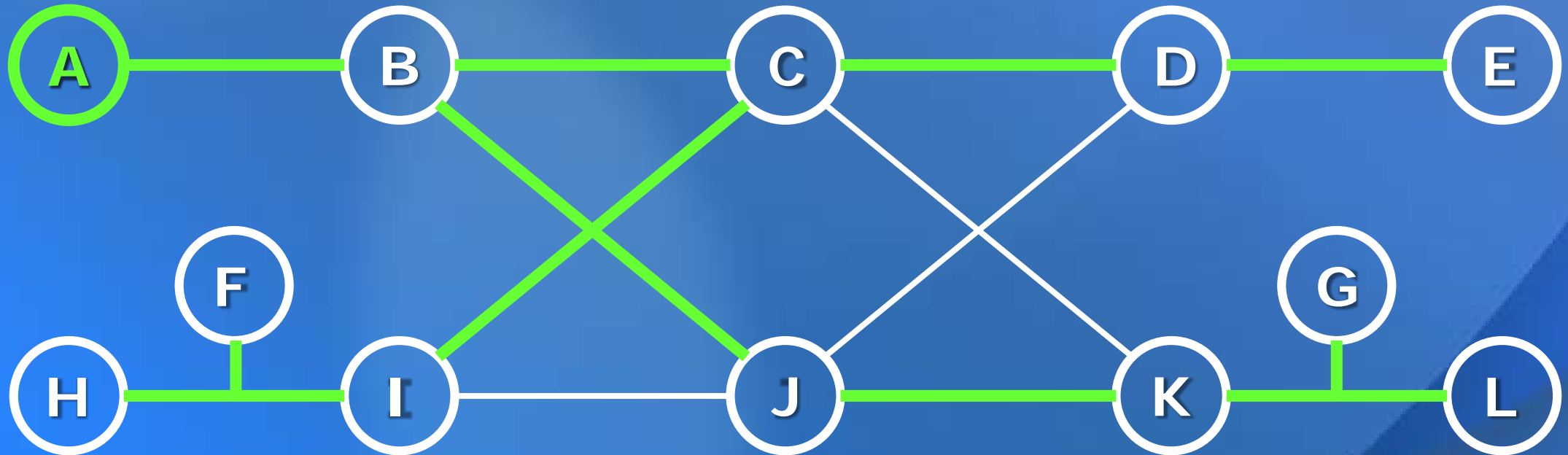


Routing

Routing

Find best path from node A to every other node

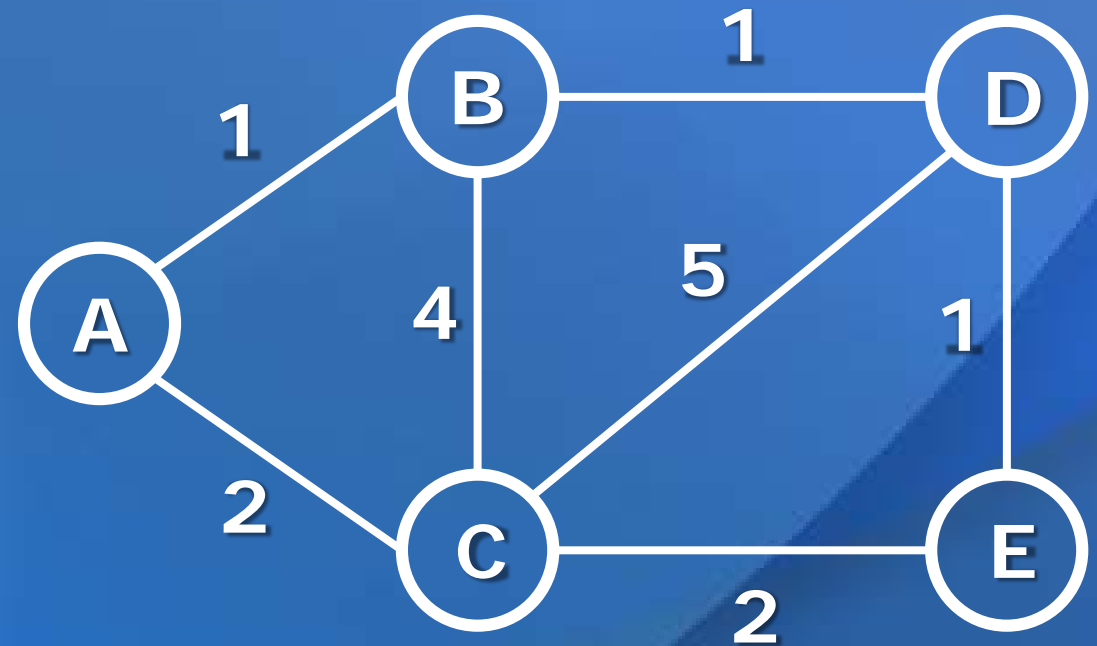


Shortest Path Routing

Each link between nodes labelled by cost (e.g. delay).

Each node wants to find the paths with minimum cost to the other nodes.

Costs are additive.



Common Plan for Distributed Routing

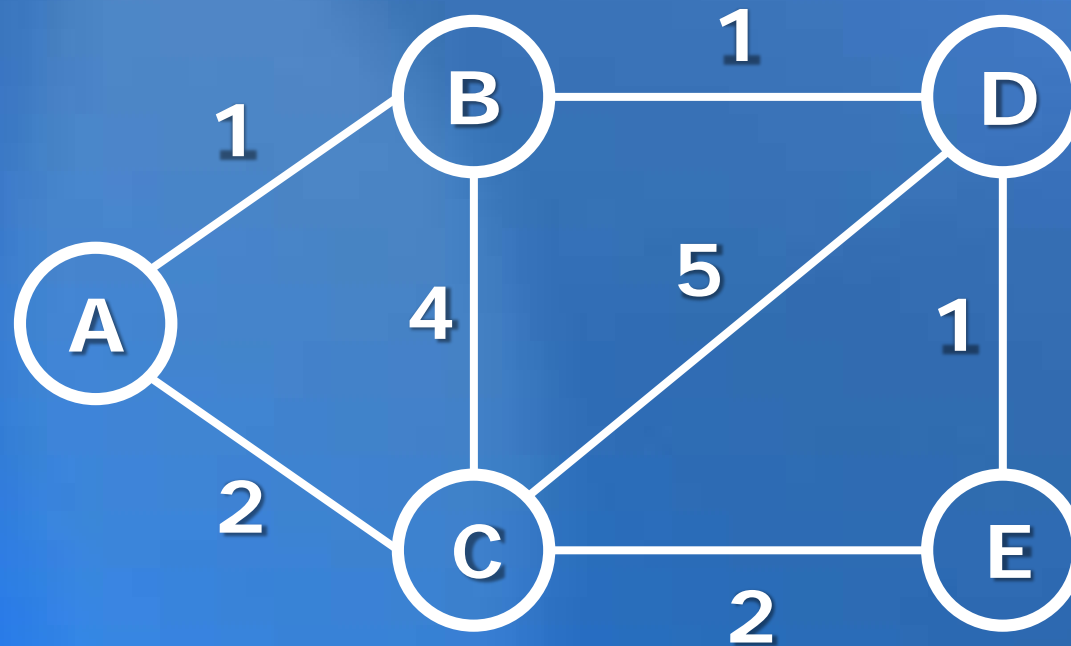
- Determine live neighbors
 - HELLO protocol: send HELLO packet periodically to neighbors
- Advertisement step
 - Periodically send some information to neighbors
- Integration step
 - Compute routing/forwarding table from advertisements

Routing: Distance Vector Algorithm

Routing Table

S = Source
D = Destination

S/D	Link	Cost
A/A	-	0
A/B	B	1
A/C	C	2
A/D	B	2
A/E	B	3



Distance Vector Algorithm

Initialization:

Each node only knows it can reach itself with cost 0.

Advertisement:

Each node advertises its cost to reach other nodes (dest) to its neighbors.

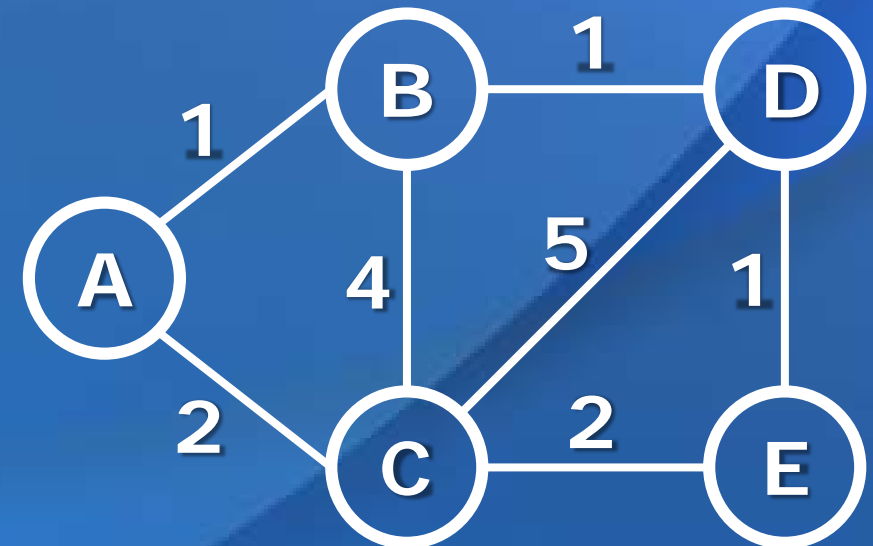
Integration:

For each (dest, cost) entry in a neighbor's advertisement, each node computes the cost to reach dest through its neighbor as

$\text{cost} = \text{link_cost to neighbor} + \text{advertised cost}$

If cost is less than the current cost to dest in the routing table, update the cost and routing table to send packets to dest through this neighbor.

S/D	Link	Cost
B/A	-	∞
B/B	-	0
B/C	-	∞
B/D	-	∞
B/E	-	∞

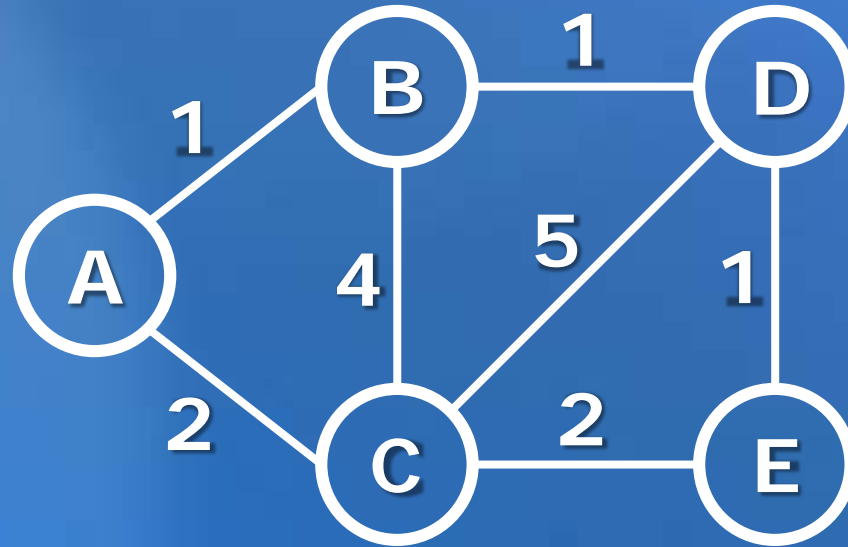


Distance Vector (n=0)

S/D	Link	Cost
A/A	-	0
A/B	-	∞
A/C	-	∞
A/D	-	∞
A/E	-	∞

S/D	Link	Cost
B/A	-	∞
B/B	-	0
B/C	-	∞
B/D	-	∞
B/E	-	∞

S/D	Link	Cost
C/A	-	∞
C/B	-	∞
C/C	-	0
C/D	-	∞
C/E	-	∞



S/D	Link	Cost
D/A	-	∞
D/B	-	∞
D/C	-	∞
D/D	-	0
D/E	-	∞

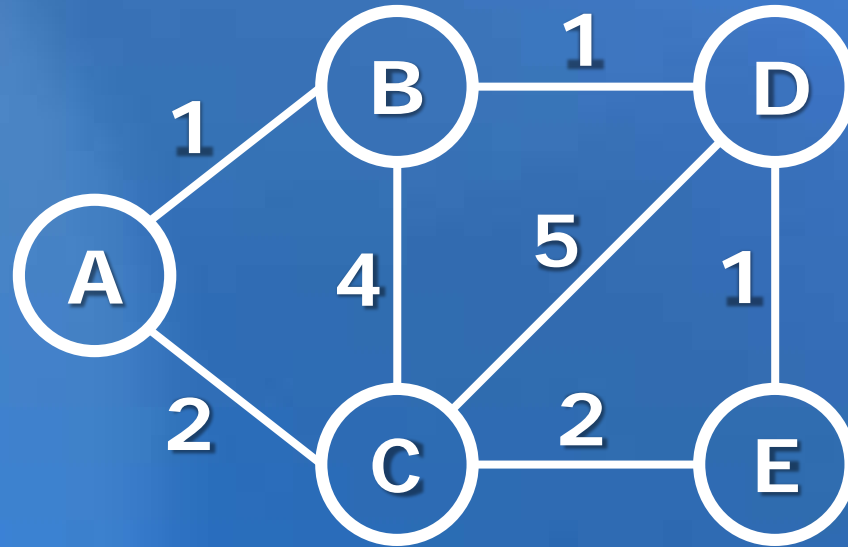
S/D	Link	Cost
E/A	-	∞
E/B	-	∞
E/C	-	∞
E/D	-	∞
E/E	-	0

Distance Vector (n=1a)

S/D	Link	Cost
A/A	-	0
A/B	B	1
A/C	C	2
A/D	-	∞
A/E	-	∞

S/D	Link	Cost
B/A	-	∞
B/B	-	0
B/C	-	∞
B/D	-	∞
B/E	-	∞

S/D	Link	Cost
C/A	-	∞
C/B	-	∞
C/C	-	0
C/D	-	∞
C/E	-	∞



S/D	Link	Cost
D/A	-	∞
D/B	-	∞
D/C	-	∞
D/D	-	0
D/E	-	∞

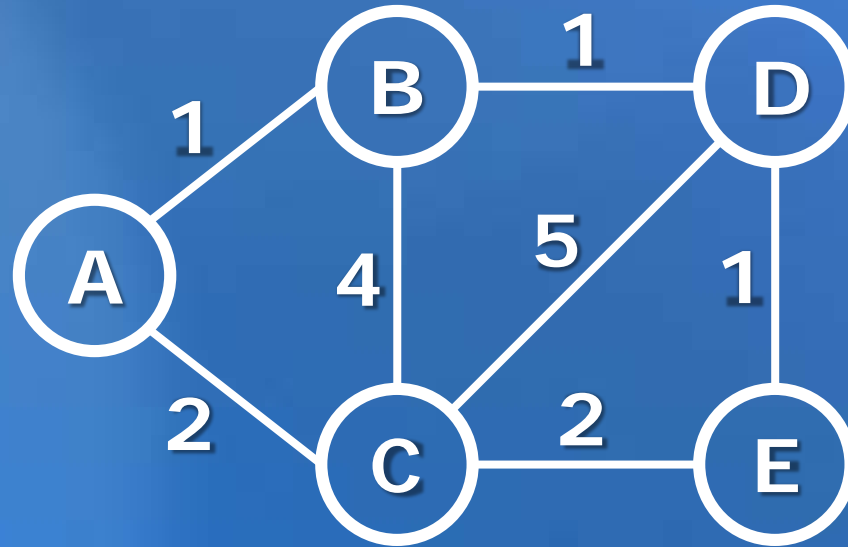
S/D	Link	Cost
E/A	-	∞
E/B	-	∞
E/C	-	∞
E/D	-	∞
E/E	-	0

Distance Vector (n=1b)

S/D	Link	Cost
A/A	-	0
A/B	B	1
A/C	C	2
A/D	-	∞
A/E	-	∞

S/D	Link	Cost
B/A	A	1
B/B	-	0
B/C	C	4
B/D	D	1
B/E	-	∞

S/D	Link	Cost
C/A	-	∞
C/B	-	∞
C/C	-	0
C/D	-	∞
C/E	-	∞



S/D	Link	Cost
D/A	-	∞
D/B	-	∞
D/C	-	∞
D/D	-	0
D/E	-	∞

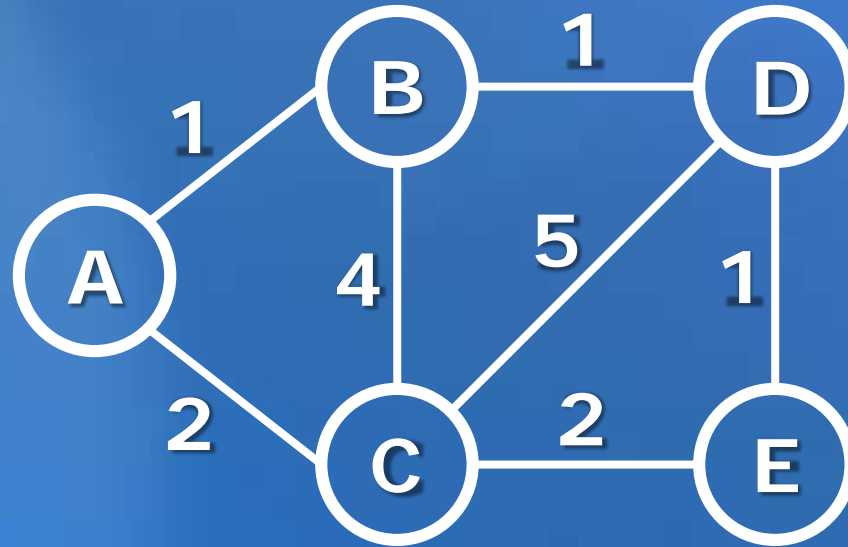
S/D	Link	Cost
E/A	-	∞
E/B	-	∞
E/C	-	∞
E/D	-	∞
E/E	-	0

Distance Vector (n=1c)

S/D	Link	Cost
A/A	-	0
A/B	B	1
A/C	C	2
A/D	-	∞
A/E	-	∞

S/D	Link	Cost
B/A	A	1
B/B	-	0
B/C	C	4
B/D	D	1
B/E	-	∞

S/D	Link	Cost
C/A	A	2
C/B	B	4
C/C	-	0
C/D	D	5
C/E	E	2



S/D	Link	Cost
D/A	-	∞
D/B	B	1
D/C	C	5
D/D	-	0
D/E	E	1

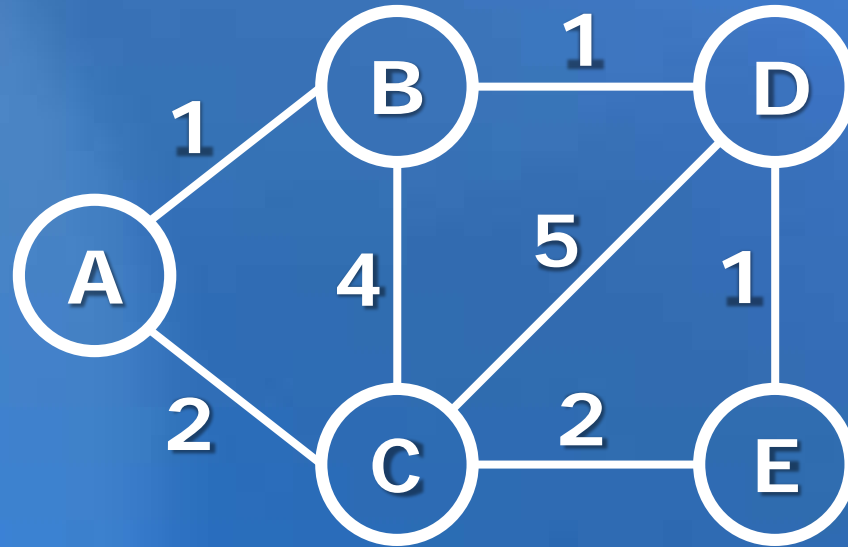
S/D	Link	Cost
E/A	-	∞
E/B	-	∞
E/C	C	2
E/D	D	1
E/E	-	0

Distance Vector (n=2)

S/D	Link	Cost
A/A	-	0
A/B	B	1
A/C	C	2
A/D	B	2
A/E	C	4

S/D	Link	Cost
B/A	A	1
B/B	-	0
B/C	A	3
B/D	D	1
B/E	D	2

S/D	Link	Cost
C/A	A	2
C/B	A	3
C/C	-	0
C/D	E	3
C/E	E	2



S/D	Link	Cost
D/A	B	2
D/B	B	1
D/C	E	3
D/D	-	0
D/E	E	1

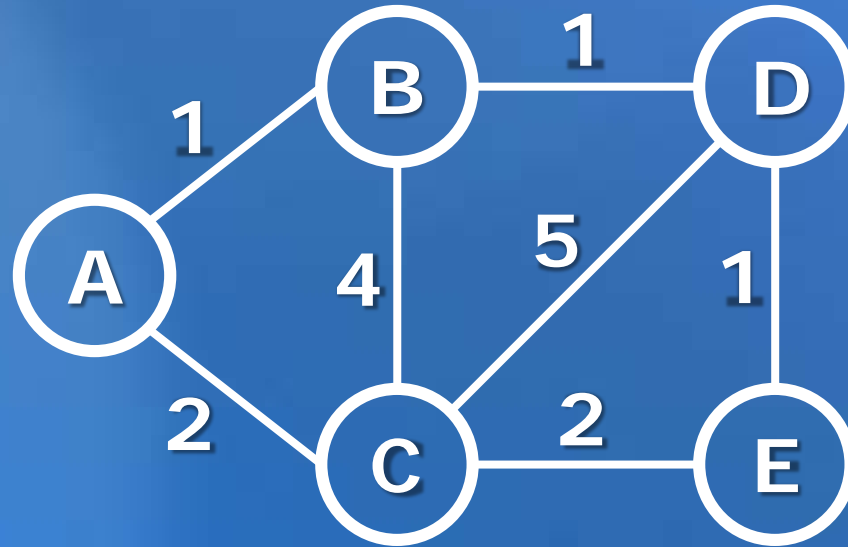
S/D	Link	Cost
E/A	C	4
E/B	D	2
E/C	C	2
E/D	D	1
E/E	-	0

Distance Vector (n=2)

S/D	Link	Cost
A/A	-	0
A/B	B	1
A/C	C	2
A/D	B	2
A/E	C	4

S/D	Link	Cost
B/A	A	1
B/B	-	0
B/C	A	3
B/D	D	1
B/E	D	2

S/D	Link	Cost
C/A	A	2
C/B	A	3
C/C	-	0
C/D	E	3
C/E	E	2



S/D	Link	Cost
D/A	B	2
D/B	B	1
D/C	E	3
D/D	-	0
D/E	E	1

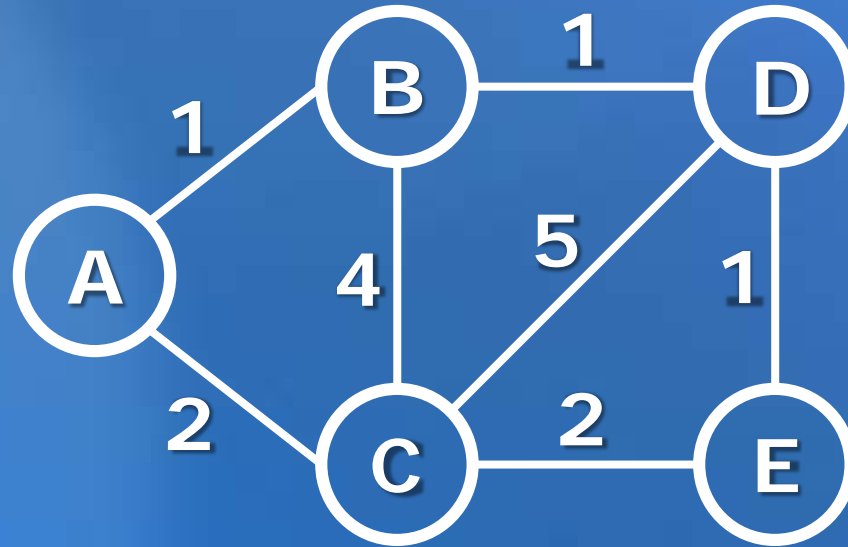
S/D	Link	Cost
E/A	C	4
E/B	D	2
E/C	C	2
E/D	D	1
E/E	-	0

Distance Vector (n=3)

S/D	Link	Cost
A/A	-	0
A/B	B	1
A/C	C	2
A/D	B	2
A/E	B	3

S/D	Link	Cost
B/A	A	1
B/B	-	0
B/C	A	3
B/D	D	1
B/E	D	2

S/D	Link	Cost
C/A	A	2
C/B	A	3
C/C	-	0
C/D	E	3
C/E	E	2



S/D	Link	Cost
D/A	B	2
D/B	B	1
D/C	E	3
D/D	-	0
D/E	E	1

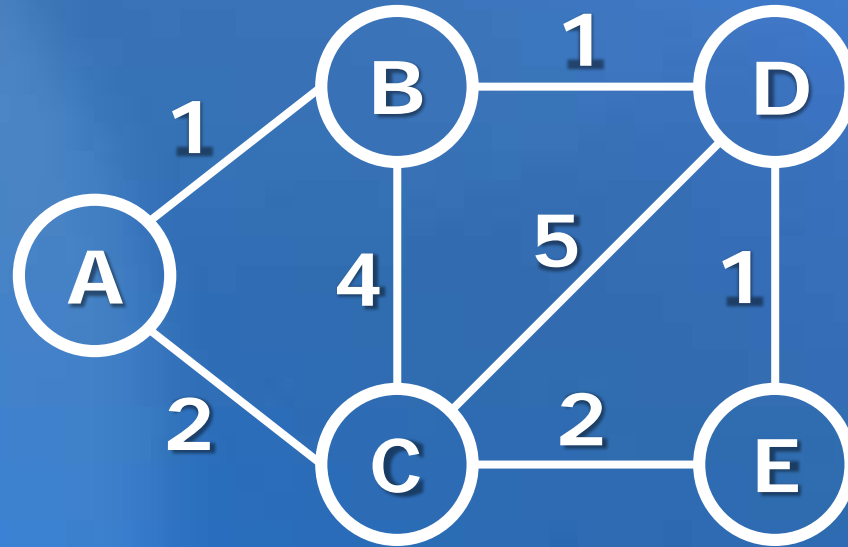
S/D	Link	Cost
E/A	D	3
E/B	D	2
E/C	C	2
E/D	D	1
E/E	-	0

Distance Vector (n=4+)

S/D	Link	Cost
A/A	-	0
A/B	B	1
A/C	C	2
A/D	B	2
A/E	B	3

S/D	Link	Cost
B/A	A	1
B/B	-	0
B/C	A	3
B/D	D	1
B/E	D	2

S/D	Link	Cost
C/A	A	2
C/B	A	3
C/C	-	0
C/D	E	3
C/E	E	2



S/D	Link	Cost
D/A	B	2
D/B	B	1
D/C	E	3
D/D	-	0
D/E	E	1

S/D	Link	Cost
E/A	D	3
E/B	D	2
E/C	C	2
E/D	D	1
E/E	-	0