Community Experience Distilled

Getting Started with Red Hat Enterprise Virtualization

Leverage powerful Red Hat Enterprise Virtualization solutions to build your own IaaS cloud

Pradeep Subramanian

[PACKT] PUBLISHING open source* community experience distilled

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About the Author

Pradeep Subramanian is a Senior Platform Consultant at Red Hat, a global provider of open source software solutions that uses a community-powered approach to develop and offer operating system, middleware, virtualization, storage, and cloud technologies. He has 10 years of experience in open source and Linux, which includes 5 years of extensive experience in open source virtualization technologies such as Xen, KVM, and Red Hat Enterprise Virtualization. His other areas of interest include high availability and grid computing, performance tuning, designing and building open hybrid cloud, architectural design, and implementation of Enterprise IT using open source tools. This is his first book.

I would like to express my gratitude to many people who saw me through this book. I would like to thank all those who provided their support, talked things over, read, wrote, offered comments, allowed me to quote their remarks, and assisted in the editing, proofreading, and designing of this book.

I owe a huge thanks to my manager, Anirudha Karandikar (Andy), for providing excellent support and advice. Above all, I want to thank my wife, Sandhya; my parents, Subramanian, Selvi, Shanmugam, Usha; and my naughty one-and-a-half-year-old son, Harsh. They all supported and encouraged me in spite of all the time the book took me away from them. It was a long and difficult journey for them. I am dedicating this book to my son, Harsh. I hope that one day, he will read this book and understand why I spent so much time in front of my computer. Last but not least, I beg forgiveness from all those who have been with me over the course of the years and whose names I have failed to mention. Thanks for everything; I look forward to writing the second edition of this book and a few more books on Open Cloud Computing soon!

About the Reviewers

Kyung Huh is currently working as a consultant in Korea. He has been working with Linux and open source software for more than 15 years as an instructor and consultant. He has experience in Red Hat Enterprise Virtualization in many production environments and also has experience in open source software such as clustering, performance tuning, and troubleshooting.

René Koch is a senior solution architect and consultant, focusing on open source virtualization, Linux, system management, and system monitoring. He started working with Red Hat Enterprise Virtualization and oVirt in 2010 and implemented various environments on the customer side. As part of the oVirt community, he is not only an active member on the oVirt mailing list, but also gives lectures about Red Hat Enterprise Virtualization and oVirt in Austria and Germany. Furthermore, he is the author of two open source projects: the Nagios plugin check_rhev3—which is used to monitor the whole RHEV environment with Nagios and Icinga—and Monitoring UI-Plugin—which is a user interface plugin for Red Hat Enterprise Virtualization and oVirt that integrates Nagios-based monitoring environments into the RHEV WebAdmin portal.

Anil Vettathu started his interaction with Linux in college. He started his career in 2006 as a Linux System Administrator. He has specialized in Open Source Virtualization technologies, especially KVM. He had the opportunity to work on RHEV from its very early versions. Currently, he is working as a TAM for Red Hat.

Marcus Young recently graduated with a degree in Computer Science and Mathematics before getting involved in system administration and DevOps. He currently works in software automation using open source tools and Red-Hat-flavored operating systems in RHEV and AWS virtualization environments. His hobbies include playing ice hockey and making homebrewed beer. He has also developed many hardware projects based on devices such as Arduino, Raspberry Pi, UDOO, and others.

I'd like to thank my beautiful fiancé for putting up with many of my projects and work items that make their way into my free time. I would also like to thank my newborn son who will continue to inspire me to keep pushing myself.

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Preface

Red Hat Enterprise Virtualization (RHEV), which is a complete enterprise virtualization management solution for servers and desktops, provides fully integrated management of your virtual infrastructures. RHEV is based on and built using two open source projects: Kernel Virtual Machine (KVM), which is open source software that comes with all standard Linux distributions, and oVirt. Based on the popular oVirt open virtualization management project, Red Hat Enterprise Virtualization positions itself as a strategic virtualization alternative to proprietary virtualization platforms with performance advantages, competitive pricing, and a trusted and stable environment.

Step-by-step, you'll learn how to build and manage Red Hat Enterprise Virtualization from scratch with various advanced features and troubleshooting steps. You'll also dive deep into the RHEV internal architecture and components.

What this book covers

Chapter 1, *An Overview of Red Hat Enterprise Virtualization*, gives you a basic introduction to RHEV, its internal architecture and components, and the basic hardware and software prerequisites.

Chapter 2, *Installing RHEV Manager and Hypervisor Hosts*, shows you how to set up and configure the RHEV Manager and access the web-based admin portal, install and configure RHEV's hypervisor hosts, and install and connect to the report portal in order to report scenarios of your virtual infrastructure's resource usage.

Chapter 3, *Setting Up the RHEV Virtual Infrastructure*, shows you how to create a virtual data center and cluster, add the hypervisor host to cluster, configure storage, and perform networking.

Chapter 4, *Creating and Managing Virtual Machines*, shows you how to create virtual machines, templates, derive virtual machines from the template, take live snapshots of virtual machines, and back up and restore of virtual machines using export and import disks.

Chapter 5, *Virtual Machine and Host High Availability*, shows you how to set up the virtual machine host availability, various cluster policies for cluster hosts, and perform live migration of virtual machines.

Chapter 6, *Advanced Storage and Networking Features*, briefs you about various storage disks options, such as sharing disks across virtual machines, direct LUN mapping from the storage, moving virtual machines across different storage domains, shaping the network traffic's VNIC profile for guest operating systems, and hot plugging of network adapter and memory into virtual machines.

Chapter 7, *Quota and User Management*, talks about applying quota to your virtualization infrastructure with user-role-based access control and integration with common directory services.

Chapter 8, *Managing a Virtualization Environment from the Command Line*, shows you how to set up the command-line tools in order to manage your virtualization infrastructure other than the standard RHEV Manager web-based interface.

Chapter 9, *Troubleshooting RHEV*, talks about various logfiles of the RHEV manager and hypervisor hosts and provides you with steps to put your RHEV virtualization infrastructure into maintenance mode for any planned outage.

Chapter 10, *Setting Up iSCSI, NFS, and IdM Directory Services for RHEV*, shows you how to set up your Red Hat Enterprise Linux server as an iSCSI, the NFS storage server for RHEV virtual machine data storage, the ISO library to store ISO, and export the domain to export the virtual machine for backup and restoration, and set up and configure IdM directory services on RHEL to integrate RHEV with the Red Hat IdM directory service for user management.

Appendix shows you how to upgrade RHEV environment from Version 3.3 to 3.4. This chapter is available as a bonus chapter and can be downloaded from `https://www.packtpub.com/sites/default/files/downloads/7402OS_Appendix.pdf`.

What you need for this book

To set up a demo environment for this book, you need a valid Red Hat account to access the Red Hat software and support portal or, optionally, an evaluation version of RHEV:

- `https://access.redhat.com/downloads/`
- `https://access.redhat.com/products/red-hat-enterprise-virtualization#evaluations`

Please note that the current RHEV GA release is 3.4, but the book is based on a 3.3 release. So if you access the preceding evaluation link, it will direct you to 3.4. Please create an evaluation account, log in to `https://access.redhat.com/downloads/`, and choose the RHEV Manager channel rhel-x86_64-server-6-rhevm-3.3 for the manager deployment.

You will also need the following set of hardware and software in order to run the examples in this book.

Red Hat Enterprise Virtualization Manager 3.3

The following are the hardware and software requirements of the Red Hat Enterprise Virtualization manager 3.3:

- **Hardware**: The commodity's physical hardware or virtual machine
- **Operating system**: Red Hat Enterprise Linux 6 Update 5
- **Software channels**:
  - rhel-x86_64-server-6-rhevm-3.3
  - rhel-x86_64-server-supplementary-6 -c
  - jbappplatform-6-x86_64-server-6-rpm

The Red Hat Enterprise Virtualization Hypervisor host

The following are the hardware and software requirements of the Red Hat Enterprise Virtualization Hypervisor host:

- **Hardware**: Commodity virtualization-enabled physical hardware supports Red Hat Enterprise Linux 6 Update 5
- **Software**: RHEV-H image (for RHEV-M 3.3)—downloadable from `https://access.redhat.com/downloads/`

Optional requirements

The following are the optional requirements that are needed to run the examples in this book:

- Red Hat IdM Directory Service:
    - **Hardware**: The commodity physical hardware or virtual machine that acts as a directory server
    - **Operating System**: Red Hat Enterprise Linux 6 Update 5
    - **Software**: Identity management (ships by default)
- ISCSI / NFS storage service:
    - **Hardware**: The commodity physical hardware or virtual machine that acts as a storage
    - **Operating system**: Red Hat Enterprise Linux 6 Update 5
    - **Software**: NFS/iSCSI-related package ships with default operating systems

Who this book is for

If you are a system administrator who is interested in implementing and managing open source virtualization infrastructures, this is the book for you. You need a basic knowledge of virtualization and its use cases and some very basic Linux command-line work experience.

Conventions

In this book, you will find a number of styles of text that distinguish between different kinds of information. Here are some examples of these styles, and an explanation of their meaning.

Code words in text, database table names, folder names, filenames, file extensions, pathnames, dummy URLs, user input, and Twitter handles are shown as follows: "This command will switch off SELinux enforcement temporarily until the machine is rebooted. If you would like to permanently disable it, edit `/etc/sysconfig/selinux` and enter `SELINUX=disabled`."

Any command-line input or output is written as follows:

```
# rhn-channel -a -c rhel-x86_64-server-6-rhevm-3.3 -c rhel-x86_64-server-
supplementary-6 -c jbappplatform-6-x86_64-server-6-rpm
Username: "yourrhnlogin"
Password: XXXX
```

New terms and **important words** are shown in bold. Words that you see on the screen, in menus or dialog boxes for example, appear in the text like this: "Finally, label the ISO domain with a name that will be unique and easily identifiable on the **Storage** tab of the administration portal".

Warnings or important notes appear in a box like this.

Tips and tricks appear like this.

Reader feedback

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