

# OpenStack I

## Basics of an Open Stack Platform

The rapid increase in virtualization in data centers and the buzzwords cloud and OpenStack are increasingly making the rounds at many companies. This course provides a very good insight into the basic OpenStack infrastructure. The technologies for setting up such infrastructures and the individual components of OpenStack are presented. Design aspects and prerequisites of the solution are also discussed. Fundamentals such as cloud computing, storage virtualization and KVM/VMware are also explained to round off the OpenStack topic. The course provides a holistic picture and a solid foundation of know-how on the subject of OpenStack infrastructures. It provides an outlook on how data centers and cloud architectures may continue to change in the coming years. In addition, the knowledge learned about OpenStack is deepened in smaller exercises.

### Course Contents

- Introduction to virtualization, storage and storage virtualization
- Cloud Computing
- Overview of OpenStack
- Applications in the Cloud
- Reference Architectures
- Neutron, Glance, Horizon, Nova, Swift & many more modules of OpenStack

**E-Book** The detailed digital documentation package, consisting of an e-book and PDF, is included in the price of the course.

### Target Group

The course is aimed at anyone who wants to familiarize themselves with the topics of virtualization and OpenStack without having to configure it themselves. For decision-makers, sales and pre-sales employees working in the cloud environment, the course provides a solid foundation of know-how and a great insight into the application scenarios with OpenStack, their limits and the state-of-the-art developments in these areas.

### Prerequisites

The willingness to deal technically with the topics of virtualization and OpenStack and to understand the basics and interrelationships of the various building blocks are prerequisites for successful course participation.

### This Course in the Web



You can find the up-to-date information and options for ordering under the following link:  
[www.experteach-training.com/go/OSGR](http://www.experteach-training.com/go/OSGR)

### Reservation

On our Website, you can reserve a course seat for 7 days free of charge and in a non-committal manner. This can also be done by phone under +49 6074/4868-0.

### Guaranteed Course Dates

To ensure reliable planning, we are continuously offering a wide range of guaranteed course dates.

### Your Tailor-Made Course!

We can precisely customize this course to your project and the corresponding requirements.

Training		Prices, excl. of V.A.T.	
Classes in Germany		5 Days	€ 3,195
Online Training		5 Days	€ 3,195
Date/course venue	Course language German 		
19/05-23/05/25  Frankfurt	10/11-14/11/25  Frankfurt		
19/05-23/05/25  Online	10/11-14/11/25  Online		

Status 04/24/2025



EXPERTeach



# Table of Contents

## OpenStack I – Basics of an Open Stack Platform

<b>1 Virtualization</b>	<b>4.1.4</b> RESTful APIs	<b>7.4.1</b> OpenStack API and REST
<b>1.1</b> Introduction to Virtualization	<b>4.2</b> Keystone	<b>7.5</b> Applications in the Cloud
<b>1.2</b> Virtual Architecture	<b>4.3</b> Glance	<b>7.5.1</b> Demands Made on Cloud Applications
<b>1.3</b> Virtual Machines	<b>4.4</b> Nova	<b>7.5.2</b> Current Application Scenarios
<b>1.4</b> Tasks of the Virtualization Layer	<b>4.4.1</b> Components of Nova	<b>7.5.3</b> Databases in the Cloud
<b>1.4.1</b> CPU Virtualization	<b>4.4.2</b> Ironic (Bare Metal) & Zun (Docker)	<b>7.6</b> Application Security and Compliance
<b>1.4.2</b> RAM	<b>4.5</b> Swift (Object)	<b>7.7</b> Availability and Scalability
<b>1.4.3</b> Virtual Networks	<b>4.6</b> Cinder (Block)	<b>7.7.1</b> Hardware Scalability
<b>1.4.4</b> Hard Disks and Drives		<b>7.7.2</b> Scalability of Applications
<b>1.5</b> VMware	<b>5 Neutron and Other Network Modules</b>	<b>7.7.3</b> I/O Behavior
<b>1.5.1</b> The Product Range	<b>5.1</b> Neutron in General	
<b>1.6</b> KVM	<b>5.2</b> Neutron Architecture	<b>8 Reference Architectures</b>
<b>1.6.1</b> QEMU	<b>5.2.1</b> Core Plug-in	<b>8.1</b> Cloud Setup
<b>1.6.2</b> libvirt	<b>5.2.2</b> Service Plug-in	<b>8.1.1</b> Server Hard- and Software
<b>1.7</b> Container Virtualization	<b>5.3</b> IPv6 and OpenStack	<b>8.1.2</b> Network, Server, and Storage Particularities
<b>1.7.1</b> Linux Containers (LXC)	<b>5.4</b> Overlay Networks	<b>8.1.3</b> The Network in Transition
<b>1.7.2</b> LXD (Linux Container Hypervisor)	<b>5.5</b> Example	<b>8.1.4</b> OpenStack Architectures
<b>1.7.3</b> Docker	<b>5.6</b> Software-Defined Network	<b>8.2</b> Automation and Orchestration
<b>1.8</b> Scalability and Security	<b>5.7</b> Octavia—Load-Balancer as a Service	<b>8.2.1</b> Application Orchestration
	<b>5.8</b> Designate—DNSaaS	<b>8.2.2</b> End-to-End Management—e.g. BMC BladeLogic
<b>2 Storage and Storage Virtualization</b>	<b>6 Further Modules</b>	<b>8.3</b> Management and Deploy
<b>2.1</b> Significance of Data Storage	<b>6.1</b> Horizon	<b>8.3.1</b> Deploying an Instance
<b>2.2</b> Storage Media	<b>6.1.1</b> Project	<b>8.4</b> Troubleshooting OpenStack
<b>2.2.1</b> Direct Attached Storage	<b>6.1.2</b> Admin	<b>8.5</b> OpenStack HA
<b>2.3</b> Network Storage	<b>6.1.3</b> Identity	<b>8.6</b> OpenStack Monitoring
<b>2.3.1</b> Network-Attached Storage	<b>6.2</b> Installation Ceilometer & Co.	
<b>2.3.2</b> Storage Area Networks	<b>6.3</b> Gnocchi	<b>9 Final Discussion</b>
<b>2.3.3</b> iSCSI	<b>6.4</b> Panko	<b>9.1</b> What does OpenStack have to offer?
<b>2.3.4</b> NFS, iSCSI, FC, and FCoE in Comparison	<b>6.5</b> aodh	<b>9.2</b> Which are the advantages entailed by OpenStack?
<b>2.4</b> Storage Consolidation and Data Deduplication	<b>6.6</b> Heat	<b>9.3</b> Which dangers does OpenStack entail?
<b>2.5</b> Storage Virtualization	<b>6.7</b> Trove	<b>9.4</b> Which monitoring options are available?
<b>2.6</b> Synchronous and Asynchronous Mirroring	<b>6.8</b> Sahara	<b>9.5</b> Which performance does OpenStack deliver?
<b>2.7</b> Storage Cluster	<b>6.8.1</b> Data Processing	<b>9.6</b> Which SLAs would be realistic?
<b>2.8</b> Features of Modern Storage Systems	<b>6.8.2</b> Hadoop	<b>9.7</b> Preview?
<b>2.9</b> Data Storage in the Cloud	<b>6.8.3</b> MapReduce	<b>9.7.1</b> Current Status
<b>2.10</b> File Systems	<b>6.8.4</b> HDFS	<b>9.7.2</b> Future Status?
<b>2.11</b> Software-Defined Storage	<b>6.9</b> Magnum	<b>9.7.3</b> Current Development
<b>2.11.1</b> Ceph	<b>6.10</b> Monasca	
<b>3 Cloud Computing</b>	<b>6.11</b> Murano	<b>A Exercises on OpenStack</b>
<b>3.1</b> The Motivation		<b>A.1</b> Login to the Environment
<b>3.2</b> Cloud Computing Service Models	<b>7 Applications in the Cloud</b>	<b>A.2</b> Exercise on Glance
<b>3.2.1</b> The Different Types of Clouds	<b>7.1</b> Demands Made on Network and Storage	<b>A.3</b> Exercise on Nova
<b>3.3</b> Security in Cloud Computing	<b>7.1.1</b> Connection in the LAN	<b>A.4</b> Exercise on Swift
<b>3.4</b> Typical Services from the Cloud	<b>7.1.2</b> Connection to the SAN	<b>A.5</b> Exercise on Cinder
<b>3.4.1</b> Typical Services	<b>7.1.3</b> Connection to the WAN	<b>A.6</b> Exercise on Neutron
	<b>7.2</b> Security in the Cloud	<b>A.6.1</b> Further Exercise on Cinder
<b>4 The Core Services</b>	<b>7.2.1</b> Hypervisor Security	<b>A.7</b> Exercise on Heat
<b>4.1</b> OpenStack	<b>7.3</b> Licensing and Standardization	<b>A.8</b> Exercise on all Modules
<b>4.1.1</b> Features of OpenStack I	<b>7.3.1</b> Licensing in the Hybrid Cloud	
<b>4.1.2</b> OpenStack Modules	<b>7.3.2</b> Standardization and Interfaces	<b>B List of Abbreviations</b>
<b>4.1.3</b> AMQP	<b>7.4</b> Interfaces	

