



# Configuring and Deploying HPE MSR Routers HK645S

<b>HPE course number</b>	HK645S
<b>Course length</b>	3 days
<b>Delivery mode</b>	ILT
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In this three-day course, students will complete hands-on activities that implement basic and advanced configurations of HPE MSR Series routers. The key products discussed are the HPE MSR Series Routers. Topics include: features of the HPE MSR Series router families, architecture of the MSR Series products, upgrading, configuring, monitoring and troubleshooting HPE MSR routers.

## Why HPE Education Services?

- IDC MarketScape leader 4 years running for IT education and training\*
- Recognized by IDC for leading with global coverage, unmatched technical expertise, and targeted education consulting services\*
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## Audience

- Network and System Administrators
- Network Engineers

## Prerequisites

- Basic fundamental LAN/WAN networking knowledge
- Theoretical knowledge of the following WAN protocols & services:
  - Routing and Switching Fundamentals
  - RIP
  - OSPF
  - BGP

## Course objectives

Upon successful completion of this course, students should be able to implement, configure and monitor the following key protocols and services:

- Internet Protocol
- Static Routing

- Routing Information Protocol (RIP)
- Open Shortest Path First (OSPF)
- Virtual Router Redundancy Protocol (VRRP)
- ACLs
- Network Address Translation (NAT)
- Border Gateway Protocol (BGP)
- Troubleshooting

## Benefits to you

- Gain hands-on experience with the product and acquire a detailed understanding of the features, functionality and the skills needed to install, configure and manage the products
- Experienced instructors provide you with a comprehensive overview, in-depth information and practical exercises on the products and technologies

\*Realize Technology Value with Training, IDC Infographic 2037, Sponsored by HPE, January 2016

## Detailed course outline

<b>Module 1: Introduction and Product Overview</b>	<ul style="list-style-type: none"> <li>• Two Day Agenda</li> <li>• HPE A-Series portfolio overview</li> </ul>	<ul style="list-style-type: none"> <li>• A-Series router portfolio</li> <li>• HPEN MSR Router Overview</li> </ul>
<b>Module 2: Basic router configuration</b>	<ul style="list-style-type: none"> <li>• Objectives</li> <li>• Console cable</li> <li>• Using the Console Port</li> <li>• Authentication modes</li> <li>• CLI command privilege levels</li> <li>• Configure console access</li> <li>• Configure Telnet access</li> <li>• Configure SSH access</li> <li>• Views (contexts) structure</li> <li>• Views in the CLI</li> <li>• A-Series CTRL</li> </ul>	<ul style="list-style-type: none"> <li>• Saving and deleting working configurations</li> <li>• Common upgrade methods</li> <li>• A-MSR router upgrade in FTP mode</li> <li>• A-MSR router upgrade over FTP (cont.)</li> <li>• Boot menu-File control</li> <li>• Initial system configuration</li> <li>• Displaying interface status</li> <li>• Displaying interface details</li> <li>• Debugging commands</li> <li>• Useful command reference</li> <li>• Lab Activity: Initial Router Configuration</li> </ul>
<b>Module 3: Routing Basics and RIP</b>	<ul style="list-style-type: none"> <li>• Objectives</li> <li>• Types of routes</li> <li>• Components of a route</li> <li>• Route table information</li> <li>• IP routes sources preferences</li> <li>• Static routes</li> <li>• Dynamic routing</li> <li>• Types of dynamic routing protocols</li> <li>• RIP overview</li> </ul>	<ul style="list-style-type: none"> <li>• RIP update example</li> <li>• RIP: Problems</li> <li>• RIP: Solutions</li> <li>• Split horizon</li> <li>• RIP configuration: Sample setup</li> <li>• RIP configuration</li> <li>• RIP configuration verification</li> <li>• Lab Activity: Configuring static routing and RIP</li> </ul>
<b>Module 4: Single area OSPF</b>	<ul style="list-style-type: none"> <li>• Objectives</li> <li>• OSPF routing protocol</li> <li>• Reviewing OSPF basics</li> <li>• Dynamic Routing Link State Principle OSPF</li> <li>• Dynamic Routing Broadcast Networks</li> <li>• Dynamic Routing IP OSPF V2 Topology Overview</li> <li>• OSPF Configuration (cont.)</li> </ul>	<ul style="list-style-type: none"> <li>• Explicitly Specifying the Router ID</li> <li>• Specifying the Authentication at Area Level</li> <li>• Specifying the Authentication at Interface Level</li> <li>• Redistributing Static in to OSPF</li> <li>• show ip ospf interface command</li> <li>• show ip ospf database command</li> <li>• Lab Activity 5: Configuring single area OSPF</li> </ul>
<b>Module 5: Configuring VRRP</b>	<ul style="list-style-type: none"> <li>• Objectives</li> <li>• Basic default gateway redundancy operation</li> <li>• VRRP: automatic failover for default gateway</li> <li>• VRRP terminology review</li> <li>• Client interacts with virtual router</li> <li>• Automatic failover</li> </ul>	<ul style="list-style-type: none"> <li>• Sample setup</li> <li>• VRRP Configuration</li> <li>• Verify VRRP</li> <li>• Other Features: Verify VRRP</li> <li>• Lab Activity: Configuring VRRP</li> </ul>
<b>Module 6: Multi Area OSPF</b>	<ul style="list-style-type: none"> <li>• Objectives</li> <li>• Multi-Area OSPF Hierarchical Design</li> <li>• Overview about OSPF Routers</li> <li>• OSPF Areas (official types)</li> <li>• LSA Types &amp; Flooding Scopes</li> <li>• Case Study—Multi Area</li> <li>• Multi-area Config</li> <li>• Other Router's Sample OSPF Configuration</li> <li>• Verify the OSPF Status</li> <li>• LSA Flooding: Stub Area</li> <li>• Case Study—Stub Area</li> </ul>	<ul style="list-style-type: none"> <li>• Stub Area Config</li> <li>• Stub Area—Default Route</li> <li>• Stub Area with No Summaries</li> <li>• Stub Area with No Summary</li> <li>• Stub Area Config</li> <li>• Stub Display OSPF</li> <li>• No Summaries NSSA</li> <li>• NSSA with No Summary</li> <li>• Stub NSSA Config</li> <li>• Lab Activity: Configuring Multi-Area OSPF</li> </ul>

## Course data sheet

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### Module 7: ACL and NAT

- Objective
- Access-list Overview
- Match Conditions in an Access-list
- Actions in an Access-list
- Configuring a Basic Access-List
- Basic ACL
- Configuring an Advanced Access-list
- Advanced ACL—Sample
- Sample Topology
- Verifying an ACL
- Displaying ACL
- NAT Basics
- NAT Configuration
- Lab Activity: ACL and NAT

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### Module 8: Configuring Border Gateway Protocol

- Objectives
  - BGP Overview
  - BGP Messages
  - Complete BGP illustration
  - Exterior BGP
  - Interior BGP
  - Why is an IGP necessary?
  - IBGP Full-mesh Scaling
  - BGP Path Attributes (= BGP Metrics)
  - Important BGP Attributes
  - AS-Path Attribute
  - AS-PATH Attribute Example
  - Origin Attribute
  - Origin Attribute Example
  - Nexthop Attribute
  - Nexthop Attribute Example
  - Resolving EBGp Next Hops
  - Local Preference Attribute
  - Local Preference Example
  - Metric Attribute
  - Metric Attribute Example
  - BGP Route Selection Procedure
  - BGP—Basic Configuration
  - Displaying BGP peers
  - Displaying BGP routing table
  - Overview of the IP Routing Policy
  - Five policy-related Filters
  - Relationship between Routing Policy and Filters
  - List of Routing policy Configuration Tasks
  - Defining the if-match Clause of the Route-Policy
  - Defining the apply Clause of the Route-Policy
  - Execution Rules of the Route-Policy
  - AS Regular Expression
  - Configuring Route Import
  - Defining ip-prefix List
  - Configure Route Filter
  - Monitoring and Maintaining the Routing Policy
  - ACL-based Route Filtering
  - AS-Path-based Route Filtering
  - Border Gateway Protocol Route Policy-based Route Filtering
  - Lab Activity: Configuring BGP
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