Network Architecture / M1-RID: Routing

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Table de routage

La table de routage inclut :

- Des routes directement connectées.
- Des routes statiques configurées par l'administrateur.
- Des routes qui ont été définies par un protocole de routage dynamique.

Distance Administrative

Definition

Valeur numérique propre à l'origine de la route (route statique, route connectée, apprise via RIP, OSPF, ...) : Préférence d'une route par un protocole sur un autre.
Plus cette valeur est petite, meilleure est la route.

Distance Administrative

Type de route	Valeur administrative
Route connectée	0
Route statique	1
RIP	120
OSPF	110
IGRP	100
IS-IS	115
BGP interne	200
BGP externe	20
EIGRP interne	90
EIGRP externe	170
Inconnu	255

Routage statique

Definition

- Est pris en charge par l'administrateur de réseau afin de déterminer la route que doit emprunter un paquet pour atteindre sa destination.
- Les tables de routage sont remplies manuellement.
- Les chemins statiques ne s'adaptent pas aux modifications des environnements réseau.
- Le routage statique est utilisé sur de petits réseaux ou sur des réseaux d'extrémité.
- Le routage statique est utilisé pour les réseaux très stables
- Il est Fastidieux et peut générer un risque d'erreur important si grand réseau (plus de 10 routeurs)

Exemple

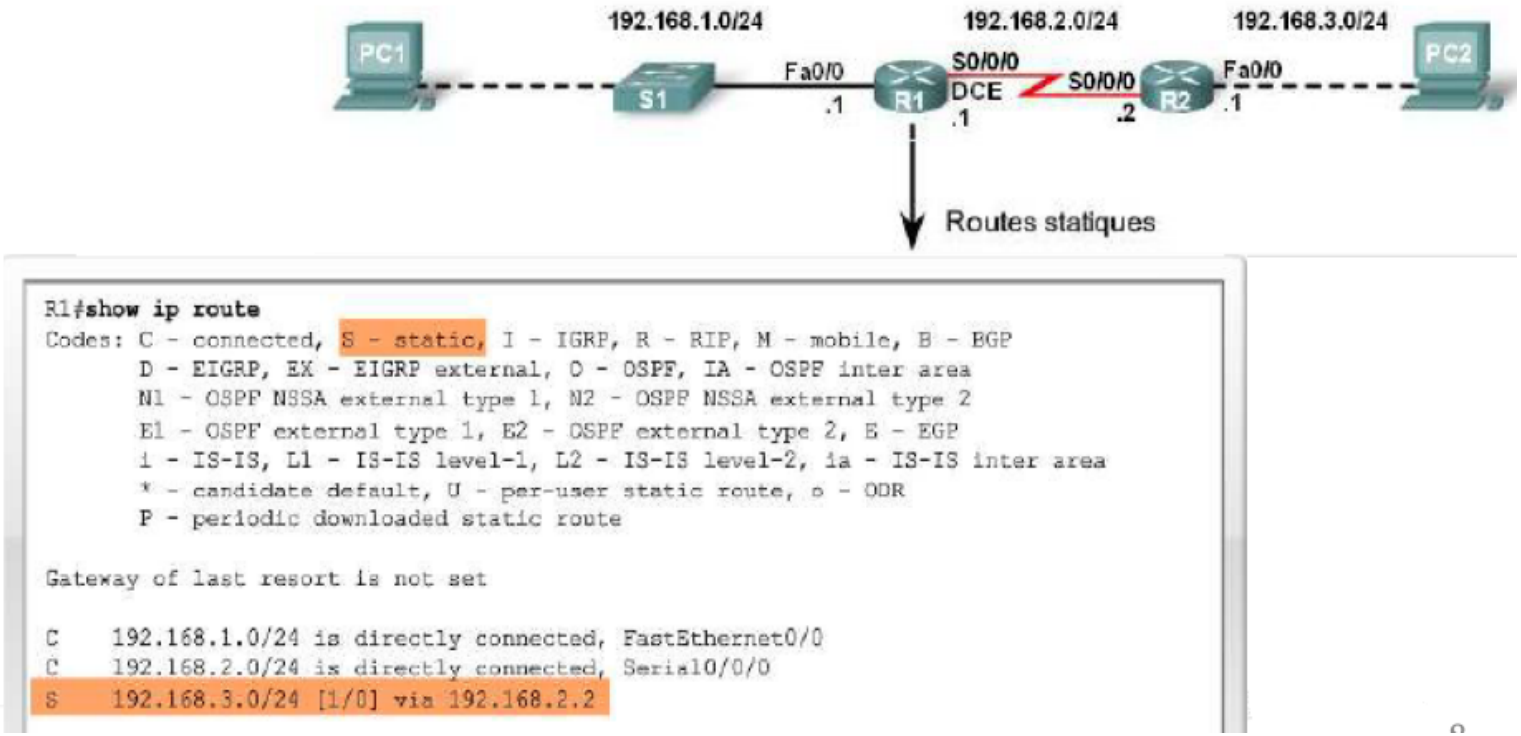

Figure 1 – Routes statiques.

Ajout d'une route statique sous PacketTracer

Router(config)# ip route network-address subnet-mask exit-interface

Route Statique par défaut

Router(config)# ip route 0.0.0.0 0.0.0.0 exit-interface

Routing Protocol RIP

- RIP protocol is an open standard, distance-vector, Interior Gateway Routing (IGP) routing protocol.
- Since it is an IGP protocol, it can only be used to perform routing between networks within the same autonomous system.
- Typically, it is suitable for a small-sized network.

Features of RIP Routing Protocol

Some of the of key features of IP protocol are :

- It supports maximum 15 hops in a path.
- It uses hops count metric to calculate the best path from a source to a destination network.
- It sends routing updates (entire routing table) after every 30 seconds and when the network changes.
- It uses UDP broadcast packets to exchange routing information.
- The Administrative Distance (AD) value of the RIP protocol is 120.
- There are two versions of RIP protocols : RIPv1 and RIPv2.

RIPv1 vs RIPv2 Differences

RIP version 1 (RIPv1) and RIP version 2 (RIPv2). The basic features, such as hops count and metric, of both the RIPv1 and RIPv2 protocols remain same. However, RIPv2 is an enhanced version of RIPv1. RIPv2 provides more functionalities than RIPv1.

RIPv1 vs RIPv2 Differences

The following table lists the key differences between RIPv1 and RIPv2 :

Feature	RIPv1	RIPv2
Routing update address	Broadcast (255.255.255.255)	Multicast (224.0.0.9)
Variable Length Subnet Mask (VLSM)	Does not support	Supports
Classless Inter Domain Routing (CIDR)	Does not support	Supports Supports
Authentication	Does not support	Supports MD5 authentication
Discontinuous network	Does not support	Supports

RIPv1 vs RIPv2 Differences

The following table lists the key differences between RIPv1 (RFC 1058) and RIPv2 (RFC 2453) :

RIPv1	RIPv2
Classfull	Classless
Does not support VLSM	Supports VLSM
Does not send subnet mask with periodic updates	Sends subnet mask with periodic updates
Uses 255.255.255.255 to send the periodic updates	Uses 224.0.0.9 to send the periodic updates
Does not support authentication	Supports authentication

RIP Timers

Routing protocols use timers to optimize the network performance. The following table lists the various types of timers used by the RIP protocol to optimize the network

Timers	Default value	uses
Hold down timer	180 seconds	Used to hold the routing information for the specified time
Invalid route timer	180 seconds	Used to keep track of discovered routes
Route update timer	30 seconds	Used to update routing information
Route flush timer	240 seconds	Used to set time interval for any route that becomes invalid and its deletion from the routing table

RIP Routing Protocol : Commands

- Router(config)# router rip → Enables RIP process on the router
- Router(config-router)# version 2 → Enables RIP version 2
- Router(config-router)# no auto-summary → Makes RIP a classless routing protocol
- Router# show ip protocols → Displays information about all routing protocols running on the router

RIP Routing Protocol : Commands

- Router# show ip protocols → Displays information about all routing protocols running on the router
- Router# show ip route → Displays the routing table of the router
- Router# show running-config → Displays the routers running-configuration

Autonomous Systems (AS)

- The global Internet consists of a set of inter-connected autonomous systems
- An autonomous system (AS) is a set of routers and networks under the same administration
- Autonomous systems are identified by 32-bit numbers, called AS numbers (ASNs) (originally the number space was limited to 16-bit but this has been increased to 32-bit)

Autonomous Systems (AS)

- IP packets are forwarded between autonomous systems over paths that are established by an Exterior Gateway Protocol (EGP)
- Within an autonomous system, IP packets are forwarded over paths that are established by an Interior Gateway Protocol (IGP)