highlights of open source OLAP and data mining tools are also added. In Chapter 4 the practical approaches to selection of hardware, software, communication and data management systems

for building real data warehouses are discussed. Chapter 5 enumerates the potential applications of data warehousing and data mining in various government sectors.

The case studies of data warehouse implementations for the Tamil Nadu and Andhra Pradesh governments and Export Processing Zones (EPZs) presented in this book offer detailed insights into practical knowledge required for such projects. The case studies of data warehousing in World Bank, Hewlett-Packard and Levi Strauss indicate the efforts made in banking and business sectors in data warehouse implementation. In this edition four new case studies have been added of which three relate to banking and retail sectors. The fourth one is on a highly available data warehouse.

The book aims at software professionals and database practitioners who are interested in developing an understanding of concepts and techniques of data warehousing. Engineering students pursuing M.Tech courses in computer science and those studying computer applications (MCA) will also immensely benefit from this single point coverage of the basics and practical guidelines to building data warehouses.

The book endeavours to provide sound and practical inputs to understand, plan and build data warehouse applications. It is hoped that this text will serve the needs of students and teachers for introductory courses in data warehousing. Any suggestions for improvements to the text will be gratefully acknowledged.

C.S.R. Prabhu

Acknowledgements

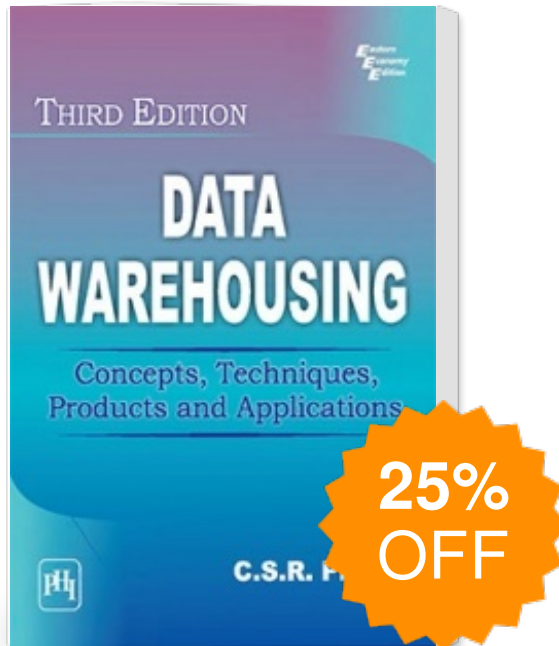
I am deeply indebted to the Director General, National Informatics Centre (NIC), New Delhi, for giving me the permission to write this book. I thank Microsoft (India) for permitting me to cover case studies on Hewlett-Packard data warehouse and World Bank data warehouse. I wish to thank and acknowledge McGraw-Hill for permission to use a few diagrams and some product descriptions from their book *Data Warehousing, Data Mining and OLAP*. I also sincerely thank and acknowledge the authors of the Web site in public domain on the data warehousing in Levi Strauss built by ArsDigita Corporation.

Numerous companies have also permitted me to cover their product descriptions. I am grateful to all of them. I thank Mr. V.S. Raghunathan of NIC, Chennai, for the case study report on Export Processing Zones (EPZs). I thank Mr. B.M. Rao, Mr. Guruprasad and Mr. D. Laxminarayana of NIC, Hyderabad for assistance in preparing case studies on A.P. Government Data Warehouses. I also thank Mrs. Annapurna, Mr. Shravan Veer and Mrs. Ratna Sudhakar of NIC, Hyderabad in preparing the manuscript.

Finally, I thank my Publishers, Prentice-Hall of India, for the careful processing of the manuscript both at the editorial and production stages.

C.S.R. Prabhu

Data Warehousing : Concepts, Techniques, Products And Applications



Publisher : PHI Learning

ISBN : 9788120336278

Author : C S R Prabhu

Type the URL : <http://www.kopykitab.com/product/7772>



Get this eBook