
Preface

Which is the right cloud computing provider for my company?

How do I use the cloud computing products of a certain provider and how do they compare to the products I already have in place? We use an infrastructure as a service platform already. What is different now?

How does cloud computing impact existing applications if they are moved to the cloud?

How can I use cloud computing to reduce provisioning and setup times, so my users can access servers more quickly?

During the past years of our collaborative research and consulting on cloud computing, we often encountered these questions or very similar ones. Often, these questions were driven by the need to rapidly produce results in big enterprise cloud initiatives that were founded with the ambitious goals to reduce the cost of IT tremendously and make provisioning of IT resources faster. We also encountered a general trend that cloud computing initiatives are often driven *bottom-up*, starting with infrastructure automation activities. These initiatives, therefore, tend to focus on the IT infrastructure and how to change its setup, deployment, and management and leave application architecture standards for the enterprise untouched. Results are company-internal infrastructure-as-a-service offerings that can provision virtual servers in a fast and efficient manner via a self-service portal. In this book, we describe how cloud computing changed IT infrastructure provisioning and management as well, but mainly we focus on the following questions:

How does cloud computing change the architecture of applications using it efficiently? How can I use cloud infrastructure and platform offerings to efficiently and rapidly design, build, and manage applications to support the changing needs of my business?

Many products found in the cloud computing market display similar functionality that customers may use to build their cloud applications. The discussions of IT architects and developers are often hindered by different product names,

provider-specific terminologies, the different distributions of common functionality among products, as well as the fact that some products are merely *cloud-washed*, and thus their name is extended with the term “cloud” to make them more attractive. In our research, we, therefore, analyzed cloud products as well as applications built using different cloud vendors and cloud computing technologies. The goal of this analysis has been to extract common behavior and common components of cloud products as well as the common architecture principles involved to build cloud applications. The result is the book you hold in your hands.

The reason for abstracting from existing cloud providers and cloud applications is to capture provider-independent and sustainable knowledge abstracted from concrete products. This abstract description covers how to build cloud applications, how different cloud products behave, and when to choose a particular form of a cloud offering given a concrete usage scenario.

What You Will Learn and What This Book Is About and Not About

In this book, we build upon our experiences and approach cloud computing principles with a *top-down* mind-set. The goal of this book is not to show you the benefits of cloud infrastructure automation technology over traditional data centers but to show you how cloud principles can be supported on the business and application layers. This book should give you nuggets of advice in the form of patterns that allow you to better understand how you can support cloud properties on the application level and how to select appropriate cloud infrastructure and platform offerings to make your life easier. Furthermore, this book gives IT architects and developers a common vocabulary when discussing about cloud products and architectures of custom cloud applications without focusing on a concrete cloud provider.

During our consulting and research experiences, we often missed the abstraction of cloud definitions from concrete provider offerings and vendor products. Thus, we chose to use a pattern-based approach to describe cloud offerings vendor neutrally in our technical report (Fehling, C., Leymann, F., Mietzner, R., Schupeck, W.: A collection of patterns for cloud types, cloud service models, and cloud-based application architectures. Technical report, University of Stuttgart) in 2011. As this approach proved very popular wherever we presented and discussed it, we decided to revise and extend this approach and the resulting pattern catalogue into what you will find in this book. In order to not lose track with reality, we describe the essential properties of a pattern and then add concrete providers and vendor offerings where we are aware of them in “known uses” sections of the pattern. These sections are by no means exhaustive; they should give you an initial idea on providers and vendors offering a product that exhibits the properties described in the pattern.

If you take this book as a catalogue of patterns that will help you to design, build, and manage *cloud-native* applications as well as select suitable cloud infrastructure and platform offerings, it will provide you with the most value. We wish you as much motivation and satisfaction reading about and applying the patterns in the book as we had collecting and presenting them at various conferences and events. For further information, please also refer to:

<http://www.cloudcomputingpatterns.org>
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Cloud Computing Patterns

Fundamentals to Design, Build, and Manage Cloud
Applications

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