



Configuring BGP on Cisco Routers BGP (642-661)

Course Objective:

After completing this course the student should be able to:

- Given a network scenario with multiple domains, configure, monitor and troubleshoot basic BGP to enable interdomain routing
- Given a network scenario where connections to multiple ISPs must be supported, use BGP policy controls to influence the route selection process with minimal impact on BGP route processing
- Given a network scenario where multiple connections must be supported, use BGP attributes to influence the route selection process
- Given customer connectivity requirements, implement the correct BGP configuration to successfully connect the customer's network to the Internet
- Given a typical service provider network with multiple BGP connections to other autonomous systems, enable the provider network to behave as a transit autonomous system
- Given a typical service provider network, identify common BGP scaling issues and enable route reflection and confederations as possible solutions to these issues
- Given a typical BGP network, use available BGP tools and features to optimize the scalability of the BGP routing protocol

Prerequisite:

Valid CCNA Certification.

Certificate of Attendance :

Certificate of Attendance will be awarded to students completing the course achieving minimum 75% attendance.

Training Methodology & Materials:

- Practical hands-on sessions, 75% lab-based and 25% theory-based.
- Well-designed lab sessions to enhance further understanding of the courseware.

Training Duration:

Full-Time : 5days (9:30am – 5:30pm)

Part-Time : 10 sessions (twice a week ; 7.00pm – 10:00pm)

DETAILED COURSE OUTLINE

Module : Configuring BGP on Cisco Routers (BGP) (642-661)

The 642-661 BGP exam is a qualifying exam for the CCIP certification. The 642-661 BGP exam tests material covered under the Configuring BGP on Cisco Routers (BGP) v 3.1 course. The BGP exam assesses a candidate's understanding of the theory of BGP, ability to configure BGP on Cisco IOS routers, and skills with troubleshooting on BGP. As a routing protocol, BGP is one of the underlying foundations of the Internet and new-world technologies.

BGP Overview

Introduction to BGP

- Given a network scenario, identify appropriate BGP usage and its limitations

BGP Session Establishment

- Given a typical BGP network scenario, describe the concept of BGP neighbors and the neighbor session establishment procedures

BGP Route Processing

- Given a diagram of an operational BGP network, describe interdomain route processing, route propagation and BGP path selection

Basic BGP Configuration

- Given a network consisting of multiple domains, successfully configure BGP

Monitoring and Troubleshooting BGP

- Given a configured BGP network, verify proper operation and perform the steps necessary to correct basic BGP configuration errors

Route Selection Using Policy Controls

Multi-Homed BGP Networks

- Given a customer scenario where connections to multiple ISPs must be supported, describe the need for influencing BGP route selection

AS-Path Filters

- Given a customer scenario where connections to multiple ISPs must be supported, successfully configure BGP to influence route selection using AS path filters

Prefix-List Filters

- Given a customer scenario where connections to multiple ISPs must be supported, successfully configure BGP to influence route selection using prefix-list filters

Outbound Route Filtering

- Given an operational BGP network, use outbound route filtering to minimize the impact of BGP routing updates on router resources

Route-Maps as BGP Filters

- Given a typical BGP network, correctly configure BGP to influence route selection using route maps

Implementing Changes in BGP Policy

- Given a typical BGP network, configure the route-refresh feature to minimize the impact of expediting BGP policy updates

Route Selection Using Attributes

BGP Path Attributes

- List BGP path attributes and functionality of each attribute Influencing BGP Route Selection with Weights
- Given a customer scenario where multiple connections must be supported, successfully configure BGP to influence route selection using the weight attribute

BGP Local Preference

- Given a customer scenario where multiple connections must be supported, successfully configure BGP to influence route selection using the local preference attribute

BGP Multi-Exit-Discriminator (MED)

- Given a customer scenario where multiple connections must be supported, successfully configure BGP to influence route selection using the Multi-Exit-Discriminator (MED) attribute

BGP Communities

- Given a customer scenario where multiple connections must be supported, successfully configure BGP to influence route selection using BGP community attributes

Customer-to-Provider Connectivity with BGP

Customer Connectivity Requirements

- Describe the requirements to connect customer networks to the Internet in a service provider environment

Static Routing Toward the Customer

- Given a service provider network, implement customer connectivity using static routing

BGP Customer Multi-Homed to a Single Service Provider

- Given a customer scenario where multiple connections to a single ISP must be supported, implement customer connectivity with BGP

BGP Customer Multi-Homed to Multiple Service Providers

- Given a customer scenario where connections to multiple ISPs must be supported, implement customer connectivity with BGP

BGP Transit Autonomous System**Transit Autonomous System Functions**

- Describe the function of a transit autonomous system and the need for IBGP, EBGP and EBGP Interaction in a Transit AS
- Given a transit autonomous system, describe the interaction between EBGP and IBGP in relation to relevant BGP attributes

Packet Forwarding in Transit Autonomous Systems

- Describe the function of an IGP in forwarding packets through an autonomous system

Configuring a Transit Autonomous System

- Given a BGP network scenario, successfully configure an autonomous system to act as a transit backbone

Monitoring and Troubleshooting IBGP in Transit AS

- Given a configured BGP transit network, verify proper operation and perform the steps necessary to correct basic IBGP configuration errors

BGP Route Reflectors**Introduction to Route Reflectors**

- Describe the function and operation of route reflectors in a BGP environment

Network Design with Route Reflectors

- Based upon established route reflector design rules, describe the concept of hierarchical route reflectors and their requirements

Configuring and Monitoring Route Reflectors

- Given an existing IBGP network, configure and verify proper operation of route reflectors to modify IBGP split-horizon rules

Advanced BGP Configuration**Limiting the Number of Prefixes Received from a BGP Neighbor**

- Given a typical BGP network, successfully configure BGP to limit the number of prefixes received from a neighbor

AS-Path Prepending

- Given a typical service provider network with connections to multiple autonomous systems, use AS-Path prepending to influence the return path selected by the neighboring autonomous systems

BGP Peer Group

- Given a typical BGP network, use BGP peer groups to share common configuration parameters between multiple BGP peers

BGP Route Flap Dampening

- Given a properly configured BGP network, use route flap dampening to minimize the impact of unstable routes

Scaling IGP and BGP in Service Provider Networks**Common Routing Issues in Service Provider Networks**

- Describe common routing concerns of service provider networks

Optical Networking Designs

- Describe the scalability issues of using OSPF and IS-IS as interior gateway protocols in a service provider network and list solutions for each

Scaling BGP in Service Provider Networks

- Describe common scalability issues when using BGP in a service provider network and list solutions for each

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