

# Routing Protocol

## Routing Protocol

Intra domain

Inter domain

Distance Vector  
(RIP)

Link state  
(OSPF)

Path vector  
(BGP)

যখন একটি packet router এ আসে তখন Router দ্বারা সবচেয়ে সঠিক way তে packet distribute করা হয়। Internal network এর মধ্যে। তখন Routing table use করে decide করে কোনাে পাঠাতে হবে।  
Routing Table include

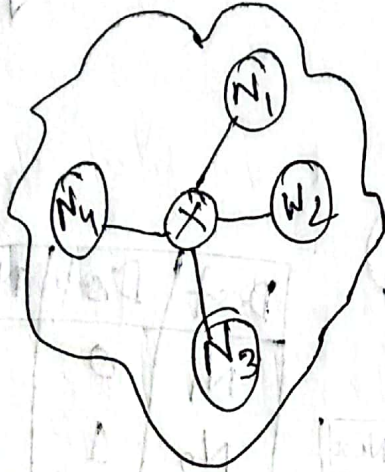
- Network এর মধ্যে value store করা
- কোন connection লম্বা ছোট (নির্দিষ্ট লম্বা ছোট)
- একটি Node থেকে অন্য Node পাওয়া
- Cost

Static Routing table: Add data manually.  
Dynamic Routing table: Update data automatically. (একটি Routing table use করা হয়)



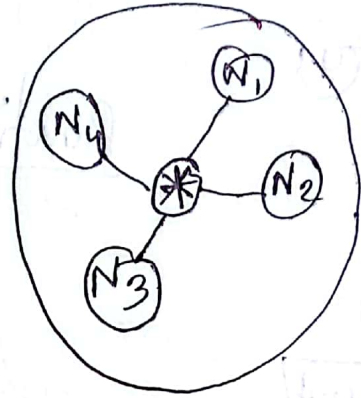
Internet is a large system. এই system La Network সূত্রা Router এর মাধ্যমে Connected থাকে এবং autonomous system গুলো। Suppose

Khulna



Autonomous 1

Dhaka



Autonomous 2

Inter Domain: যখন দুটি Autonomous system মধ্যে Connection হয় বা data আদান প্রদান হয়। তখন এই Inter Domain বলে। within <sup>more</sup> ~~one~~ auto. syst.

Intra Domain: যখন একটি স্বা. Autonomous system এর মধ্যে data আদান প্রদান বা সব যন্ত্রের Networking বিজ্ঞপ্তি পরিচালিত হয়। within one Auto. system.

RIP → Real Life Protocol (Data sharing in tra domain)

OSPF → Open Shorted Path first (Link state)

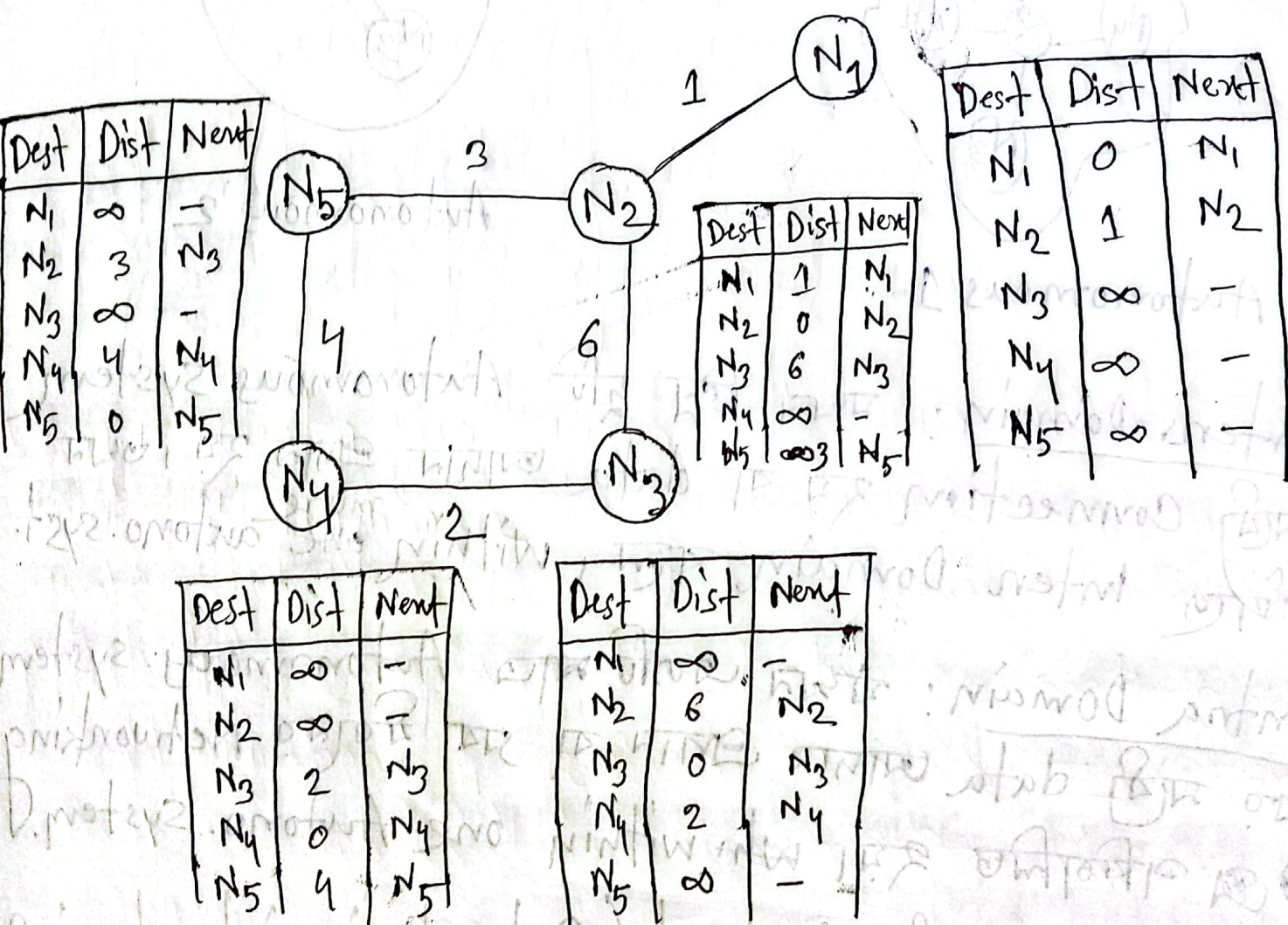
BGP → Boarden Gateway Protocol

These three protocol works on unicasting.



Distance Vector Routing (DVR): আসল ফ্রান্সি, Router  
 তর কাজ হলো সবচেয়ে short distance এ data পাঠানো,  
 এটাও জন্য সব Network এর detail information  
 needed। Detail information এর জন্য Routing table  
 use করে।

## Routing Table



Router সবারে একে অপরকে মধ্যে Routing table (Distance Vector) share করে Connection চিহ্নিত করে, condition:

- share only neighbour
- share only distance vector.



যেমন,  $N_1 \rightarrow N_2$   
 $N_2 \rightarrow N_5, N_3$   
 $N_3 \rightarrow N_4, N_2$

Suppose  $N_1$  and  $N_2$  এর মধ্যে connection build  
 হতে। তাহলে  $N_2$  তার Distance vector  $N_1$  কে share  
 করবে। Ex.

At  $N_1$ ,

$N_2$
1
0
6
$\infty$
3

$N_1$ New R.T		
Dest	Dist	Next
$N_1$	0	$N_1$
$N_2$	1	$N_2$
$N_3$	7	$N_3$
$N_4$	$\infty$	$N_4$
$N_5$	4	$N_5$

\*  $N_1 \rightarrow N_2$  and  $N_2 \rightarrow N_2$

$$\text{Cost} = 1 + 0 = 1$$

\*  $N_1 \rightarrow N_2$  and  $N_2 \rightarrow N_3$

$$\text{Cost} = 1 + 6 = 7$$

\*  $N_1 \rightarrow N_5$

$$\text{Cost} = 1 + \infty = \infty$$

Let's another example:

Suppose Connection between  $N_5$  and  $N_1$ . Here  $N_2$  &  $N_4$  distance will get by

$N_5$

$N_2$	$N_4$
1	$\infty$
0	$\infty$
6	2
$\infty$	0
3	4

$N_5$		
Dest	Dist	Next
$N_1$	4	$N_1$

$N_5 \rightarrow N_2 \rightarrow N_1$

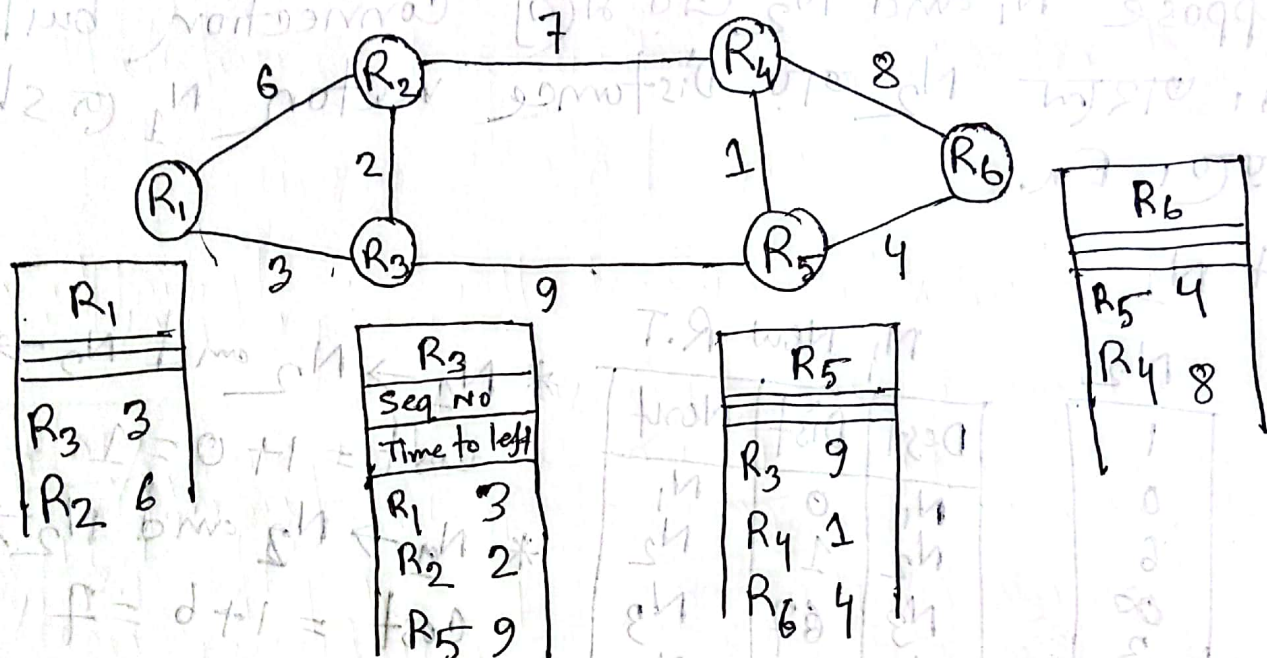
$$\text{Cost} = 3 + 1 = 4$$

$N_5 \rightarrow N_4 \rightarrow N_1$

$$\text{Cost} = 4 + \infty = \infty$$



Link state Routing: Routing table বানানোর জন্য Link state একটি method.



এখানে Router এতে অবশ্যই hello মেসেজ পাঠিয়ে details জেনে নেয়া। Neighbour ~~ক~~ বনতে ~~যাওয়া~~ ~~স্বাক্ষর~~ connected. Link state model এ Router connection build packet sharing এতে ~~ফ্লোডিং~~ Flooding method use করে। ~~অন্য~~ shortest পথে R1 থেকে R6 পর্যন্ত পৌঁছানোর জন্য Dijkstra method use করা হয়। Example:

Source R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>	R <sub>4</sub>	R <sub>5</sub>	R <sub>6</sub>	(Destination)
	6	3	∞	∞	∞	
R <sub>1</sub> R <sub>3</sub>	5	3	∞	12	∞	
R <sub>1</sub> R <sub>3</sub> R <sub>2</sub>			12	12	∞	
R <sub>1</sub> R <sub>3</sub> R <sub>2</sub> R <sub>4</sub>				12	21	
					16	[R <sub>1</sub> R <sub>2</sub> R <sub>3</sub> R <sub>4</sub> R <sub>5</sub> ]



Distance

$R_1 \rightarrow 0$      $R_3 \rightarrow 3$      $R_5 \rightarrow 12$   
 $R_2 \rightarrow 5$      $R_4 \rightarrow 12$      $R_6 \rightarrow 16$

Via:

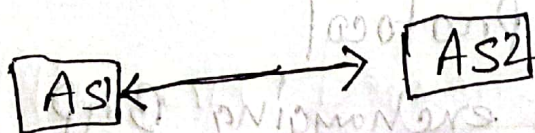
$R_1 \rightarrow R_1$      $R_4 \rightarrow R_3 R_2$   
 $R_2 \rightarrow R_1$      $R_5 \rightarrow R_3$   
 $R_3 \rightarrow R_1$      $R_6 \rightarrow R_3 R_5$

## BGP (Border Gateway Protocol):

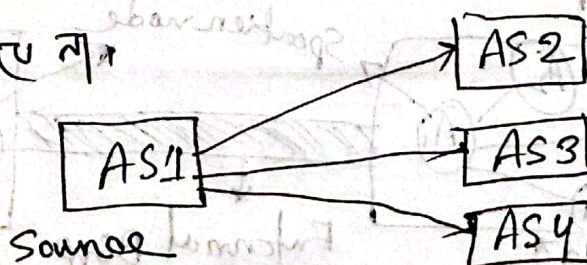
It is an inter domain routing protocol that uses path vector routing.

Types of Autonomous system (AS):

i) Stub AS: It means only one connection with two another autonomous systems. માત્ર એક જ કોઈ સ્થળે એક જ મશીન Data રજૂ થયે છે અને તે જ રજૂ થાય છે via data transfer કરી શકે છે.

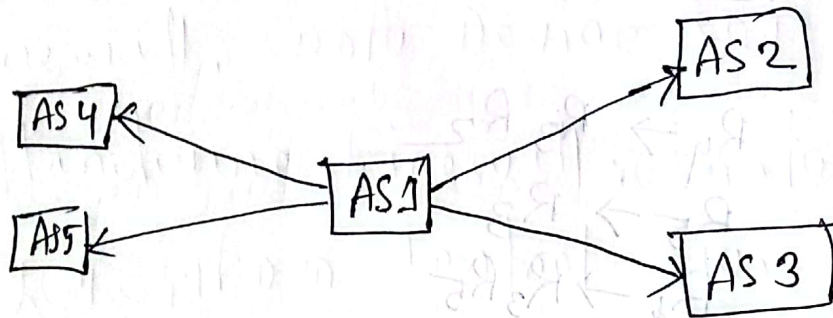


ii) Multihomed AS: It has more than one connection to another AS. But same as stub. via data transfer કરી શકે છે.





iii) Transit As : It is a multihomed and allow to transmit data via it.



Path attributes : well known attributes

{ Every BGP Router must Recognize }

First Attributes : BGP sessions : It defines with

- 2 types :
- ① Internal BGP (within As)
  - ② External BGP (Outside of As)

Spoken node : A Spoken node is a router within an As that is designed to communicate BGP information with router in other As.

- It runs BGP Protocol
- Responsible for exchanging BGP Routing info with another As via external BGP.
- acts representative of As to the outside world.

