Red Hat
Training and Certification

Classroom Technology Requirements

Red Hat Training classes and exams are highly interactive and require a properly configured classroom. Instructors use automated classroom installation methods to ensure a consistent and efficient training environment. This document specifies the minimum requirements that a classroom must meet to support a Red Hat Training course, including internet and bandwidth requirements and recommendations for Bring Your Own Device (**BYOD**) users.

Classrooms and personal devices that do not meet these requirements are not supported. **Red Hat is not responsible for any damages resulting from a Client's failure to provide an appropriate physical environment and/or equipment as described below.** Direct any questions regarding these specifications to your Red Hat Training representative.

Fast Facts

- Meeting classroom requirements is critical for successful Red Hat training events.
- Most events use one computer system per person. Exact requirements vary for each course, documented in this guide.
- For Instructor-Led Training (ILT) classrooms, physical computer systems are required. Virtualized desktops or similar virtual machines are not supported.
- In ILT classrooms, the physical computer system's operating system will be installed by the instructor prior to the starting time on the first day of class. This required installation will overwrite the system's disks.

The Baseline Classroom

The baseline classroom configuration for Red Hat training classes is described in this section. Required adjustments to this baseline to reflect course-specific requirements are detailed in the Course Specific Requirements table of this document.

Classroom Environment

- **Overhead projector with projection screen capable of HD resolution** or better at 2000 ANSI lumens brightness, preferably with HDMI connection. Alternatively, **a large screen (55" or greater) LCD/LED television or monitor** (HD resolution or better) with HDMI connections.
- **Whiteboard or flipchart** for instructor use with appropriate writing materials.
- **Sufficient desk space** so that students can take notes while working with the computers.
- Minimal ambient noise and appropriate temperature control to provide **a comfortable learning environment.**
- Red Hat recommends an **optional second monitor** to access the ebooks. The learners will be able to access the Lab environment using a monitor and use the other to copy/paste easily from the ebook. A single widescreen monitor can serve a similar purpose.

Desktops vs. Servers

Our classes are designed to use typical desktop or laptop hardware. Server hardware is not appropriate for noise, power and configuration reasons. Servers in a data center can not be used because of security, connectivity and liability reasons.

Computers

Red Hat courses utilize a state of the art lab system that deploys exercises to student systems in an automated fashion. This lab system depends on a consistent environment that matches the following requirements. Each course has a specific required hardware level that aligns with the course requirements. The requirements listed below assume the usage of **Performance CPU cores (P-Cores)**, machines with chips that utilize efficiency cores (E-Cores) may not perform adequately. Newer CPU chipsets have begun using Performance Cores and Efficiency cores and that for older CPU models, unless the cores are specified, they all function as performance cores.

*For courses that utilize a **Virtual Training (VT or ROL) classroom, students may use any Level II or above computer** with a supported browser and properly-tested access to the remote Red Hat classroom. To test a system's compatibility with ROL please visit https://rhtapps.redhat.com/compatibility.*

Level	CPU minimum	RAM	Minimum P-Cores Required	Local Storage minimum	Video Graphics minimum	Network	USB and boot method
I	Intel Core i3 with VT support / AMD equivalent Ryzen 3 or better with AMD-V	8 GB	4	100 GB single HDD	1280x1024 text only 1600x900 graphical	wired Gigabit Ethernet	USB2 and DVD USB3 recommended
II **VT Labs Only**	Intel Core i5 with VT support / AMD equivalent Ryzen 5 or better with AMD-V	8GB	4	250 GB single HDD	1280x1024 text only 1600x900 graphical	wired Gigabit Ethernet	USB2 and DVD USB3 recommended
III	Intel Core i5 with VT support 4th Generation or better / AMD equivalent Ryzen 5 or better with AMD-V	16 GB	4	250 GB single HDD SSD recommended	1280x1024 text only 1600x900 graphical	wired Gigabit Ethernet	USB2 and DVD USB3 recommended
IV	Intel Core i7 or Xeon equivalent with VMCS shadowing 6th Generation or better / AMD equivalent Ryzen 7 or better with AMD-V	32 GB	4	250 GB SSD SSD required	1600x900 minimum, 1920x1080 (Full HD) recommended	wired Gigabit Ethernet	USB3 USB boot support
V	Intel i7 or i9 or Xeon equivalent VMCS shadowing 9th Generation or better / AMD equivalent Ryzen 9 or better with AMD-V	64 GB	4	500 GB SSD NVMe SSD recommended	1600x900 minimum, 1920x1080 (Full HD) recommended	wired Gigabit Ethernet	USB3 USB boot support
VI	Intel i7 or i9 or Xeon equivalent VMCS shadowing 9th Generation or better / AMD equivalent Ryzen 9 or better with AMD-V	96 GB	4	1 TB GB SSD NVMe SSD recommended	1600x900 minimum, 1920x1080 (Full HD) recommended	wired Gigabit Ethernet + 2nd Ethernet or WiFi	USB3 USB boot support
VII	Intel i9 or Xeon equivalent VMCS shadowing 10th Generation or better / AMD equivalent ??? or better with AMD-V	128 GB	4	1 TB GB SSD NVMe SSD recommended	1920x1080 (Full HD) or better	wired Gigabit Ethernet + 2nd Ethernet or WiFi	USB3 USB boot support

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General Notes

- Systems are installed at the beginning of each class to ensure a consistent environment. A backup is not performed prior to reinstalling, and Red Hat is not responsible for any data loss.
- All student machines used in a course should use identical hardware (required for candidate systems in exam sessions).
- At least one spare system should be available (**required** for exam sessions).
- Physical hardware is required. Third-party virtual machines (e.g., VMware, Citrix) or cloud-based solutions are not supported. Red Hat Training courses and Exams routinely use and/or teach the use of virtual machines in the classroom using the KVM hypervisor included with Red Hat Enterprise Linux. However, the classroom must be hosted on physical hardware in the student's location.
- Red Hat recommends using classroom computer systems that have been **certified by Red Hat**. See https://hardware.redhat.com/ or https://access.redhat.com/ecosystem. When certified hardware is not available, test computer systems by performing an installation of the relevant operating system release, and then confirm proper system, disk, network, and graphics functionality.
- **Hardware must be accessible to the students in the physical classroom.** Hardware in a remote data center and remote desktop access is not supported. Exception: Red Hat Online Learning Environment (OLE) used for Virtual Training and for select classes.
- Red Hat recommends that the classroom computer systems are all attached to an Uninterruptible Power Supply (UPS) for battery backup (strongly encouraged for exam sessions).

BIOS Settings

- Set UEFI machines to "legacy BIOS only." This setting is universally supported, whereas booting "UEFI only" requires disabling Secure Boot, and must be tested with specific hardware.
- Enable network booting (PXE).
- Set hard disks to AHCI (native). Disable RAID arrays.
- If a second hard drive is installed, then deactivate the second drive in the BIOS or disconnect its data cable.
- Check that the "Execute Disable" (XD) CPU feature is available and enabled in the BIOS on all machines. This might be referred to as "Enhanced Virus Protection" (EVP) on AMD systems, or as the "No Execute" (NX) processor flag.
- Enable virtualization support. This is referred to as either "VT" on Intel systems or "AMD-V" on AMD systems.
- Set boot order to CD->Hard Disk->PXE
- Disable all wireless interfaces on student machines. If a second NIC is installed on student machines, then disable it in BIOS or remove it from the system.
- BIOS passwords: Ensure that BIOS settings can be changed by the instructor.

Network

The network configuration for Red Hat training classes is described in this section.

Classroom Network

A **wired** Gigabit Ethernet (1000Mbit) network is required to connect the instructor machine and student machines. This classroom network must be **isolated**, meaning that the network used for systems in this room must not connect to any other networks, servers, or devices outside this physical classroom. Wireless network performance is insufficient, and may not be used for connectivity between student and instructor systems. **Wireless NICs must be removed from student machines for exams** for security reasons**.**

Network Switch Settings

- Factory default settings usually work best.
- All network ports of the classroom network must be connected to the same VLAN
- Disable all protocol filters. The isolated network deploys DHCP, TFTP, and other protocols that must be unfiltered/unmanaged.
- If Spanning Tree Protocol (STP) is used, then ensure that the 'Port Fast' option is enabled on all ports.
- Disable all MAC address filtering and "Port Security" because virtual machine NICs utilize multiple MAC addresses.

Classroom Internet Access

An internet connection is generally required for all courses and exams. A direct, external internet connection is not required, but may instead be routed through facility networking. The second NIC on the Instructor system is used for this internet access, allowing an instructor to control or disable internet access to the Classroom network. Although USB network adapters are insufficient for use on the Classroom network, either wired or wireless USB NIC adapters can be used for the internet uplink as the Instructor system's second NIC. The use of a USB adapter requires manual configuration by the instructor. Please note, certain classes and exams require internet access to complete specific exercises. These courses are indicated in the "***Course & Exam Specific Hardware Requirements***" chart below.

Certified Hardware

Ideally, use Red Hat certified hardware. When not available, perform a test installation of the relevant release and check if network, disk and graphics are functional.

OS Version

The RHEL version noted refers to the operating system installed on the physical computer system, and may not represent the operating systems in the course virtual machines used by students during the course or exams.

WARNING: Skylake processors

RHEL versions 7.2 and older and 6.6 and older are not compatible with the Intel Skylake and later architectures.

Additional Considerations

- **The following courses require access to the OpenShift shared cluster.**
  - *Developing Event-Driven Applications with Apache Kafka and Red Hat AMQ Streams* (AD482)
  - *Introduction to OpenShift Applications* (DO101 v4.6)
  - *Red Hat Cloud-native Microservices Development with Quarkus* (DO378)
- **The following courses require access to the quay.io and gihub.com domains as well as access to ports 80 and 443:**
  - *Red Hat OpenShift Administration II: Operating a Production Kubernetes Cluster* (DO280)

  - *Red Hat OpenShift Administration III: Scaling Kubernetes Deployments in the Enterprise* (DO380)
  - *Red Hat OpenShift Installation Lab* (DO322)
  - *Building Resilient Microservices with Istio and Red Hat Service Mesh* (DO328)
- **The following courses require access to the *.nextcle.com, github.com, quay.io, docker.io, registry.connect.redhat.com, and registry.redhat.io domains as well as access to ports 80, 443, and 6443:**
  - *Developing Event-Driven Applications with Apache Kafka and Red Hat AMQ Streams* (AD482)
  - *Introduction to OpenShift Applications* (DO101)
  - *Introduction to Containers, Kubernetes, and Red Hat OpenShift* (DO180)
  - *Red Hat OpenShift Development I: Containerizing Applications* (DO288)
  - *Red Hat Cloud-native Microservices Development with Quarkus* (DO378)
  - *Red Hat DevOps Pipelines and Processes: CI/CD with Jenkins, Git, and Test Driven Development (TDD)* (DO400)
- ***Microsoft Windows Automation with Red Hat Ansible* (DO417)**
  - This class requires that Your device must be installed with a *Remote Desktop Protocol* (RDP).
    - If running Microsoft Windows, you should have **Microsoft Remote Desktop** installed.
    - If running macOS, you will need to install **Microsoft Remote Desktop for Mac** (by Microsoft) from the App Store.
    - If running Linux, you may install **Remmina** from their distribution (if available) or following instructions at https://remmina.org (if not). If they prefer, they may instead install the FreeRDP clients from their Linux distribution (in the freerdp package in Red Hat Enterprise Linux).
  - This class requires access to public cloud infrastructure for the classroom lab environment virtual machines (VMs) via TCP port 3389.
- ***Ansible for Network Automation*** (**DO457**)
  - This class is run with remote VT-based labs only. All deliveries must be provisioned by Red Hat Training Operations in your region prior to the start of class.
- ***Cloud-Native API Administration with Red Hat 3scale API Management***(**DO240**)
  - This class downloads some material from the public internet.
- ***Red Hat Certified OpenShift Administrator Exam* (EX280 v4.X) & *Red Hat Certified OpenShift Application Developer Exam* (EX288v4.x)**
  - This exam requires the use of cloud based exam systems for OpenShift Container Platform version 4.10, 4.12 and 4.14.
- ***Red Hat Certified Specialist in Systems Deployment and Systems Management Exam* (EX403 v66)**
  - This exam requires the use of cloud based exam systems for Red Hat Satellite version 6.6

Note: Red Hat Training & Certification utilizes the internet connection for exam monitoring. If no internet connection is available, please contact your Red Hat Training & Certification representative.

Internet, Bandwidth, & BYDW Specifications:

In general, when a course requires internet access, the facility must provide students with a minimal bandwidth and latency to the Red Hat Online Learning environment and public cloud infrastructure. As a guideline, a facility that runs any vILT course should provide at least 4 Mbps per student and less than 250 ms latency. Any course that requires a connection to the shared cluster should provide at least 2 Mbps per student and less than 300 ms latency. **Any students that use a bring-your-developer-workstation (BYDW), for a course that supports it, should have at least 16 Mbps bandwidth and less than 300 ms latency.** Tablets will not provide a satisfactory student experience and are not recommended. Laptop devices are required. The following are the recommended specs for your workstation:

Attribute	Minimum Requirements	Recommended
CPU	1.6 GHz or faster processor	Multi-core i7 or equivalent
Memory	8 GB	16 GB or more
Disk	10 GB free space HD	10 GB or more free space SSD
Display Resolution	1024 x 768	1920 x 1080 or greater

All specifications can be tested by using the compatibility tester*.

- **Individual student compatibility tester:**
  - https://www.redhat.com/rhtapps/services/compatibility
- **Facility compatibility tester:**
  - https://www.redhat.com/rhtapps/services/compatibility/classroom

The release of a universal compatibility tester is in planning stages and will be released at a later date. The tester application will reside on the same website page as other instant system/internet compatibility testing applications, and the results will be sent to a user provided email. This tester will evaluate both classroom device readiness and individual BYOD user's device & bandwidth readiness.

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Course & Exam Specific Hardware Requirements:

SKU	Course Title	Hardware Level	OS Version	Internet Required for Delivery	BYDW Optional, Required, or Not Available	Specific Ports Needed
AD141-9.0	Python Programming with Red Hat	2	7.5***	Yes	Strongly recommended	None
AD183-7.0	Red Hat Application Development I: Programming in Java EE	3	7.x	No	Not Available	None
AD221-7.10	Cloud-native Integration with Red Hat Fuse	VT Labs Only	8.4***	Yes	Not Available	6443, 80, 443
AD248-7.4	Red Hat JBoss Application Administration I	3	9.0	No	Not Available	None
AD258-8.0	roduction to Red Hat JBoss Enterprise Application Platform 8	5	9.0	No	Not Available	None
AD482-1.8	Developing Event-Driven Applications with Apache Kafka and Red Hat AMQ Streams	VT Labs Only	8.x	Yes	Strongly recommended	6443
AI267-2.13	Developing and Deploying AI/ML applications on Red Hat OpenShift AI	VT Labs Only	9.4	Yes	Not Available	None
AI267-2.8	Developing and Deploying AI/ML applications on Red Hat OpenShift AI	VT Labs Only	9.2	Yes	Not Available	None
CL110-16.1	Red Hat OpenStack Administration I: Core Operations for Cloud Operators	5	8.x	No	Not available	None
CL170-18.0	OpenStack Administration: Control Plane Management	VT Labs Only	9.2	Yes	Not available	None
CL210-16.1	Red Hat OpenStack Administration II: Day 2 Operations for Cloud Operators	5	8.x	No	Not available	None
CL260-5.0	Cloud Storage with Red Hat Ceph Storage	4	8.4	Yes	Not available	None
CS120-4.14	Introduction to Red Hat OpenShift Service on AWS	VT Labs Only	9.2	Yes	Not available	None
CS220-4.12	Creating and Configuring Production ROSA Clusters	2	9.2	Yes	Not available	None
CS220-4.14	Creating and Configuring Production ROSA Clusters	VT Labs Only	9.2	Yes	Not available	None
CS221-4.14	Integrate ROSA Applications with AWS Services	VT Labs Only	9.2	Yes	Not available	None
DO100-1.22	Red Hat Training: Introduction to Kubernetes Applications	No Lab Env	1.22	-	Strongly recommended	-
DO101-4.6	Introduction to Red Hat OpenShift Applications	VT Labs Only	8.3*	Yes	Strongly recommended	6443
DO121-4.10	Introduction to Microsoft Azure Red Hat OpenShift (ARO)	No Lab Env	4.10	-	Strongly recommended	-
DO180-4.14	Red Hat OpenShift Administration I: Operating a Production Cluster	VT Labs Only	9.2	No	Not available	None
DO188-4.14	Red Hat OpenShift Developer I: Introduction to Containers with Podman	VT Labs Only	9.*	Yes	Not available	None
DO188-4.18	Red Hat OpenShift Developer I: Introduction to Containers with Podman	VT Labs Only	9.5	Yes	Not available	None
DO240-2.11	Cloud-native API Administration with Red Hat 3scale API Management	VT Labs Only	8.5***	Yes	Not Available	80, 443
DO244-1.23	Developing Applications with Red Hat OpenShift Serverless and Knative	6	8.6	Yes	Not Available	None
DO274-2.4	Introduction to Event-Driven Ansible	3	9.3	Yes	Not available	None
DO280-4.14	Red Hat OpenShift Administration II: Configuring a Production Cluster	VT Labs Only	9.2	No	Not available	None
DO288-4.14	Red Hat OpenShift Developer II: Building Kubernetes Applications	4	9.3	Yes	Not available	None
DO313-7.6	Red Hat Single Sign-On Administration	VT Labs Only	7.6	No	Not Available	None
DO316-4.14	Managing Virtual Machines with Red Hat OpenShift Virtualization	VT Labs Only	9.2	No	Not available	None
DO316-4.16	Managing Virtual Machines with Red Hat OpenShift Virtualization	VT Labs Only	9.4	No	Not available	None
DO322-4.6	Red Hat OpenShift Installation Lab	VT Labs Only	8.2	Yes	Not Available	None
DO328-2.0	Building Resilient Microservices with Istio and Red Hat Service Mesh	VT Labs Only	8.2***	Yes	Not available	None
DO336-4.16	Automate and Manage Red Hat OpenShift Virtualization with Ansible	VT Labs Only	9.4	No	Not available	None

DO346-4.16	Migrating Virtual Machines to Red Hat OpenShift Virtualization with Ansible Automation Platform	VT Labs Only	9.4	No	Not available	None
DO370-4.16	Enterprise Kubernetes Storage with Red Hat OpenShift Data Foundation	VT Labs Only	9.4	No	Not available	None
DO374-2.2	Developing Advanced Automation with Red Hat Ansible Automation Platform	4	8.4	No	Not available	None
DO378-2.13	Red Hat Cloud-native Microservices Development with Quarkus	4	8.6	Yes	Not available	None
DO378-3.8	Red Hat Cloud-native Microservices Development with Quarkus	4	9.3	Yes	Not available	None
DO380-4.14	Red Hat OpenShift Administration III: Scaling Deployments in the Enterprise	VT Labs Only	9.2	No	Not available	None
DO400-4.6	Red Hat DevOps Pipelines and Processes: CI/CD with Jenkins, Git, and Test Driven Development (TDD)	VT Labs Only	8.2***	Yes	Strongly recommended	6443
DO417-2.4	Microsoft Windows Automation with Red Hat Ansible Automation Platform	VT Labs Only	9	Yes	Not available	None
DO430-4.6	Securing Kubernetes Clusters with Red Hat Advanced Cluster Security	VT Labs Only	9.4	Yes	Not available	None
DO457-2.3	Network Automation with Red Hat Ansible Automation Platform	VT Labs Only	9.2	No	Not available	None
DO467-2.2	Managing Enterprise Automation with Red Hat Ansible Automation Platform	5	8.6	No	Not available	None
DO480-2.4	Multicluster Management with Red Hat OpenShift Platform Plus	VT Labs Only	8.5	Yes	Not available	None
RH104-9.1	Red Hat Training: Getting Started with Linux Fundamentals	VT Labs Only	9	No	Not Available	None
RH124-8.2	Red Hat System Administration I	3	8.x	No	Not Available	None
RH124-9.3	Red Hat System Administration I	3	9.3	No	Not Available	None
RH134-8.2	Red Hat System Administration II	3	8.x	No	Not Available	None
RH134-9.3	Red Hat System Administration II	3	9.3	No	Not Available	None
RH174-7.9	Managing CentOS Migrations and RHEL Upgrades	VT Labs Only	7.9	No	Not Available	None
RH199-8.2	RHCSA Rapid Track Course	3	8.x	No	Not Available	None
RH199-9.3	RHCSA Rapid Track Course	3	9.3	No	Not Available	None
RH294-8.4	Red Hat Enterprise Linux Automation with Ansible	3	8.x	No	Not Available	None
RH294-9.0	Red Hat Enterprise Linux Automation with Ansible	3	9	No	Not Available	None
RH304-10.0	New Features in Red Hat Enterprise Linux	3	10	No	Not Available	None
RH318-4.3	Red Hat Virtualization	4	7.x*	No	Not Available	None
RH342-8.4	Red Hat Enterprise Linux Diagnostics and Troubleshooting	3	8.4	Yes	Not Available	None
RH354-8.0	Red Hat Enterprise Linux 8 New Features for Experienced Linux Administrators	3	8.x	No	Not Available	None
RH358-8.1	Red Hat Services Management and Automation	3	8.x	No	Not Available	None
RH358-9.4	Red Hat Services Management and Automation	4	9.4	No	Not Available	None
RH362-9.1	Red Hat Identity Management with Microsoft Active Directory Integration	5	9.1	Yes	Not Available	None
RH403-6.11	Red Hat Satellite 6 Administration	VT Labs Only	RHEL 8 / RHEL 9	Yes	Not available	None
RH403-6.15	Red Hat Satellite 6 Administration	VT Labs Only	9.5	Yes	Not available	None
RH415-9.2	Red Hat Security: Linux in Physical, Virtual, and Cloud	VT Labs Only	9	Yes	Not Available	None
RH436-8.3	Red Hat High Availability Clustering	3	8.x	No	Not Available	None
RH442-8.0	Red Hat Enterprise Performance Tuning	2	8.x	No	Not Available	None
RH445-8.4	Scaling SAP with Red Hat Enterprise Linux for SAP Solutions	VT Labs Only	SAP HANA	Yes	Not Available	None
TL112-1.0	Introduction to Pragmatic SRE	No Lab Env	-	-	-	-
TL250-1.0	Red Hat Training: Open Practices for your DevOps Journey	No Lab Env	-	-	-	-
TL500-4.0	DevOps Culture & Practice	VT Labs Only	8.6	Yes	Not Available	None

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SKU	Exam Title	Hardware Level	OS Version	Internet Required for Delivery:	BYDW Optional, Required, or Not Available	Specific Ports Needed for Delivery
EX183V70	Red Hat Certified Enterprise Application Developer	3	7.x**	Yes	-	-
EX188V4	Red Hat Certified Specialist in Containers	1	RHEL 8.6	Yes	-	-
EX200V8	Red Hat Certified System Administrator	3	8.x	Yes	-	-
EX200V93	Red Hat Certified System Administrator	3	9	Yes	-	-
EX200V9	Red Hat Certified System Administrator	3	9	Yes	-	-
EX210V16.1	Red Hat Certified Specialist in Cloud Infrastructure	3	8.2	Yes	-	-
EX221V710	Red Hat Certified Specialist in Cloud-native Integration	4	8.2	Yes	-	-
EX229v4.14	Red Hat Certified Specialist in ROSA	3	8.*	Yes	-	6443, 8443, 80, 443
EX240V211	Red Hat Certified Specialist in API Management	3	8.5	Yes	-	443
EX248V70	Red Hat Certified Specialist in Enterprise Application Server Administration	3	7.x**	Yes	-	-
EX248V74	Red Hat Certified Specialist in Enterprise Application Server Administration	4	8.5*	Yes	-	-
EX260V42	Red Hat Certified Specialist in Ceph Cloud Storage	4	8.*	Yes	-	-
EX260V50	Red Hat Certified Specialist in Ceph Cloud Storage	4	8.4*	Yes	-	-
EX267V28	Red Hat Certified Specialist in OpenShift AI Exam	1	9.2	Yes	-	-
EX267V213	Red Hat Certified Specialist in OpenShift AI Exam	1	9.2	Yes	-	-
EX280V410	Red Hat Certified Specialist in OpenShift Administration	2	8.2	Yes	-	443, 22
EX280V412	Red Hat Certified Specialist in OpenShift Administration	2	8.*	Yes	-	-
EX280V414	Red Hat Certified Specialist in OpenShift Administration	2	8.*	Yes	-	-
EX288V410	Red Hat Certified Specialist in OpenShift Application Development	2	8.4	Yes	-	-
EX288V412	Red Hat Certified Specialist in OpenShift Application Development	2	8.6	Yes	-	443, 22
EX294V84	Red Hat Certified Engineer	2	8.x*	Yes	-	-
EX294V9	Red Hat Certified Engineer	3	9 *	Yes	-	-
EX316V410	Red Hat Certified Specialist in OpenShift Virtualization Exam	2	8.*	Yes	-	-
EX316V414	Red Hat Certified Specialist in OpenShift Virtualization Exam	1	9.2+	Yes	-	-
EX316V416	Red Hat Certified Specialist in OpenShift Virtualization Exam	1	9.*	Yes	-	-
EX318V43	Red Hat Certified Specialist in Virtualization	1	7.6+	Yes	-	-
EX328V20	Red Hat Certified Specialist in Building Resilient Microservices	2	8.x	Yes	-	-
EX342V84	Red Hat Certified Specialist in Enterprise Linux Diagnostics and Troubleshooting	3	8.x	Yes	-	-
EX358V81	Red Hat Certified Specialist in Services Management and Automation	4	8.1	Yes	#N/A	-
EX362V45	Red Hat Certified Specialist in Identity Management	4	8.x*	Yes	-	-
EX362V48	Red Hat Certified Specialist in Identity Management	3	9.*	Yes	-	-
EX370V47	Red Hat Certified Specialist in OpenShift Data Foundation	2	8.x*	Yes	-	443
EX374V20	Red Hat Certified Specialist in Developing Automation with Ansible Automation Platform	4	8.4	Yes	-	-
EX374V22	Red Hat Certified Specialist in Developing Automation with Ansible Automation Platform	4	8.6 *	Yes	-	-
EX378V213	Red Hat Certified Cloud-native Developer	4	8.2	Yes	-	-
EX378V38	Red Hat Certified Cloud-native Developer	4	9.2	Yes	-	-
EX380V410	Red Hat Certified Specialist in OpenShift Automation and Integration	2	8.4	Yes	-	-
EX380V414	Red Hat Certified Specialist in OpenShift Automation and Integration	2	8.6	Yes	-	-
EX380V46	Red Hat Certified Specialist in OpenShift Automation and Integration	2	8.x*	Yes	-	443
EX403V611	Red Hat Certified Specialist in Enterprise Deployment and Systems Management	2	8.6	Yes	-	443/tcp 443/udp, 50022,50080,50443,510

						22,52022,52122,52222,53022,53090
EX403V66	Red Hat Certified Specialist in Enterprise Deployment and Systems Management	1	7.6+	Yes	-	-
EX415V75	Red Hat Certified Specialist in Security: Linux	3	7.x**	Yes	-	-
EX415V92	Red Hat Certified Specialist in Security: Linux	3	9.2	Yes	-	-
EX417V24	Red Hat Certified Specialist in Microsoft Windows Automation with Ansible Exam	2	8.*	Yes	#N/A	5.70226E+16
EX436V7	Red Hat Certified Specialist in High Availability Clustering	3	7.x**	Yes	-	-
EX436V83	Red Hat Certified Specialist in High Availability Clustering	3	8.x*	Yes	-	-
EX442V8	Red Hat Certified Specialist in Performance Tuning	2	8.x	Yes	-	-
EX457V23k	Red Hat Certified Specialist in Ansible Network Automation	2	8.6+	Yes	#N/A	-
EX457V25	Red Hat Certified Specialist in Ansible Network Automation	1	8.2	Yes	-	-
EX467V22	Red Hat Certified Specialist in Managing Automation with Ansible Automation Platform Exam	1		Yes		
EX480V410	Red Hat Certified Specialist in MultiCluster Management	2	8.4*	Yes	-	-
EX482V18	Red Hat Certified Specialist in Event-Driven Development with Kafka	4	8.x	Yes	-	-
PE110V16	Preliminary Exam in Red Hat OpenStack Administration	-	-	Yes	Required	-
PE124V80	Preliminary Exam in Red Hat System Administration I	-	-	Yes	Required	-
PE124V90	Preliminary Exam in Red Hat System Administration I	-	9.*	Yes	Required	-
PE180v412	Preliminary Exam in Red Hat OpenShift Administration	-	8.*	Yes	Required	-

** This course requires nested virtualization. Note, physical machines running later RHEL versions provide the best performance.*

*** The maximum Foundation version is 7.5 due to issues with registration. Foundation 7.6 or later may be allowed with prior approval from the Certification Team.*

**** A second NIC is required in the instructor machine for internet connectivity.*