28/11/22

CN- Assignment

Static and Dynamic Nat configuration

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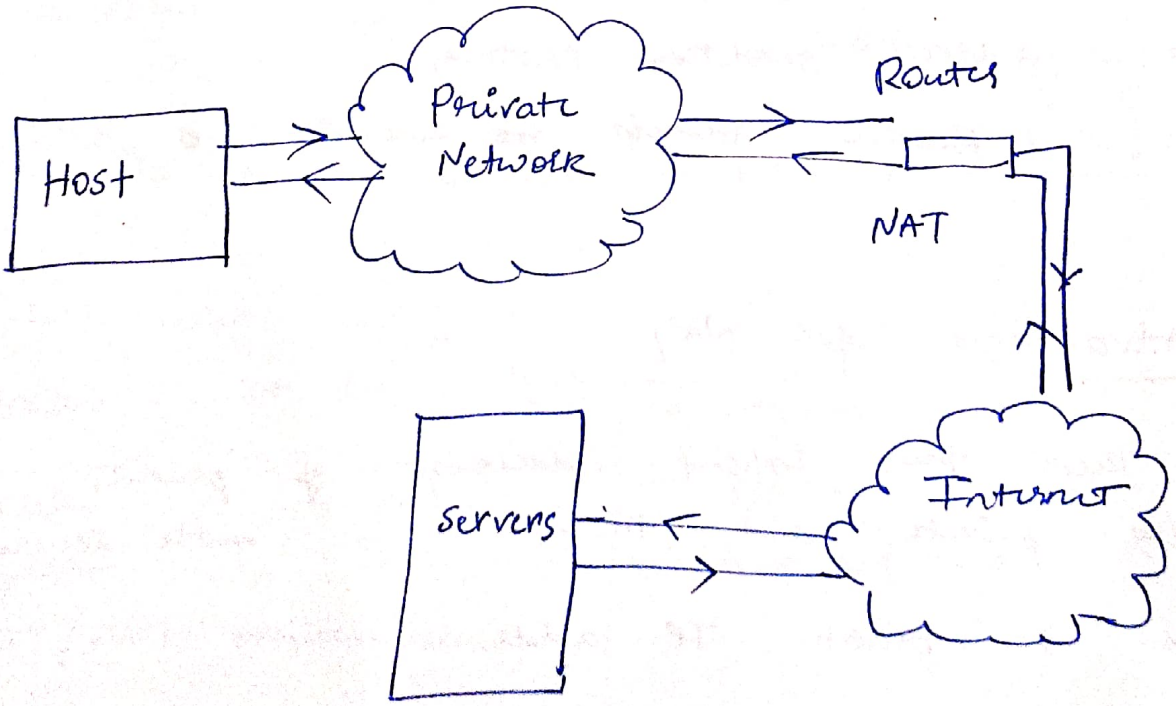
Theory:

⊛ Definition of NAT with diagram:

NAT - Network address translation : It is a way to map multiple private IP addresses to a public one for transferring the information.

Organizations that want multiple devices to use a single IP address use Nat; so do most routers at home.



(*) Static and Dynamic Methods:

Mapping a logical address to its corresponding physical address.

— Static Mapping:

- It means creating a table that associates a logical address with a physical address.
- It needs to be updated periodically.

Dynamic Mapping

- Each time a machine knows one of the 2 IP addresses (logical or physical), it can use a protocol to find the other one.

ARP – (Address resolution protocol)
RARP – (Reverse Address ~~to~~ resolution protocol)

(*) Advantages for NAT

- It keeps the internal addressing of private networks private and therefore is more secure.
- Reuse of private IP addresses.
- Connecting a large no. of hosts to the global internet; using a smaller no Public IP.

(A) FAQ's

Q(1) What command will show us the translations active on our router?

— The command "show ip nat translations" will show you the translation table containing all the active Nat entries.

Q(2) What is the difference between Nat and PAT ?

NAT	PAT
— stands for network address translation.	— stands for port address translation.
— Private IP addresses are translated to Public	— Private IP addresses are translated to public via port number.
— NAT is superset of PAT	— PAT is Dynamic NAT
— NAT uses IPV4 addresses - It has 3 types - Static - Dynamic - PAT / NAT overloadings	— Also uses IPV4 . has 2 types. — static — Overloaded PAT.

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CN Assignment

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Routing Algorithms

Theory

1. Distance vector Routing : The router gets data from the routing table. Every neighbouring router gets the information updated. Based on the number of hops, packet queue length, and time delay, it decides which route is better.

2. Link state Routing : Each Router shares its neighbourhood's knowledge with each other creating a topology of networks. It then uses Dijkstra's algorithm to calculate optimal route to all nodes.

3. Path vector Routing : It is like distance vector routing but instead it relies on analysis of path.

RIP Implementation :

1. Introduction and Algorithm : It is one of the least distance vector routing algorithm which employs hop count as a routing metric.

2. Messages :

1. Request message : Asking a neighbouring routes to send its table.
2. Response message : Carries the routing table of a router.

RIP V1	RIP V2
- Sends updates as broadcast	- Sends updates as multicast
- Broadcast at 255.255.255.255	- Multicast at 224.0.0.0.
- Classful routing protocol.	Classless protocol updates support classful.

Timers

a. Update Timers : controls the interval between 2 gratuitous responses.

b. Invalid Times : Specifies how long a routing can be is a table without being updated.

c. Flush Timers : Controls time between the route is invalidated and removal of entry from table.

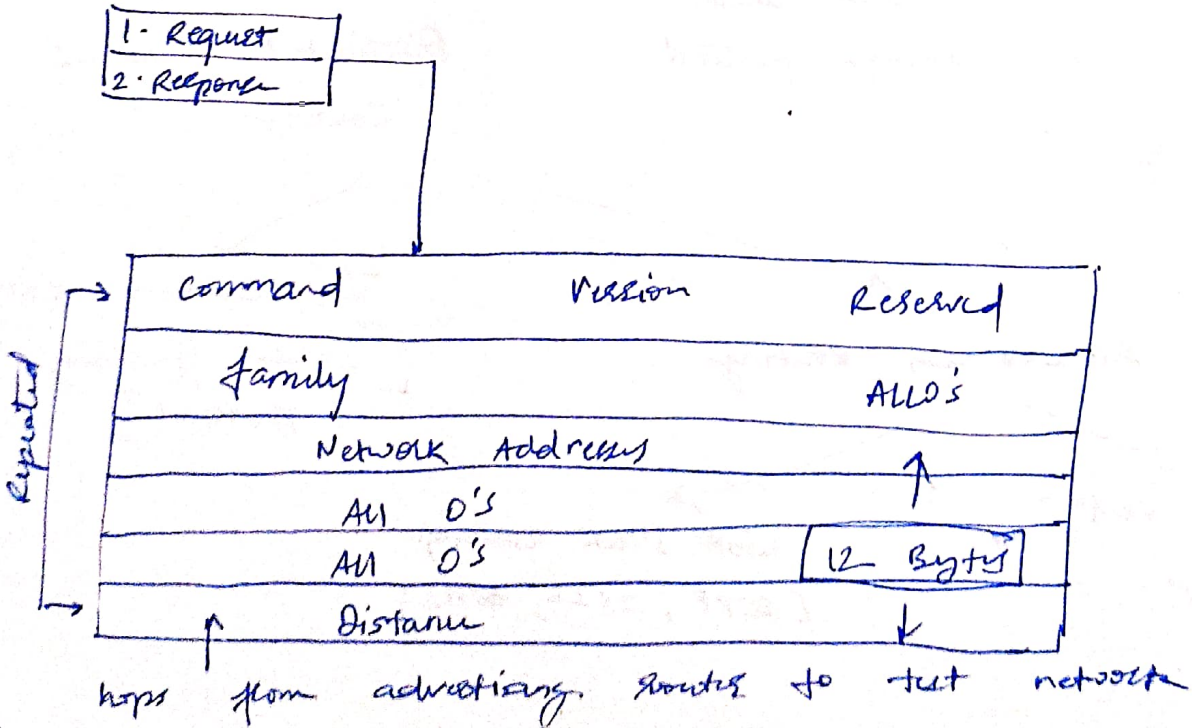
d. Hold down Times : It is started per route entry.

FAQs

(*) 1. Explain any features of RIP.

- Open Standard Protocol
- Classful Routing Protocol.
- Updates are broadcast via 255.255.255.255
- Administrative distance is 120.
- Metric : Hop ~~count~~ count.
- Max hop count = 15 ; Max Routers = 15.
- Load Balancing upto 4 equal Paths.
- Used for small organizations.
- Exchange entire routing table for every 30 seconds.
- Each router advertises its distance vector every 30 seconds to all of its neighbours.

Q.3 Draw and explain RIP Message format.



→ it is sent by a router when booted or when an entry times out many request updates for all networks, or specific ones.

→ Solicited response to a previous request sent periodically to all neighbours.

Q.2 State classification of Routing Protocols

(1) Routing Algorithm Types

- Adaptive
- Non-Adaptive Routing Alg.

(2) Based on current measurement of traffic &/or topology

- Centralized IGP (Interior Gateway Protocol)
- Island Exterior gateway protocol
- Distributed Dynamic Routing
  - Intra Domain Routing
    - Distance vector Routing: RIP
    - Link state Routing [OSPF, ISIS, NMI]
  - Inter domain Routing [Border Gateway Protocol]