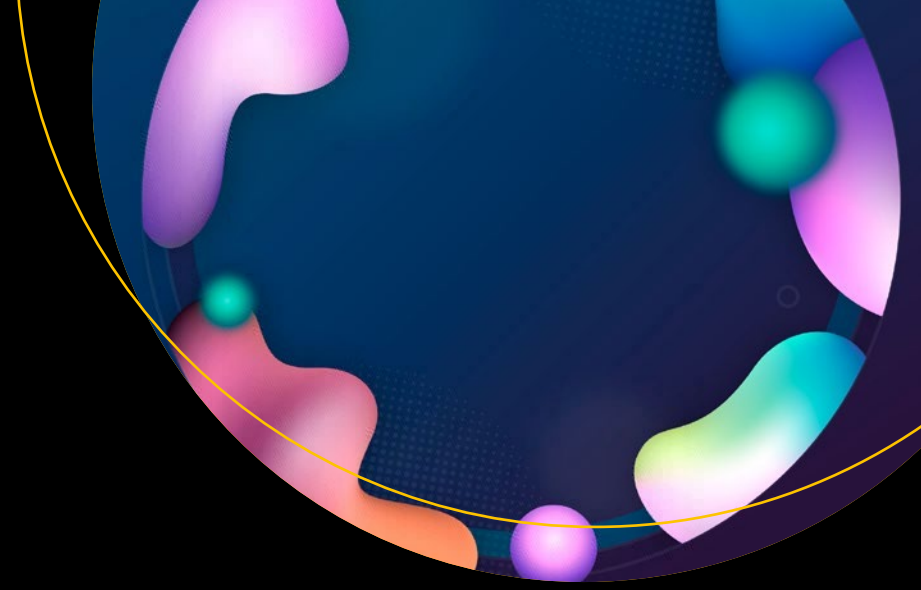

Ansible for VMware by Examples

A Step-by-Step Guide to Automating Your VMware Infrastructure

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Printed on acid-free paper

For my son Filippo, the joy of my life.

Table of Contents

About the Author

Luca Berton is an Ansible Automation Expert who has been working with the Red Hat Ansible Engineer Team for three years. With more than 15 years of experience as a system administrator, he has strong expertise in infrastructure hardening and automation. An enthusiast of open source, he supports the community by sharing his knowledge in different events of public access. Geek by nature, Linux by choice, Fedora of course.

About the Technical Reviewer

Nikhil Jain is an Ansible expert with over 12 years of DevOps experience. He has been using Ansible and contributing to it from its inception. He currently works closely with Ansible Engineering.

He is an open source enthusiast and is part of the Ansible Pune Meetup Organizing team. He has presented multiple Ansible sessions at various global and local events. Apart from sitting in front of his computer automating things using Ansible, he loves watching sports and is a regular part of the local cricket team.

Acknowledgments

To my son, family, and friends who make life worth living and whose support and encouragement makes this work possible.

I'd like to thank my technical reviewer, Nikhil Jain, previously a Red Hat colleague, who joined my effort early on and contributed to the project.

To everyone I've worked with over the years and shared any ideas for this book: thank you for the knowledge you've shared.

Preface

This book is a guide to automating your VMware infrastructure using the Ansible open source technology.

If you are an IT professional in information technology in any industry and you would like a jargon-free understanding of Ansible technology, including VMware, Linux, and Windows Systems Administrators, DevOps professionals, thought leaders, Infrastructure-as-Code enthusiasts, and information technology team members providing leadership to a business, this book is for you.

This book can be a powerful resource for computer engineers and leaders who believe that innovation, automation, and acceleration are drivers for a successful business of tomorrow. Look back on your career path and think of at least three times a lack of infrastructure automation has been a challenge for your project's deadline. Remember the human errors that impacted your business continuity and then think of when effective infrastructure performance enabled your projects to succeed.

Consider the need for business and information technology departments and get curious about what that means for information technology and business stakeholders.

A successful infrastructure is a matter of gradual improvements and good habits that you can achieve by using more automation on your journey.

Learn how to become more productive and effective using the Ansible open source automation technology.

Engineers have great impact, power, and responsibility for the success of the business.

What Is In This Book?

This book provides in-depth content on the following topics:

- The Ansible code language for beginners and experienced users via examples
- Ansible installation on the most common operating systems

- Troubleshooting of common errors
- Information on the latest releases of Ansible and ansible-core packages
- Ansible for VMware infrastructure code snippets and examples

Your Development Environment

This book does not require you to use a specific IDE. You need a simple base environment consisting of

- A common editor: terminal (VIM, Emacs, Nano, Pico, etc.) or GUI (VS Code, Atom, Geany, etc.)
- A workstation with Ansible or ansible-core packages
- VMware vSphere ESX, VMware vSphere ESXi, or VMware vSphere vCenter Server (for VMware-specific code

Additional Online Resource

Luca Berton maintains a popular website on Ansible development at `www.ansiblepilot.com`.

Introduction

I wrote this book to share with you how to automate tasks in your VMware infrastructure with Ansible. Ansible is rapidly ramping-up automation technology. It has become popular nowadays as an open-source IT infrastructure automation tool. You may have heard of technologies such as Puppet, Chef, and Terraform. What makes Ansible so successful is that it is free, portable, powerful, remarkably human readable, easy, and fun to use. Ansible has expanded to be very valuable in further use cases in production, acceptance, and testing (PAT) infrastructure design patterns under the categories of Provisioning, Configuration Management, Application Deployment, Continuous Deployment, Automation, and Orchestration. Especially in the post-pandemic world, we all live in an interconnected, fast-paced world driven by innovation and acceleration in technology. IT infrastructure is more than ever a key cornerstone in the innovation journey of every modern business corporation. A lot of enterprises already take advantage of the timesaving, error-avoiding, and auto-healing infrastructures permitted by modern IT automated infrastructure. In example after example I will show you the best way to simplify your VMware journey and get the best value from your Ansible code. Every IT department nowadays manages some resources on bare metal servers, virtual machines, the cloud, containers, and edge computing. And the demand is growing more and more year-over-year. In this book, you are going to learn how to enable Ansible to interact with your VMware infrastructures such as data centers, clusters, host systems, datastores, and virtual machines. For example, you can automate the creating, deleting, updating, and gathering of information for virtual machines. Say goodbye to mundane and annoying manual activity and focus your effort on how to scale your infrastructure and enable your business for the challenges of tomorrow!

For all of you who are security paranoid, Ansible provides out-of-the-box support protection for sensitive data. For example, you store credentials and tokens in an Ansible Vault using at least the AES-256 security cipher.

Are you ready to automate your day with Ansible?

Some interesting resources to explore for a deep dive into the Ansible product:

- Official Ansible documentation, https://docs.ansible.com/
- Wikipedia Ansible page, https://en.wikipedia.org/wiki/Ansible_(software)

Who Is This Book For?

This book is designed for IT professionals in the information technology industry who would like a jargon-free understanding of Ansible technology for automating a VMware infrastructure.

This book offers systems administrators, developers, DevOps, decision makers, and thought leaders a guideline about implementing Infrastructure-as-Code in your VMware infrastructure.

This book is designed for beginners of Ansible technology and is a great companion to intermediate and expert levels to the state-of-the-art of the Ansible platform.

The already experienced Ansible users are going to love the unique, specific code samples and examples for the Ansible for VMware infrastructure.

You are going to learn how to save time and avoid human errors by efficiently automating your VMware infrastructure using the Ansible open source IT automation technology enabling IaC for DevOps methodologies.

You can read this book with two different mindsets: development and operations. Both mindsets are going to love the practical approach of code snippets and code nutshells to easily apply to your day-to-day journey and challenges.

Many of the IT engineers I work with are already familiar with administering a fleet of Linux servers and are comfortable interacting via the OpenSSH protocol using command-line commands. These users use the so-called “imperative” programming to interact with machines. The Ansible platform evolves your fleet management as a declarative programming language so people already familiar with configuration management tools (Puppet or Chef) can find some connecting dots.

Modern IT Infrastructure

Deploying and managing applications requires more and more server machines that are reliable and efficient. Traditionally, system administrators took care of this burden for the internal (developers) and external (users) stakeholders who interact with the systems.

The day-to-day tasks of a system administrator involved the manual installation of software, changing of configurations, and management of services on servers, virtual machines, and nodes. And every day the IT department received requests to boost the data center's resources in order to accommodate the business needs or better tackle the marketplace. System administrators realized they couldn't scale their manual systems management scripts as fast as the business stakeholders demanded: the hosted web applications increased the complexity, email flow increased, and new releases of the operating systems continued. API-driven server management and configuration management tools like Ansible helped make things manageable for a time.

You could see this trend in the rise of the application-as-service, developer-centric methodologies DevOps and DevSecOps. Microservices, and serverless application architecture meant that a more seismic shift was coming. Instead of thinking in terms of servers and infrastructure, developers expect to be able to manage containerized application lifecycles, with no regard for the servers on which their applications run.

Modern business applications require one or more of the following features:

- Self-healing infrastructure
- Auto-scaling/elasticity
- High availability with multi-server failover
- Flexible or multi-tier storage backends
- Multi-cloud compatibility
- Enabling DevSecOps

The containerized app development and deployment became more and more popular with a huge number of technologies to real-time check these boxes, like Apache Mesos and Docker Swarm. Some cloud vendors even built their container orchestration and management products to meet the needs of cloud-native applications. Examples: Amazon Elastic Container Service (Amazon ECS) by Amazon Web Services (AWS), Google Container Engine (GKE) by Google Cloud Platform (GCP), Azure Container

Service by Microsoft Azure, IBM Bluemix Cloud Kubernetes Container Service by IBM Cloud, Oracle Container Cloud Service (OCCS) by Oracle Cloud, and Alibaba Cloud Container Registry.

Creative software engineers and solution creators love to use the Ansible Automation Platform (formerly Ansible Tower). It is the enterprise product used to store resources across your team and trigger automation recipes and workflows in the DevSecOps environment. Other popular tools like Jenkins, Rundeck, GitHub Actions, GitLab CI/CD, Atlassian Bamboo, CircleCI, TeamCity, Travis CI, BuildMaster, Bitrise, Buddy, or Go CI may also be used to enable continuous integration and continuous deployment in your organization.

Author Bio

I'm Luca Berton and we're going to have a lot of fun together.

I've been an Ansible expert and working directly with the Ansible Engineering Team of Red Hat for three years.

I have more than 15 years of system administration experience, working with infrastructures either on-premises or with the major cloud providers and technologies.

I'm an enthusiast of open source and I support the community by sharing my knowledge in different events of public access.

I'm also a co-founder of the FSUG Padova, my hometown Linux Users Group, visited by Richard Stallman, the founder of the Free Software Movement in 2007.

I consider myself a lazy person, so I always try new ways to automate the repetitive task of my work.

After years of Perl, Bash, and Python scripting, I landed on the Ansible technology. I took the certification and worked for more than three years with the Ansible Engineer Team.

I consider Ansible the best infrastructure automation technology nowadays. It's human-readable, the learning curve is accessible, and it is very requested by the recruiters in the market.

On every page of this book, I'm going to share with you one specific use case, the possible solution, the code, the execution, and the verification of the target system. All these solutions are battle-tested and used by me in my everyday automation.

You can easily jump between lessons and review them as many times as you need.

Awards and Recognitions

Since 2021, I have shared my knowledge about Ansible in my Ansible Pilot project and it is gaining more traction among IT professionals every day.

Some major milestones:

- "Ansible Anwendertreffen - From Zero to Hero: How to build the Ansible Pilot Community" by Luca Berton (Red Hat CZ) 15:15 - 16:00 February 22, 2022
- Author of *Red Hat Ansible Playbook* included in RHSB-2021-009 Log4Shell trigger Remote Code Execution in log4j (CVE-2021-44228) January 12, 2022
- *The Ansible Bullhorn #41 - A Newsletter for the Ansible Developer Community*, January 7, 2022
- *The Ansible Bullhorn #34 - A Newsletter for the Ansible Developer Community*, September 17, 2021

Are you ready to have fun together?

Conventions Used in the Book

This is a practical book, so it's jam-packed with code to be used on the command line plus commands and Ansible language code samples.

You are going to find commands and code samples throughout the book either inline (for example, `ansible [command]`), or in a code block (with or without line numbers) like

```
---
# YAML file example
```

The command-line commands use the standard POSIX conventions and are ready to be used in a Unix-like system such as Linux, macOS, or BSD. Each of the commands is assumed to be used by a standard user account when the prefix is the $ (dollar) symbol, or by the `root` user when the prefix is the # (number sign) symbol. You are going to find this code in some installation, code execution, and troubleshooting examples. The commands were tested in the most used Linux distributions on the market nowadays.