

# Docker (GL340) HODS3S

<b>HPE course number</b>	HODS3S
<b>Course length</b>	3 days
<b>Delivery mode</b>	ILT, VILT
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Linux containers are changing the way companies think about service development and deployment. Containers play a vital role in the modern data-center, and Docker is leading the way. This course covers all the core features of Docker including: container creation and management, interacting with Docker hub, using Dockerfile to create and manage custom images, advanced Docker networking (how to safely expose container services to the world, and link containers), the use of Docker volumes to manage persistent data, and Docker Compose to build multi-container applications. Emphasis is placed on best practices and how to secure Docker installations and containers. The course culminates with comprehensive labs where students use Docker, Git, and a continuous integration server to automate the testing of containerized applications.

## Prerequisites

Proficiency with the Linux CLI. A broad understanding of Linux system administration.

## Supported Distributions

- Red Hat Enterprise Linux 7
- Ubuntu 16.04 LTS

## Detailed Course Outline

<b>Module 1: Container Technology Overview</b>	<ul style="list-style-type: none"> <li>• Application Management Landscape</li> <li>• Application Isolation</li> <li>• Resource Measurement and Control</li> <li>• Container Security</li> <li>• Open Container Initiative</li> </ul>	<ul style="list-style-type: none"> <li>• Docker Ecosystem</li> </ul> <p><b>Lab Tasks</b></p> <ul style="list-style-type: none"> <li>• Container Concepts runC</li> <li>• Container Concepts Systemd</li> </ul>
<b>Module 2: Installing Docker</b>	<ul style="list-style-type: none"> <li>• Installing Docker</li> <li>• Docker Architecture</li> <li>• Starting the Docker Daemon</li> <li>• Docker Daemon Configuration</li> <li>• Docker Control Socket</li> <li>• Enabling TLS for Docker</li> </ul>	<ul style="list-style-type: none"> <li>• Validating Docker Install</li> </ul> <p><b>Lab Tasks</b></p> <ul style="list-style-type: none"> <li>• Installing Docker</li> <li>• Install Docker via Docker Machine</li> <li>• Protecting Docker with TLS</li> </ul>
<b>Module 3: Managing Containers</b>	<ul style="list-style-type: none"> <li>• Creating a New Container</li> <li>• Listing Containers</li> <li>• Viewing Container Operational Details</li> <li>• Running Commands in an Existing Container</li> <li>• Interacting with a Running Container</li> <li>• Stopping, Starting, and Removing Containers</li> </ul>	<ul style="list-style-type: none"> <li>• Copying files in/out of Containers</li> <li>• Inspecting and Updating Containers</li> </ul> <p><b>Lab Tasks</b></p> <ul style="list-style-type: none"> <li>• Managing Containers</li> <li>• Configure a docker container to start at boot.</li> </ul>
<b>Module 4: Managing Images</b>	<ul style="list-style-type: none"> <li>• Docker Images</li> <li>• Listing and Removing Images</li> <li>• Searching for Images</li> <li>• Downloading Images</li> <li>• Committing Changes</li> <li>• Uploading Images</li> </ul>	<ul style="list-style-type: none"> <li>• Export/Import Images</li> <li>• Save/Load Images</li> </ul> <p><b>Lab Tasks</b></p> <ul style="list-style-type: none"> <li>• Docker Images</li> <li>• Docker Platform Images</li> </ul>
<b>Module 5: Creating Images with Dockerfile</b>	<ul style="list-style-type: none"> <li>• Dockerfile</li> <li>• Caching</li> <li>• docker image build</li> <li>• Dockerfile Instructions</li> <li>• ENV and WORKDIR</li> <li>• Running Commands</li> </ul>	<ul style="list-style-type: none"> <li>• Getting Files into the Image</li> <li>• Defining Container Executable</li> <li>• Best Practices</li> </ul> <p><b>Lab Tasks</b></p> <ul style="list-style-type: none"> <li>• Dockerfile Fundamentals</li> </ul>
<b>Module 6: Docker Volumes</b>	<ul style="list-style-type: none"> <li>• Volume Concepts</li> <li>• Creating and Using Internal Volumes</li> <li>• Creating and Using External Volumes</li> <li>• Managing Volumes (cont.)</li> <li>• Changing Data in Volumes</li> <li>• Removing Volumes</li> </ul>	<ul style="list-style-type: none"> <li>• Backing up Volumes</li> <li>• SELinux Considerations</li> <li>• Mapping Devices</li> </ul> <p><b>Lab Tasks</b></p> <ul style="list-style-type: none"> <li>• Docker Volumes</li> </ul>

**Module 7: Docker Compose/Swarm**

- Concepts
  - Compose CLI
  - Defining a Service Set
  - Docker Swarm Proxy (Legacy)
  - Docker Engine Swarm Mode (Modern)
  - Creating a Swarm
- Creating Services
- Lab Tasks**
- Docker Compose
  - Docker Swarm Proxy
  - Docker Engine Swarm Mode

**Module 8: Docker Networking**

- Overview
  - Data-Link Layer Details
  - Network Layer Details
  - Hostnames and DNS
  - Service Reachability
  - Container to Container Communication
  - Container to Container: Links
  - Container to Container: Private Network
  - Managing Private Networks
- Remote Host to Container
  - Multi-host Networks with Overlay Driver
- Lab Tasks**
- Docker Networking
  - Exposing Ports
  - Docker Links
  - Docker Networking
  - Multi-host Networks

**Appendix A: Docker Registry**

- Lab Tasks**
- Docker Registry
- Docker Registry (secured)
  - Docker Content Trust

**Appendix B: Continuous Integration with GitLab, GitLab CI, and Docker**

- Lab Tasks**
- GitLab and GitLab CI Setup
- Unit and Functional Tests

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