**Static Routing**

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**Static routing** is the process of **manually adding entries** to a **routing table**. Any **changes** to the routing table in the future must also be done **manually**. This means that the network administrator must know the **entire network topology** to be able to add the entries, which is **difficult** and **impractical** for larger networks. Because of this, on large networks, static routing is only used as a **backup system** for **dynamic routing**.

For smaller networks however, static routing provides the benefit of **lower resource and bandwidth usage**, since no part of the bandwidth is being used to update the routing tables, as is done in dynamic routing.

## Configuration

The command required to specify a **static route** has the following format:

ip route destination\_network\_prefix destination\_prefix\_mask (next-hop\_address | interface) [distance\_metric]

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For **IPv6 addresses**, the command is slightly modified:

ipv6 route ipv6\_destination\_network\_prefix (with CIDR) (ipv6\_next-hop\_address | interface) [distance\_metric]

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In both cases, we have a distance\_metric parameter. This parameter is **optional** and defines the **cost** of using that route. If we have **multiple** options to reach a destination, then the router will use the **lowest cost** one. By default, the value of this parameter is .

Note that we need to configure routers in **both directions** to be able to communicate, i.e. if one router knows that it needs to forward packets from one location to another router to reach a destination, the other router also needs to know that it must forward packets to the first router to be able to reach the source. The communication and configuration must be **bi-directional**. Even **pings** won’t work without this.

Example

R1(config)#ip route 192.168.2.0 255.255.255.0 s0/1/1  
R1(config)#ip route 192.168.2.0 255.255.255.0 192.168.0.1

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R2(config)#ip route 192.168.1.0 255.255.255.0 g0/0  
R2(config)#ip route 192.168.1.0 255.255.255.0 192.168.0.6

CLI

Notice that the configuration of both routers is shown, thus allowing **bidirectional communication**.

## Default Routes

In a routing table, we store entries as **destination address** and corresponding **interface** or **next hop addresses**. However, it is not practical to store an entry for every single possible destination address. Because of this, there is a special entry called a **default route**. If a destination address cannot be found in the table, the default route is used.

There are two types of default routes:

1. **Directly Connected Static Default Route** – This has just the **interface** specified.
2. **Next-Hop Static Default Route** – This has the **next-hop address** specified.

### Primary Static Default Route

There is one more special case of the default route, called the **Primary Static Default Route**. This specifies the next hop address or interface through which packets from **any IP address** with **any subnet mask** will be sent.

The commands to specify a primary static default route for IPv4 and IPv6 respectively are:

ip route 0.0.0.0 0.0.0.0 (next\_hop\_address | interface) [distance\_metric]  
ipv6 route ::/0 (ipv6\_next\_hop\_address | interface) [distance\_metric]

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## Floating Static Routes

A **Floating Static Route** is used to forward a packet to a certain destination when the **main route** is unavailable. We configure a Floating Static Route in the same way that we configure a normal route. The difference is that we give it a **higher distance metric**, so that it is not normally used.

R1(config)#ip route 192.168.2.0 255.255.255.0 192.168.0.1 5

CLI

Having **multiple static routes** which have **no specified distance metric** will cause the router to use one of them **randomly**.