

Fundamentals of Cost Accounting

3e

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FUNDAMENTALS OF COST ACCOUNTING

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Dedication

To my wife, Donna, and my children, Cathy and Tom, for encouragement, support, patience, and general good cheer throughout the years.

Bill

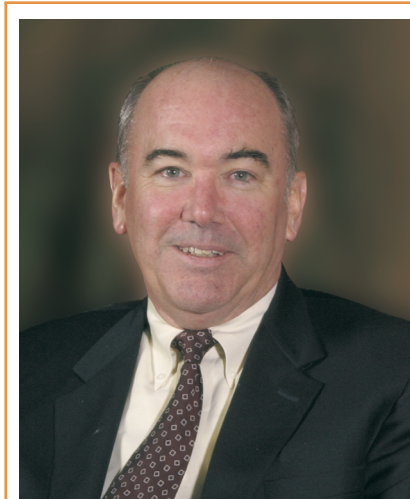
I dedicate this book to my husband Randy, my children Evan and David, and my parents, Max and Nina Weems. Your support and example motivate me to improve. Your love and God's grace assure me that it isn't necessary.

Shannon

I dedicate this book to my children, Krista and Andrea, and to my extended family, friends, and colleagues, who have provided their support and wisdom over the years.

Michael

About the Authors



William N. Lanen

William Lanen is Professor of Accounting at the **University of Michigan Business School**. He holds degrees in economics from the **University of California, Berkeley**, and **Purdue University** and earned a PhD in accounting from the **Wharton School of the University of Pennsylvania**.

Bill teaches management accounting in both the BBA and MBA programs at the University of Michigan. He also teaches management accounting in Global MBA Programs and Executive Education Programs in Asia, Europe, and Latin America. Before coming to the University of Michigan, Bill was on the faculty at the Wharton School of the University of Pennsylvania, where he taught various financial and managerial accounting courses at the undergraduate, MBA, and Executive MBA levels. He has received teaching awards at both the University of Michigan and the Wharton School.

Bill is an Associate Editor of *Management Science* and serves on the Editorial Boards of *The Accounting Review* and the *Journal of Management Accounting Research*. He has published in *Journal of Accounting Research*; *Journal of Accounting and Economics*; *Accounting, Organizations and Society*; and *The Accounting Review*. Bill is past-president of the Management Accounting Section of the American Accounting Association.



Shannon W. Anderson

Shannon Anderson is an Associate Professor of Management at the **Jones Graduate School of Business at Rice University** and a Principle Fellow at the **University of Melbourne**. She previously taught at the **University of Michigan** and worked as an engineer at General Motors Corporation. She received a doctorate and master's degree in business economics at **Harvard University** and a BSE in civil engineering with a concentration in operations research at **Princeton University**.

Shannon's research, which focuses on the design and implementation of performance measurement and cost control systems, spans the fields of management accounting and operations research. Her research on activity-based costing won the 2006 American Accounting Association's Notable Contribution Award and the 2003 AAA Management Accounting Section's Notable Contribution to the Literature Award. She and Bill won the 2006 AAA Management Accounting Section's Notable Contribution to the Literature Award for their study of the performance impact of electronic data interchange (EDI) systems.

Shannon currently serves as an Editor of the *Accounting Review* and on the Editorial Boards of *Accounting, Organizations and Society*; *Production and Operations Management*; and *Management Accounting Research*. She has also served on numerous committees for the American Accounting Association and the Management Accounting Section of the American Accounting Association. Her research, which has been funded in part by competitive grants from the AICPA, the Institute of Internal Auditors, and the Institute of Management Accountants, has been published by the *Accounting Review*, *Accounting Organizations and Society*, *Production and Operations Management*, *Management Science*, and the *Journal of Management Accounting Research*. She is also coauthor of the award-winning book, *Implementing Management Innovations*.



Michael W. Maher

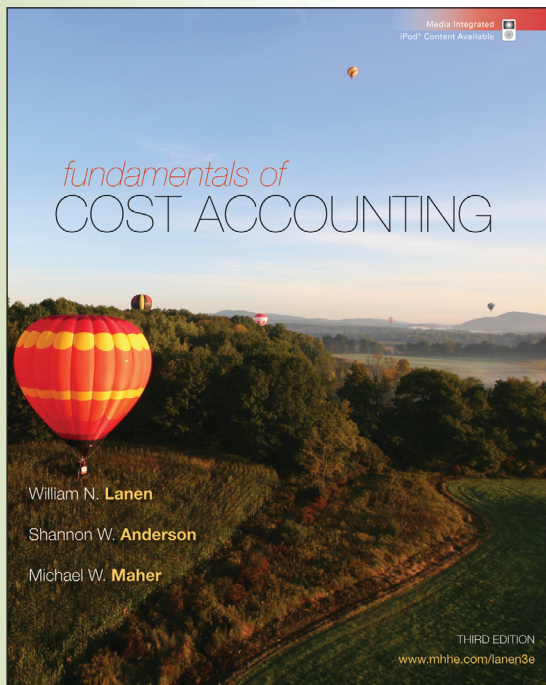
Michael Maher is a Professor of Management at the **University of California-Davis**. He previously taught at the **University of Michigan**, the **University of Chicago**, and the **University of Washington**. He also worked on the audit staff at Arthur Andersen & Company and was a self-employed financial consultant for small businesses. He received his BBA from **Gonzaga University**, which named him Distinguished Alumnus in 1989, and his MBA and PhD from the **University of Washington**, and he earned the CPA from the state of Washington.

Michael is a past-president of the Management Accounting Section of the American Accounting Association and has served on the editorial boards of *The Accounting Review*, *Accounting Horizons*, *Journal of Management Accounting Research*, and *Management Accounting*. He is coauthor of two leading textbooks, *Principles of Accounting* and *Managerial Accounting*. Maher has coauthored several additional books and monographs, including *Internal Controls in U.S. Corporations* and *Management Incentive Compensation Plans*, and published articles in many journals, including *Management Accounting*, *The Journal of Accountancy*, *The Accounting Review*, *Journal of Accounting Research*, *Financial Executive*, and *The Wall Street Journal*.

For his research on internal controls, Michael was awarded the American Accounting Association's Competitive Manuscript Award and the AICPA Notable Contribution to Literature Award. He also received the award for the Outstanding Tax Manuscript. He received the Annual Outstanding Teacher Award three times from his students at the **University of California's Graduate School of Management** and has twice received a special award for outstanding service. Maher's current research includes studies in health care costs and corporate corruption.

Providing A Clear View

For a student, taking a cost accounting course can be like finding oneself in tall grass: surrounded by dense concepts and far from the path to mastery. *Fundamentals of Cost Accounting* gives students a clear view by lifting them above the overgrowth. By focusing on the fundamental concepts that students will need and employing a conversational writing style that keeps them engaged throughout the course, *Fundamentals* focuses students on comprehension rather than memorization and provides a context for their learning. The material is presented from both a preparer and a user perspective, allowing instructors to provide both accounting majors and nonmajors with an effective and relevant understanding of cost accounting topics. In this third edition, the text continues to provide the following core features:



Well written, clear and concise. . . . Gives students the basics but eliminates a lot of the in-depth material that tends to confuse students and have them lose sight of the important concepts. The Critical Analysis and discussion questions at the end of the chapter are excellent discussion points for either in-class discussion or written take-home problems.

Michael Fedoryshyn
St. John Fisher College

Readability

Fundamentals of Cost Accounting continues to be praised as one of the most readable texts on the market. Lanen, Anderson, and Maher employ a conversational writing style that students can understand, making concepts and topics more accessible. Throughout the text, exhibits and illustrations provide visuals to further assist students in understanding how complex topics fit together in a logical way.

Conciseness

Short, readable chapters that focus on core cost accounting concepts give Lanen, Anderson, and Maher a leg up on the competition. While other texts tend to tack on topics and fit concepts into chapters in seemingly arbitrary ways, *Fundamentals of Cost Accounting* presents basic topics in a coherent sequence, helping students to see the integration of the concepts quickly and easily.

Relevance

Each chapter of *Fundamentals of Cost Accounting* opens with a real dilemma faced by a manager in a variety of service and manufacturing companies. The **Debrief** feature links the topics in the chapter to the decision dilemma faced by the manager in the opening vignette. **In Action** boxes in the text highlight related issues reported in the business press and the authors' own experiences with companies where they have worked or conducted research.

NEW to this edition, the authors have tied the chapter opening vignette to an *In Action* box to demonstrate the relevance of cost accounting to the real world.

... an excellent text for instructors who are looking for a cost accounting text to follow a financial accounting text. It provides coverage of traditional methods & techniques and has great explanations of measurement and interpretation issues.

Roy Regel
University of Montana—Missoula

... [A] great text that shows many different ways to view cost accounting—not just a number-crunching text.

Terry Elliott
Morehead State University

Step into the Real World

5

Chapter Five

Cost Estimation

LEARNING OBJECTIVES

After reading this chapter, you should be able to:

- L.O.1** Understand the reasons for estimating fixed and variable costs.
- L.O.2** Estimate costs using engineering estimates.
- L.O.3** Estimate costs using account analysis.
- L.O.4** Estimate costs using statistical analysis.
- L.O.5** Interpret the results of regression output.
- L.O.6** Identify potential problems with regression data.

I've read several books on cost analysis and worked through decision analysis problems in some of my college classes. Now that I own my own business, I realize that there was one important thing that I always took for granted in doing those problems. We were always given the data. Now I know that doing the analysis once you have the data is the easier part. How are the costs determined? How do I know if they are fixed or variable? I am trying to decide whether to open a new store and I need answers to these questions. I thought about the importance of being able to determine fixed and variable costs after reading an article about, of all things, the costs of text messaging [see the *In Action* item "The Variable Cost of a Text Message" on the next page]. The article talked about the low variable costs of sending text messages and the implications for pricing services. Although I am in a different industry, the basic principles still apply.

Charlene Cooper owns Charlene's Computer Care (3C), a network of computer service centers located throughout the South. Charlene is thinking about opening a new center and has asked you to help her make a decision. She especially wants your help estimating the costs to use in the analysis.

Why Estimate Costs?

When managers make decisions, they need to compare the costs (and benefits) among alternative actions. Therefore, managers need to estimate the costs associated with each alternative. We saw in Chapter 4 that good decisions require good information about costs; the better these estimates, the better the decision managers will make. In this chapter, we discuss how to estimate the cost data required for decision making. Cost estimates can be an important element in helping managers make decisions that add value to the company.

Chapter Opening Vignettes

Do your students sometimes wonder how the course connects with their future? Each chapter opens with a vignette where a decision-maker needs cost accounting information to make a better decision. This sets the stage for the rest of the chapter and encourages students to think of concepts in a business context.

The Debrief

After considering the cost estimates in Exhibit 5.8, Charlene commented:

This exercise has been very useful for me. First, I learned about different approaches to estimating the cost of a new center. More important, I learned about the advantages and disadvantages of each approach.

When I look at the numbers in Exhibit 5.8, I have confidence in my decision to open a new center.

Although there is a range in the estimates, all of the estimates are below my expected revenues. This means I am not going to spend more time on reconciling the cost estimates because I know that regardless of which estimate I think is best, my decision will be the same.

Debrief

Do your students understand how to apply the concepts in each chapter to become better decision makers? All chapters now end with a Debrief feature that links the topics in the chapter to the decision problem faced by the manager in the opening vignette.

In Action

Do your students need help connecting theory to application? The *In Action* examples are drawn from contemporary journals and the authors' own experiences and illustrate how to apply cost accounting methods and tools.

Cost-Volume-Profit Analysis and Airline Pricing

In Action

Cost-volume-profit analysis helps managers evaluate the impact of alternative product pricing strategies on profits. It can also be useful for evaluating competitors' pricing strategies and efforts to grow market share, as in the following examples:

Aloha Airlines CEO David Banmiller and C. Thomas Nulty, senior vice president for marketing and sales, explain that their airline must charge \$50 per seat to break even when planes are 62 percent full.

Hawaiian Airlines, Aloha Airlines and go! are each losing money when they sell interisland tickets below \$50, according to a study commissioned by Aloha Airlines.

"Why would somebody come in and charge \$19, and \$29, and \$39 when their costs were substantially higher? Why would somebody do it?" said Banmiller.

The Sabre study showed that when planes are 62 percent full, Aloha's costs are \$50 per seat, Hawaiian's are \$55, and go!'s are \$67.

However, managers at the parent company of go! (Mesa Airlines) disputed the estimates with a CVP analysis of their own:

Jonathan Ornstein, Mesa's chief executive officer, said yesterday that Aloha's cost estimates are way off when it comes to his airline. He said go!'s expenses per passenger are about \$40 when the planes are 80 percent full.

Note: Aloha Airlines is no longer in business.

Source: Rick Daysog, "Below-Cost Fares Puzzle Aloha Airlines CEO," *Honolulu Advertiser*, December 21, 2006.

Critical Analysis and Discussion Questions

- 13-7. "Preparing a budget is a waste of time. The strategic plan is what we work to accomplish." How would you respond to this comment?
- 13-8. In the *In Action* feature, "Using the Budget to Help Manage Cash Flow," smaller firms were more likely to find the budget "extremely or very important" than larger firms. Why might this be the case?
- 13-9. What are the advantages and disadvantages of starting the budgeting process early in the year versus later in the year prior to the budget year?
- 13-10. Would the budgeting plans for a company that uses a just-in-time (JIT) inventory system be different than those for a company that does not? Why?
- 13-11. Government agencies are limited in spending by budget categories, not just by an overall spending limit. What purpose does this serve? What problems does it create?
- 13-12. What is the difference between the planning and the control functions of the budget? What problems do these differences create?
- 13-13. When might the master budget start with a forecast of something other than sales, for example, production? Why?
- 13-14. In some organizations (firms, universities, government agencies), spending appears to increase as the end of the budgeting period approaches, even if there are no seasonal differences. What might cause this?
- 13-15. "Our cash budget shows a surplus for the quarter, so we do not have to think about arranging any bank financing." Comment on this statement.



Exercises

13-16. Estimate Sales Revenues

SVI is a large securities dealer. Last year, the company made 150,000 trades with an average commission of \$60. Because of the general economic climate, SVI expects trade volume to decline by 15 percent. In addition, employees at a local manufacturing plant have historically constituted 10 percent of SVI's volume. The plant just closed and all employees have closed their accounts.

Offsetting these factors is the observation that the average commission per trade is likely to increase by 15 percent because trades are expected to be larger in the coming year.

Required

Estimate SVI's commission revenues for the coming year.

(L.O. 3)



End-of-Chapter Material

Being able to assign end-of-chapter material with confidence is important. The authors have tested the end-of-chapter material over time to ensure quality and consistency with the chapter content.

Integrative Cases

Cases can generate classroom discussion or be the basis for good team projects. These integrative cases, which rely on cost accounting principles from previous chapters as well as the current chapter, ask students to apply the different techniques they have learned to a realistic situation.

Integrative Cases

8-49. Show Cost Flows: FIFO Method, Over- or Underapplied Overhead

(L.O. 5)

Vermont Company uses continuous processing to produce stuffed bears and FIFO process costing to account for its production costs. It uses FIFO because costs are quite unstable due to the volatile price of fine materials it uses in production. The bears are processed through one department. Overhead is applied on the basis of direct labor costs, and the application rate has not changed over the period covered by the problem. The Work-in-Process Inventory account showed the following balances at the start of the current period:

Direct materials	\$131,000
Direct labor	260,000
Overhead applied	325,000

These costs were related to 52,000 units that were in process at the start of the period.

What's New in the Third Edition?

Our primary goal in the third edition remains the same as in the previous two editions—to offer a cost accounting text that lets the student see the development of cost accounting tools and techniques as a natural response to decision making. We emphasize the intuition behind concepts and work to minimize the need to “memorize.” We believe that students who develop this intuition will, first, develop an appreciation of what cost accounting is about and, second, will have an easier time understanding new developments that arise during their careers. Each chapter clearly establishes learning objectives, highlights numerous real-world examples, and identifies where ethical issues arise and how to think about these issues. Each chapter includes at least one integrative case that illustrates the links among the topics.

We present the material from the perspective of both the preparer of information as well as those who will use the information. We do this so that both accounting majors and those students planning other careers will appreciate the issues in preparing and using the information. The opening vignettes now tie to one of the *In Action* features in the chapter to highlight the relevance of cost accounting to today's business problems. As in the second edition, all chapters end with a Debrief that links the topics in the chapter to the decision problem faced by the manager in the opening vignette.

The end-of-chapter material has increased by over 10 percent, and more than 50 percent of the material retained from the second edition has been revised. Throughout the revision process, we have retained the clear writing style that is frequently cited as a strength of the text.

Chapter 1 Cost Accounting: Information for Decision Making

- Enhanced development of the role of the value chain in value creation.
- Updated *In Action* items, including discussion of ethical issues.
- New material on lean accounting.
- New end-of-chapter material on the role of cost accounting in decision making.

Chapter 2 Cost Concepts and Behavior

- New *In Action* item discussing how the economic climate affects the decision about where to locate manufacturing sites.
- Two new critical analysis assignments.
- Five new exercises and problems.

Chapter 3 Fundamentals of Cost-Volume-Profit Analysis

- New *In Action* item illustrating CVP analysis in a service industry (airlines).
- New Integrative Case.
- Eight new exercises and problems.

Chapter 4 Fundamentals of Cost Analysis for Decision Making

- New *In Action* item on decision making in a small business.
- Two new Integrative Cases.
- Eight new questions, exercises, and problems in end-of-chapter material.

Chapter 5 Cost Estimation

- New *In Action* items involving text messaging and major league baseball.
- Revised discussion of using Microsoft Excel to estimate regression (updated for Office 2007).
- Revised questions, exercises, and problems in end-of-chapter material.

Chapter 6 Fundamentals of Product and Service Costing

- New Integrative Case.
- New and updated questions, exercises, and problems in end-of-chapter practice material.

Chapter 7 Job Costing

- New *In Action* items on cost allocation and government contracts, including ethical implications.
- New Integrative Case.
- Eight new questions, exercises, and problems in end-of-chapter material.

Chapter 8 Process Costing

- New *In Action* feature on equivalent units and fraud.
- New Integrative Case.
- Revisions of most exercises and problems.

Chapter 9 Activity-Based Costing

- Revised cost diagrams to provide consistent formatting.
- New *In Action* item illustrating the cost hierarchy in a service (airline) example.
- New Integrative Case.

Chapter 10 Fundamentals of Cost Management

- New *In Action* item on cost of customers based on social networking sites.
- Six new exercises, problems, and cases in end-of-chapter material.

Chapter 11 Service Department and Joint Cost Allocation

- New learning objective and discussion on using the reciprocal method for decision making.
- New *In Action* feature on outsourcing information services.
- Three new problems on decision making and cost allocations.

Chapter 12 Fundamentals of Management Control Systems

- New *In Action* item on compensation at AIG and Goldman Sachs.
- New material motivating this overview chapter.
- Three new questions, exercises, and problems.

Chapter 13 Planning and Budgeting

- New *In Action* item illustrating using the budget to control cash flow.
- Five new questions, exercises, and problems.

Chapter 14 Business Unit Performance Measurement

- Six new questions, exercises, and problems.

Chapter 15 Transfer Pricing

- Moved discussion of “Perfect Intermediate Markets with Quality Differences” to appendix to improve flow of material.
- New *In Action* item based on Weyerhaeuser.
- Five new questions, exercises, and problems.

Chapter 16 Fundamentals of Variance Analysis

- Six new questions, exercises, and problems.

Chapter 17 Additional Topics in Variance Analysis

- New introductory paragraph to link the example from Chapter 16 more clearly.
- Six new questions, exercises, and problems.

Chapter 18 Nonfinancial and Multiple Measures of Performance

- New *In Action* feature on the profitability of loyal customers.
- New discussion of productivity and measuring productivity.
- Six new questions, exercises, and problems.

Appendix Capital Investment Decisions: An Overview

- Revised questions, exercises, and problems.

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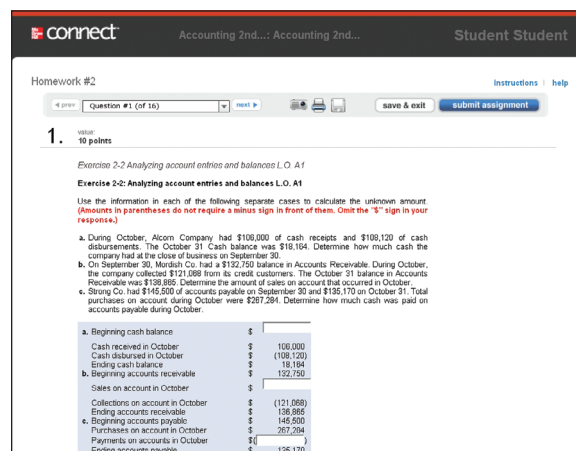
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Student study center.

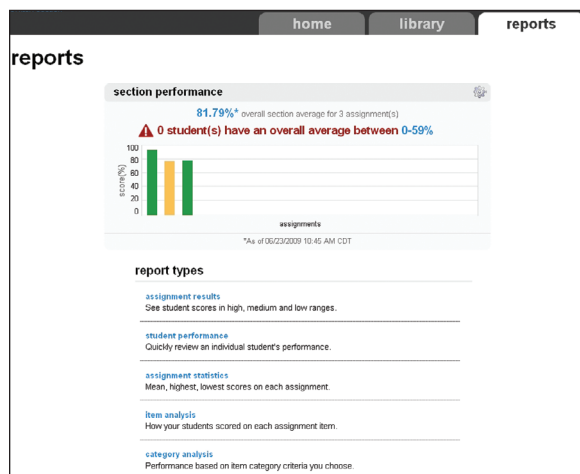
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Assurance of Learning Ready

Many educational institutions today are focused on the notion of *assurance of learning*, an important element of some accreditation standards. *Fundamentals of Cost Accounting* is designed specifically to support your assurance of learning initiatives with a simple, yet powerful solution.

Each test bank question for *Fundamentals of Cost Accounting* maps to a specific chapter learning outcome/objective listed in the text. You can use our test bank software, EZ Test and EZ Test Online, or in *Connect Accounting*, to easily query for learning outcomes/objectives that directly relate to the learning objectives for your course. You can then use the reporting features of EZ Test to aggregate student results in a similar fashion, making the collection and presentation of assurance of learning data simple and easy.

AACSB Statement

The McGraw-Hill Companies is a proud corporate member of AACSB International. Understanding the importance and value of AACSB accreditation, *Fundamentals of Cost Accounting*, 3e, recognizes the curricula guidelines detailed in the AACSB standards for business accreditation by connecting selected questions in the text and test bank to the six general knowledge and skill guidelines in the AACSB standards.

The statements contained in *Fundamentals of Cost Accounting*, 3e, are provided only as a guide for the users of this textbook. The AACSB leaves content coverage and assessment within the purview of individual schools, the mission of the school, and the faculty. While *Fundamentals of Cost Accounting*, 3e, and the teaching package make no claim of any specific AACSB qualification or evaluation, we have within *Fundamentals of Cost Accounting*, 3e, labeled selected questions according to the six general knowledge and skills areas.

Test Bank

Prepared by Jay Holmen, University of Wisconsin–Eau Claire

With an abundance of objective questions and short exercises, this is a valuable resource for instructors who prepare their own quizzes and examinations. Available on the Instructor's Resource CD-ROM and the password-protected side of the Online Learning Center.

Online Learning Center (OLC)

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Instructor's Resource Manual

Prepared by Chiabo Chang, Montclair State University

Each chapter and appendix includes:

- Chapter Learning Objectives
- Chapter Outline
- Comments and observations concerning the chapter content, methods of presentation, and usefulness of specific assignment material
- Many real-world examples not found in the text, including Internet assignments, sample assignment schedules, and suggestions for using each element of the supplement package

Available on the Instructor CD-ROM and the password-protected side of the Online Learning Center.

Solutions Manual

Prepared by William Lanen, University of Michigan

Solutions to all Discussion Questions, Exercises, Problems, Cases, and Comprehensive Problems. Available on the Instructor's Resource CD-ROM and the password-protected Instructor side of the Online Learning Center.

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PowerPoint Presentations

Prepared by Olga Quintana, University of Miami–Coral Gables

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