**Preface**

Cloud Native architecture is all about building software applications as a collection of independent, loosely coupled, business capability–oriented services (microservices) that can run on dynamic environments (public, private, hybrid, multicloud) in an automated, scalable, resilient, manageable, and observable way.

Writing applications to work natively on the cloud is increasingly common due to the agility, reliability, affordability, and scalability it provides. In current cloud native architecture, the focus is mostly on deployment and operational aspects of applications. However, when building cloud native applications, we can’t apply conventional application development patterns and techniques. This book addresses this issue by defining proven solutions as patterns based on APIs, data, events, and streams. It aims to help architects and developers incrementally design, develop, and deploy cloud native applications that are optimal for their use cases, and that can be managed and maintained with minimal cost, time, and effort.

There is a wide range of design patterns that architects and developers can apply when building cloud native applications. In this book, we mainly focus on the development patterns that must be applied when building the business logic of cloud native applications, when connecting them, and when enabling external parties to consume them. Depending on the nature of your application, and the patterns you use to build it, the cross-cutting capabilities such as deployment, scaling, security, and observability may be implemented differently. For that reason, we spend some time discussing the trade-offs and ramifications of using the various patterns. We organize these patterns into seven key areas: communication, connectivity, composition, data, events, stream processing, and API management and consumption.

The chapters in the book are organized as follows:

[*Chapter 1, Introduction to Cloud Native*](https://learning.oreilly.com/library/view/design-patterns-for/9781492090700/ch01.html#introduction_to_cloud_native)

This chapter helps you understand what cloud native is by exploring the key characteristics of cloud native applications. We focus on the importance of using design patterns for building cloud native applications.

[*Chapter 2, Communication Patterns*](https://learning.oreilly.com/library/view/design-patterns-for/9781492090700/ch02.html#communication_patterns)

This gives you a broad understanding of the communication patterns and implementation technologies that you can use to build cloud native applications. We mainly focus here on foundational communication patterns for synchronous and asynchronous communication.

[*Chapter 3, Connectivity and Composition Patterns*](https://learning.oreilly.com/library/view/design-patterns-for/9781492090700/ch03.html#connectivity_and_composition_pattern)

Here we explore a wide range of patterns that build connectivity between microservices as well as with other existing systems in a cloud native application. We also look at creating business functionalities by integrating services using Service Composition patterns.

[*Chapter 4, Data Management Patterns*](https://learning.oreilly.com/library/view/design-patterns-for/9781492090700/ch04.html#data_management_patterns)

In this chapter we look at patterns for managing data in cloud native applications. We focus on the selection of data stores, and how data can be integrated with cloud native applications via data composition, while supporting scalability and reliability and optimizing for performance.

[*Chapter 5, Event-Driven Architecture Patterns*](https://learning.oreilly.com/library/view/design-patterns-for/9781492090700/ch05.html#event_driven_architecture_patterns)

We cover the design patterns for building event-driven architectures using cloud native applications. Here, we focus on basic event delivery, event sourcing, and how events can be orchestrated among various asynchronous cloud native applications.

[*Chapter 6, Stream-Processing Patterns*](https://learning.oreilly.com/library/view/design-patterns-for/9781492090700/ch06.html#stream_processing_patterns-id00204)

This chapter explores patterns for processing event streams at scale by both stateful and stateless cloud native applications. We also look at patterns for building reliability into real-time applications, so that they can preserve their in-memory states across failures.

[*Chapter 7, API Management and Consumption Patterns*](https://learning.oreilly.com/library/view/design-patterns-for/9781492090700/ch07.html#api_management_and_consumption_patterns)

This chapter explores some of the most commonly used patterns in API management. We also cover a few API Consumption patterns, which are essential in building frontend applications such as a web application, mobile application, or desktop application on top of the managed APIs.

[*Chapter 8, Cloud Native Patterns in Practice*](https://learning.oreilly.com/library/view/design-patterns-for/9781492090700/ch08.html#cloud_native_patterns_in_practice)

This final chapter shows you how to apply various cloud native patterns when building different aspects of a real-world cloud native application.

**Conventions Used in This Book**

The following typographical conventions are used in this book:

**TIP**

This element signifies a tip or suggestion.

**NOTE**

This element signifies a general note.

**WARNING**

This element indicates a warning or caution.

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**NOTE**

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