

Tableau Your Data!

Fast and Easy Visual Analysis
with Tableau Software®

Daniel G. Murray and
the InterWorks BI Team

WILEY

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*To my wife, Linda, and my children, Erin and Hannah, for
your understanding during the months I was "away" writing
at home. And to my parents, Mike and Joan, who instilled the
desire to learn.*

About the Author

Daniel G. Murray has over 30 years of professional experience. Dan has seen firsthand the technical revolution in data that led to the creation of Tableau Software. Prior to starting the InterWorks Tableau/BI practice in 2008, he held a variety of increasingly responsible roles in finance, accounting, sales, and operations for a mid-sized global manufacturing company serving the heavy industry and construction markets. During the late 1990s his employer acquired over 50 companies. Dan's role in 2006 as a CFO/CIO led to an assignment to integrate and create a global reporting environment. Uninspired by the high cost and complicated products available from traditional vendors, Dan discovered Tableau Software through data visualization expert Stephen Few. Less than one month after downloading a trial license of Tableau Software, Dan and his team were able to successfully create a reporting platform for less than 15 percent of the cost, and in 1/10th the time that traditional vendors had quoted. At this point it was apparent that everyone needed Tableau—they just didn't know it yet.

Within months after speaking at Tableau's first customer conference, Dan went to friend and Founder of InterWorks Inc., Behfar Jahanshahi, to convince him to allow Dan to form a boutique consulting team focusing on providing the best practices of data visualization and reporting using Tableau Software and any emerging or popular database.

InterWorks, Inc. is now the premier Gold Professional Consulting Partner for Tableau Software with clients all over the world and over 35 Tableau consultants providing data visualization, database, and hardware expertise to many of the most significant organizations spanning business, education, and government.

Dan is a 1982 graduate of Purdue University's Krannert School of Business. He and his family live in the metro Atlanta area.

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Foreword

Tableau was founded with a simple mission: to help people see and understand their data. More than ten years later, we're pursuing that same mission. We've been fortunate to build a talented team of people who deeply believe in serving that mission. Just as importantly, we've collaborated with hundreds of thousands of people working for our 13,500+ customer accounts worldwide.

Tableau Desktop and Tableau Server, which are the focus of this book, put the power of data into the hands of those people who inspired us from the beginning. We've designed our software to be flexible and capable enough to help a single person answer questions from a spreadsheet, or to enable thousands of people across an enterprise to execute complex queries against massive databases.

Tableau can help you answer questions with data. We hear stories daily about how people use Tableau to help increase sales, streamline operations, improve customer service, manage investments, assess quality and safety, study and treat diseases, pursue academic research, address environmental problems and improve education.

My hope is that this book can accelerate your adoption of Tableau.

CHRISTIAN CHABOT
CEO, CO-FOUNDER AND CHAIRMAN
TABLEAU SOFTWARE

Introduction

Tableau Software started ten years ago as a desktop application, but as the tool has matured it has become popular in the enterprise and is being used in “Big Data” environments. The *enterprise* means any type of significant organization—a global business or non-profit, such as a large university, small college or hospitals, banks, retailers, or internet-based data companies that have accumulated massive data sets. Or, this might refer to a small business with only a few employees. A short list of the types of organizations using Tableau should include:

- Multi-national financial institutions
- Federal Government
- International police organizations
- The military
- Government intelligence organizations
- Media companies
- Financial institutions
- Hospitals
- Book publishers
- Internet-based business (with Big Data)
- Insurance companies
- Non-profit entities
- Manufacturing and Distribution companies
- Education (Universities, Colleges, Charter Schools, Public Schools)
- Law firms
- Consulting firms
- Retailers
- Consumer product companies
- Accounting firms
- Consulting firms

Any entity that needs to see and understand data is a candidate for using Tableau Software.

Tableau does a good job listening to their customers and partners. They've improved the speed, security, and added more visualization types to Tableau's capabilities.

Today, many large enterprises use Tableau because they find it increases user adoption rates. It also allows business users to create their own reports with relative ease—reducing the report backlog that accumulates within information technology departments. Smaller enterprises are using Tableau because it provides a low-cost way to turn data into useful information.

OVERVIEW OF THE BOOK AND TECHNOLOGY

This book aims to provide an introduction to Tableau in the context of the needs of enterprises—large and small. With every Tableau deployment, there are several user constituencies—report designers that are responsible for performing analysis and creating reports; information technology team members, responsible for managing Tableau Server and maintaining good data governance; and the information consumers that use the output and may want to do their own report creation.

This book's goal is to provide each group with a basic introduction to the Tableau's Desktop and Server environments while also providing best practice recommendations that encompass novice, intermediate, and advanced use of the software.

HOW THIS BOOK IS ORGANIZED

There are four distinct sections. Part I (Chapters 1-8) covers the basics related to Tableau Desktop and then progresses to more advanced topics, including best practices for building dashboards that will be understandable to end users, load quickly, and be responsive to query requests made by information consumers.

Part II (Chapters 9-11) focuses on Tableau Server, mostly from the perspective of a technology manager responsible for installing, securing, and maintaining the Tableau Server environment.

Part III (Chapter 12) includes case studies from clients and experienced users that have deployed Tableau and are actively using it effectively. These short stories provide a glimpse into how other people are using Tableau and will provide grist for your brainstorming related to your own project.

Part IV (Appendices A, B, C, D) Appendix A includes a detailed function reference, sorted alphabetically, that includes every function with example code and brief explanations. The intent is to provide a quick reference if you need to refresh your memory about the syntax of a function. One to three examples for most of the functions are provided. The goal of the function reference is to give you an easy way to refresh your memory regarding infrequently-used functions or help you learn about a function you've never used. Other supplemental material related to preparing data for analysis is presented in Appendix B, while Appendix C provides a brief introduction to the book's companion website. A glossary of technical terms is provided in Appendix D.

WHO SHOULD READ THIS BOOK

This book is intended to introduce new users to the features that Tableau Desktop has to offer from the perspective of someone that needs to create new analysis or reporting. It is also intended for staff responsible for installing, deploying, and maintaining Tableau Server.

The chapters related to Tableau Server are more technical because the subject matter assumes that you have a grasp of server terminology and security.

You can read the book sequentially from start to finish. Or, you can skip around and read about a topic of particular interest. Each chapter builds on the previous material, but if you've already mastered the basics of connecting and using the Desktop, you can skip any chapter related to Tableau Desktop and focus on topics of interest.

TOOLS YOU WILL NEED

You can read the book without having Tableau Software installed on your computer, but you'll get a lot more from the material if you follow the examples yourself. Tableau provides free trials of the software. Alternatively, you can download Tableau Public for free, indefinitely—all of the book examples related to Tableau Desktop should work on Tableau Public.

WHAT'S ON THE COMPANION WEBSITE?

Tableau constantly updates the Desktop and Server products with multiple maintenance releases and at least one major product release every 12 to 15 months. The book's companion website includes articles related to the releases, sample files related to the book's examples, and will also include examples related to new capabilities added to the product as Tableau makes

them available. The InterWorks team activity tests new Tableau products so the companion website may also include demonstrations of new visualization types or techniques before they become available publically.

Wiley also has a website dedicated to the book that you can find at:

www.wiley.com/go/tableauyourdata

SUMMARY

Tableau lowers the technical bar for accessing data from many different data-sources. This book should allow you to advance your technical ability and enable you to save time deploying Tableau in your enterprise by making better decisions, earlier in your deployment.

PART I

DESKTOP

In this part

- **CHAPTER 1:** Creating Visual Analytics with Tableau Desktop
- **CHAPTER 2:** Connecting to Your Data
- **CHAPTER 3:** Building Your First Visualization
- **CHAPTER 4:** Creating Calculations to Enhance Your Data
- **CHAPTER 5:** Using Maps to Improve Insight
- **CHAPTER 6:** Developing an Ad Hoc Analysis Environment
- **CHAPTER 7:** Tips, Tricks, and Timesavers
- **CHAPTER 8:** Bringing It All Together with Dashboards

CHAPTER 1

Creating Visual Analytics with Tableau Desktop

Data graphics should draw the viewer's attention to the sense and substance of the data, not to something else.

EDWARD R. TUFTÉ¹

The seeds for Tableau were planted in the early 1970s when IBM invented Structured Query Language (SQL) and later in 1981 when the spreadsheet became the killer application of the personal computer. Data creation and analysis fundamentally changed for the better. Our ability to create, and store data increased exponentially.

The business information (BI) industry was created with this wave; each vendor providing a product “stack” based on some variant of SQL. The pioneering companies invented foundational technologies and developed sound methods for collecting and storing data. Recently, a new generation of NOSQL² (Not Only SQL) databases are enabling web properties like Facebook to mine massive, multi-petabyte³ data streams.

Deploying these systems can take years. Data today resides in many different proprietary databases and may also need to be collected from external sources. The traditional leaders in the BI industry have created reporting tools that focus on rendering data from their proprietary products. Performing analysis and building reports with these tools requires technical expertise and time. The people with the technical chops to master them are product specialists that don't always know the best way to present the information.

The scale, velocity, and scope of data today demands reporting tools that deploy quickly. They must be suitable for non-technical users to master. They should connect to a wide variety of datasources. And, the tools need to guide us to use the best techniques known for rendering the data into information.

THE SHORTCOMINGS OF TRADITIONAL INFORMATION ANALYSIS

Entities are having difficulty getting widespread usage of traditional BI tools. A recent study by the Business Application Research Center (BARC, 2009) reported adoption rates are surprisingly low.⁴

In any given BI using organization just over 8 percent of employees are actually using BI tools. Even in industries that have aggressively adopted BI tools (e.g., wholesales, banking, and retail), usage barely exceeds 11 percent.

NIGEL PENDSE, BARC.

In other words, 92 percent of the people that have traditional BI tools—don't use them. The BARC Survey noted these causes:

- The tools are too difficult to learn and use.
- Technical experts were needed to create reports.
- The turnaround time for reports is too long.

Companies that have invested millions of dollars in BI systems are using spreadsheets for data analysis and reporting. When BI system reports are received, traditional tools often employ inappropriate visualization methods. Stephen Few has written several books that illuminate the problem and provides examples of data visualization techniques that adhere to best practices. Stephen also provides examples of inappropriate visualizations provided by legacy vendor tools.⁵ It turns out that the skills required to design and build database products are different from the skills needed to create dashboards that effectively communicate. The BARC study clearly indicates that this IT-centric control model has failed to deliver compelling answers that attract users.

People want to make informed decisions with reliable information. They need timely reports that present the evidence to support their decisions. They want to connect with a variety of datasources, and they don't know the best ways to visualize data. Ideally, the tool used should automatically present the information using the best practices.

THE BUSINESS CASE FOR VISUAL ANALYSIS

Whether the entity seeks profits or engages in non-profit activities, all enterprises use data to monitor operations and perform analysis. Insights gleaned from the reports and analysis are then used to maintain efficiency, pursue