

Assignment II

Title: RIP / OSPF / BGP Protocols

Problem Statement: Configure RIP / OSPF / BGP using packet tracer

Objective:

1. To understand the concept of dynamic routing
2. To understand dynamic routing protocols

Outcome: Students will be able to configure and understand RIP using packet tracer

H/W and S/W requirements:

64 bit Linux based OS

Cisco Packet Tracer

Theory:

Dynamic Routing

Dynamic Routing is a networking technique that provides optimal data routing. Unlike static routing, dynamic routing enables routers to select paths according to real-time logical network layout changes. It is a dynamic routing protocol used in large to very large networks. There are 2 major approaches:

1. Link State Algorithms
2. Distance Vector Algorithms

Dynamic Routing Protocols

1. OSPF (Open Shortest Path First)

OSPF is a link state routing protocol. It is a dynamic routing protocol used in large to very large networks. The protocol uses a link-state database.

The algorithms used for OSPF to determine the best route relies on the link-state database and allows OSPF to update its router, are faster than RSP when a network change is encountered.

OSPF is an interior gateway protocol (IGP) for routing Internet Protocol (IP) packets solely within a single routing domain, such as an autonomous system. It gathers link state information from available routers and constructs a topology map of the network. The topology is presented as a routing table to the Internet layer which routes packets based solely on their destination IP address

Open Shortest Path First (OSPF) is a routing protocol for Internet Protocol (IP) networks. It uses a link state routing (LSR) algorithm and falls into the group of interior gateway protocols (IGPs), operating within a single autonomous system (AS).

2. BGP (Border Gateway Protocol)

BGP is used to exchange routing information for the internet and is protocol used between ISPs. The protocol can connect together any network of autonomous systems using arbitrary topology.

3. RIP (Routing Information Protocol)

RIP is a dynamic routing protocol which uses hop count as a routing metric to find the best path between source and destination network.

RIP employs the hop count as a routing metric. RIP prevents routing loops by

implementing a limit on the number of hops allowed in a path from source to destination. The maximum number of hops allowed for RIP is 15, which limits the size of networks that RIP can support. A hop count of 16 is considered an infinite distance and the route is considered unreachable. RIP implements the split horizon, route poisoning and hold-down mechanisms to prevent incorrect routing information from being propagated.

Features of RIP:

1. Updates of the network are exchanged periodically.
2. Fast routing tables are sent in the updates.
3. Updates are always broadcast.
4. Little to no configuration is required.

Configure RIP for Router 1

```
# router rip
# network 192.168.1.0
# network 10.0.0.0
```

Configure RIP for Router 2

```
# router rip
# network 192.168.2.0
# network 10.0.0.0
```

Conclusion: We successfully configured Routing Information Protocol (RIP) using CISCO Packet Tracer.