Introduction

Objective of This Book

A design pattern is a proven design solution for a common design problem that is formally documented in a consistent manner. Cloud computing design patterns provide proposed design practices and technology architectures, as well as established feature-sets offered by industry tools, technologies, products, and platforms. This book was written with one primary goal in mind: to provide a master design patterns catalog for cloud computing.

What This Book Does Not Cover

Due to the vendor-neutral basis of this book, it does not contain any significant coverage of commercial or vendor-specific cloud computing vendors, services, or technologies. Furthermore, it is important to note that this book documents design patterns only. It does not provide any introductory or tutorial-like coverage of general cloud computing topics. Such coverage is provided in *Cloud Computing: Concepts, Technology & Architecture*, a preceding title released as part of the *Prentice Hall Service Technology Series from Thomas Erl*. For more information about this and other titles in the series, visit www.servicetechbooks.com.

Who This Book Is For

This book is aimed at the IT professionals who:

- want to learn proven design solutions and practices for building, maintaining, and evolving cloud-based solutions and environments

- want to prepare themselves for common challenges associated with the design and architecture of cloud-based services and solutions

- want to gain vendor-neutral insight into the complexion of modern-day cloud computing technologies and innovations

Origin of This Book

As with the *Cloud Computing: Concepts, Technology & Architecture* title, this book is primarily comprised of content from Cloud Certified Professional (CCP) courses developed by Arcitura Education.

The manner in which this catalog componentizes cloud architecture into individually documented pattern profiles makes this book an ideal educational resource for learning and understanding both basic and advanced cloud computing technology concepts, as well as the deep mechanics and inner workings of modern-day cloud platforms.

While this book groups all patterns into a catalog that acts as a master technical reference, CCP courses organize patterns and mechanisms together with additional content into industry certification tracks that map to common cloud computing project roles, such as cloud architect, virtualization specialist, storage specialist, and security specialist.

Recommended Reading

Many of the design patterns in this book were inspired by or have roots in previously published pattern catalogs that may be of interest, especially if you are new to the world of design patterns:

- *Design Patterns: Elements of Reusable Object-Oriented Software* (E. Gamma, R. Helm, R. Johnson, J. Vlissides, Addison-Wesley 1994)

- *Patterns of Enterprise Application Architecture* (M. Fowler, Addison-Wesley 2003)

- *Pattern-Oriented Software Architecture* Volumes 1-5 (F. Buschmann, K. Henney, M. Kircher, R. Meunier, H. Rohnert, D. Schmidt, P. Sommerlad, M. Stal, Wiley 1996-2007)

Furthermore, the previously published title in the *Prentice Hall Service Technology Series from Thomas Erl* also dedicated to design patterns is *SOA Design Patterns* (T. Erl et al, Prentice Hall, 2008).

How This Book Is Organized

Unlike other titles in this series, this book does not group chapters into parts. The coverage of each chapter containing design patterns is relatively comprehensive, allowing the chapters themselves to provide sufficiently broad content separation.

The book begins with Chapters 1 and 2 providing introductory content, and then continues with the following primary chapters:

Chapter 3: Sharing, Scaling and Elasticity Patterns

Design patterns that provide basic and advanced design solutions focused on IT resource sharing, scaling, elasticity, and overall optimization.

Chapter 4: Reliability, Resiliency and Recovery Patterns

Design patterns that address a range of issues pertaining to failover, redundancy, and recovery of IT resources and cloud environments.

Chapter 5: Data Management and Storage Device Patterns

Design patterns focused on cloud storage architecture, cloud storage device configuration and management, as well as the management and optimization of cloud-hosted data.

Chapter 6: Virtual Server and Hypervisor Connectivity and Management Patterns

Design patterns that cover connectivity, accessibility, configuration, and related issues pertaining to virtual servers and hypervisors.

Chapter 7: Monitoring, Provisioning and Administration Patterns

This chapter groups administrative design patterns, such as those pertaining to runtime monitoring, IT resource provisioning, and general administrative features and controls.

Chapter 8: Cloud Service and Storage Security Patterns

Patterns focused on establishing security controls for cloud service architectures and cloud storage devices are covered in this chapter.

Chapter 9: Network Security, Identity & Access Management and Trust Assurance Patterns

This chapter provides a range of cloud security patterns that tackle common security requirements, as well as various forms of attack preventions.

Chapter 10: Common Compound Patterns

Many of the previously documented design patterns can be combined into super-patterns that represent common models or environments in the cloud computing industry, or provide larger, more complex design solutions. This chapter provides examples of some of the more relevant combinations through the definition of a series of compound design patterns.

Appendix A: Cloud Computing Mechanisms Glossary

Design patterns are applied with the involvement and implementation of different combinations of cloud computing mechanisms. This appendix provides concise definitions of all mechanisms associated with and referenced by the preceding design pattern profiles.

Appendix B: Alphabetical Design Patterns Reference

A quick reference list of cloud computing design patterns in alphabetical order, with page numbers.

Additional Information

These sections provide supplementary information and resources for the *Prentice Hall Service Technology Series from Thomas Erl*.

Symbol Legend

This book contains numerous diagrams that are labeled as *figures*. The primary symbols used throughout the figures are individually listed in the symbol legend located on the inside of the book cover. This legend is consistent with the symbol legend used in the *Cloud Computing: Concepts, Technology & Architecture* title.

Pattern Documentation Conventions

Each pattern in this book is documented in a consistent format according to a set of pre-defined notation conventions that are explained in the "Design Pattern Notation" section in Chapter 2.

Updates, Errata, and Resources (www.servicetechbooks.com)

Information about other series titles and various supporting resources can be found at the official book series Web site: www.servicetechbooks.com. You are encouraged to visit this site regularly to check for content changes and corrections.

Cloud Computing Design Patterns (www.cloudpatterns.org)

All of the pattern profile summary tables documented in this book are also published online at CloudPatterns.org. This site acts as an online reference tool and allows for the submission of new pattern candidates.

What Is Cloud? (www.whatiscloud.com)

A quick reference site comprised of excerpts from this book to provide coverage of fundamental cloud computing topics.

Referenced Specifications (www.servicetechspecs.com)

This site provides a central portal to the original specification documents created and maintained by primary standards organizations, with a section dedicated exclusively to cloud computing industry standards.

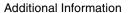**The Service Technology Magazine (www.servicetechmag.com)**

The Service Technology Magazine is a monthly publication provided by Arcitura Education Inc. and Prentice Hall and is officially associated with the *Prentice Hall Service Technology Series from Thomas Erl.*

CloudSchool.com™ Certified Cloud (CCP) Professional (www.cloudschool.com)

The pattern profiles and mechanisms covered in this book originated from courses that are part of the Cloud Certified Professional (CCP) curriculum, an academic, vendor-neutral program dedicated to specialized areas of cloud computing.

Social Media and Notification

To be automatically notified of new book releases in this series, new supplementary content for this title, or key changes to the aforementioned resource sites, use the notification form at www.servicetechbooks.com or send a blank email to notify@arcitura.com.

Alternatively, connect via the official *Prentice Hall Service Technology Series from Thomas Erl* Facebook page, LinkedIn group, or Twitter account by visiting: www.servicetechbooks.com/community.