Demo: distance-vector routing

- Initialization
 - Initially, each router uses an ECHO packet to learn the cost to each of its neighbours.
- Sharing
 - Periodically each router sends each neighbour a list of estimated costs to each destination it knows about.
- Update
 - Each router updates its tables with the best cost to each destination according to that received from its neighbours.
 - If no route exists, insert a new entry
 - If a route exists and the new route has smaller cost, update to the new route



Step 1: Initialization

Initially, each router uses an ECHO packet to learn the cost to each of its neighbours.

		DESTINATION						
		А	В	С	D	Е		
	А		(B, 1)	∞	(D, 2)	∞		
	В	(A, 1)		(C, 4)	∞	∞		
SOURCE	С	∞	(B, 4)		(D, 2)	(E, 2)		
	D	(A, 2)	œ	(C, 2)		(E, 7)		
	Е	∞	∞	(C, 2)	(D, 7)			



Step 2: Sharing

Periodically each router sends each neighbour a list of estimated costs to each destination it knows about.

suppose B sends its distance vector to A, and we only look at the update of distance vector at A.

			DESTINATION							
		Α	В	С	D	E				
	Α		(B, 1)	œ	(D, 2)	x	\$			
	В	(A, 1)		(C, 4)	∞	∞				
SOURCE	С	∞	(B, 4)		(D, 2)	(E, 2)				
	D	(A, 2)	8	(C, 2)		(E, 7)				
	Е	00	∞	(C, 2)	(D, 7)					



Step 3: Update

Each router updates its tables with the best cost to each destination according to that received from its neighbours.

- If no route exists, insert a new entry;
- If a route exists and the new route has smaller cost, update to the new route.

 $Cost(A, C) = Min\{Cost(A,C), Cost(A,B)+Cost(B,C)\}$ = Min{\pi, 1+4} = 5

 $Cost(A, Z) = Min_{X \in Neigh(A)} \{Cost(A, X) + Cost(X, Z)\}$

 $Cost(A, E) = Min\{Cost(A,E), Cost(A,B)+Cost(B,E)\}$ = Min{\alpha, \alpha\} = \alpha

			DESTINATION						
		А	В	С	D	E			
	Α		(B, 1)	∞	(D, 2)	∞			
	В	(A, 1)		(C, 4)	∞	∞	(=		
SOURCE	С	∞	(B, 4)		(D, 2)	(E, 2)			
	D	(A, 2)	œ	(C, 2)		(E, 7)			
	Ε	∞	∞	(C, 2)	(D, 7)				

		DESTINATION					
		Α	В	С	D	Е	
	Α		(B, 1)	(B,5)	(D, 2)	∞	
	В						
SOURCE	С						
	D						
	Е						



Step 2: Sharing

Periodically each router sends each neighbour a list of estimated costs to each destination it knows about.

			DESTINATION								
		А	В	С	D	E					
	А		(B, 1)	∞	(D, 2)	∞					
	В	(A, 1)		(C, 4)	∞	∞					
SOURCE	С	∞	(B, 4)		(D, 2)	(E, 2)					
	D	(A, 2)	œ	(C, 2)		(E, 7)					
	Е	00	∞	(C, 2)	(D, 7)						

		DESTINATION					
		А	В	С	D	Е	
	Α		(B, 1)	(B,5)	(D, 2)	∞	
	В						
SOURCE	С						
	D						
	Е						



Step 3: Update

Each router updates its tables with the best cost to each destination according to that received from its neighbours.

- If no route exists, insert a new entry;
- If a route exists and the new route has smaller cost, update to the new route.

 $Cost(A, C) = Min\{Cost(A,C), Cost(A,D)+Cost(D,C)\}$ = Min{5, 2+2} = 4

 $Cost(A, Z) = Min_{X \in Neigh(A)} \{Cost(A, X) + Cost(X, Z)\}$

 $Cost(A, E) = Min\{Cost(A,E), Cost(A,D)+Cost(D,E)\}$ = Min{\pi, 2+7} = 9

		DESTINATION						
		А	В	С	D	E		
	Α		(B, 1)	∞	(D, 2)	∞		
	В	(A, 1)		(C, 4)	∞	∞		
SOURCE	С	∞	(B, 4)		(D, 2)	(E, 2)		
	D	(A, 2)	œ	(C, 2)		(E, 7)		
	Ε	∞	∞	(C, 2)	(D, 7)			

		DESTINATION					
		Α	В	С	D	E	
	Α		(B, 1)	(B,5)	(D, 2)	∞	
	В						
SOURCE	С						
	D						
	E						



Step 3: Update

Each router updates its tables with the best cost to each destination according to that received from its neighbours.

- If no route exists, insert a new entry;
- If a route exists and the new route has smaller cost, update to the new route.

 $Cost(A, C) = Min\{Cost(A,C), Cost(A,D)+Cost(D,C)\}$ = Min{5, 2+2} = 4

 $Cost(A, Z) = Min_{X \in Neigh(A)} \{Cost(A, X) + Cost(X, Z)\}$

 $Cost(A, E) = Min\{Cost(A,E), Cost(A,D)+Cost(D,E)\}$ = Min{\pi, 2+7} = 9

		DESTINATION						
		А	В	С	D	E		
	Α		(B, 1)	∞	(D, 2)	∞		
	В	(A, 1)		(C, 4)	∞	∞		
SOURCE	С	∞	(B, 4)		(D, 2)	(E, 2)		
	D	(A, 2)	œ	(C, 2)		(E, 7)		
	Ε	∞	∞	(C, 2)	(D, 7)			

		DESTINATION					
		Α	В	С	D	E	
	Α		(B, 1)	(D,4)	(D, 2)	(D,9)	
	В						
SOURCE	С						
	D						
	E						



Step 2 and Step 3 are repeated until there is no change to make on routing table.

			DESTINATION							
		Α	В	С	D	E				
	А		(B, 1)	∞	(D, 2)	∞				
	В	(A, 1)		(C, 4)	∞	∞				
SOURCE	С	∞	(B, 4)		(D, 2)	(E, 2)				
	D	(A, 2)	œ	(C, 2)		(E, 7)				
	Е	∞	∞	(C, 2)	(D, 7)					

			DESTINATION						
		Α	В	С	D	E			
	Α		(B, 1)	(D,4)	(D, 2)	(D,6)			
	В	(A, 1)		(C, 4)	(A, 3)	(C, 6)			
SOURCE	С	(D, 4)	(B, 4)		(D, 2)	(E, 2)			
	D	(A, 2)	(A, 3)	(C, 2)		(C, 4)			
	Е	(C, 6)	(C, 6)	(C, 2)	(C, 4)				