DV ROUTING ALGORITHM WITH POISONED REVERSE

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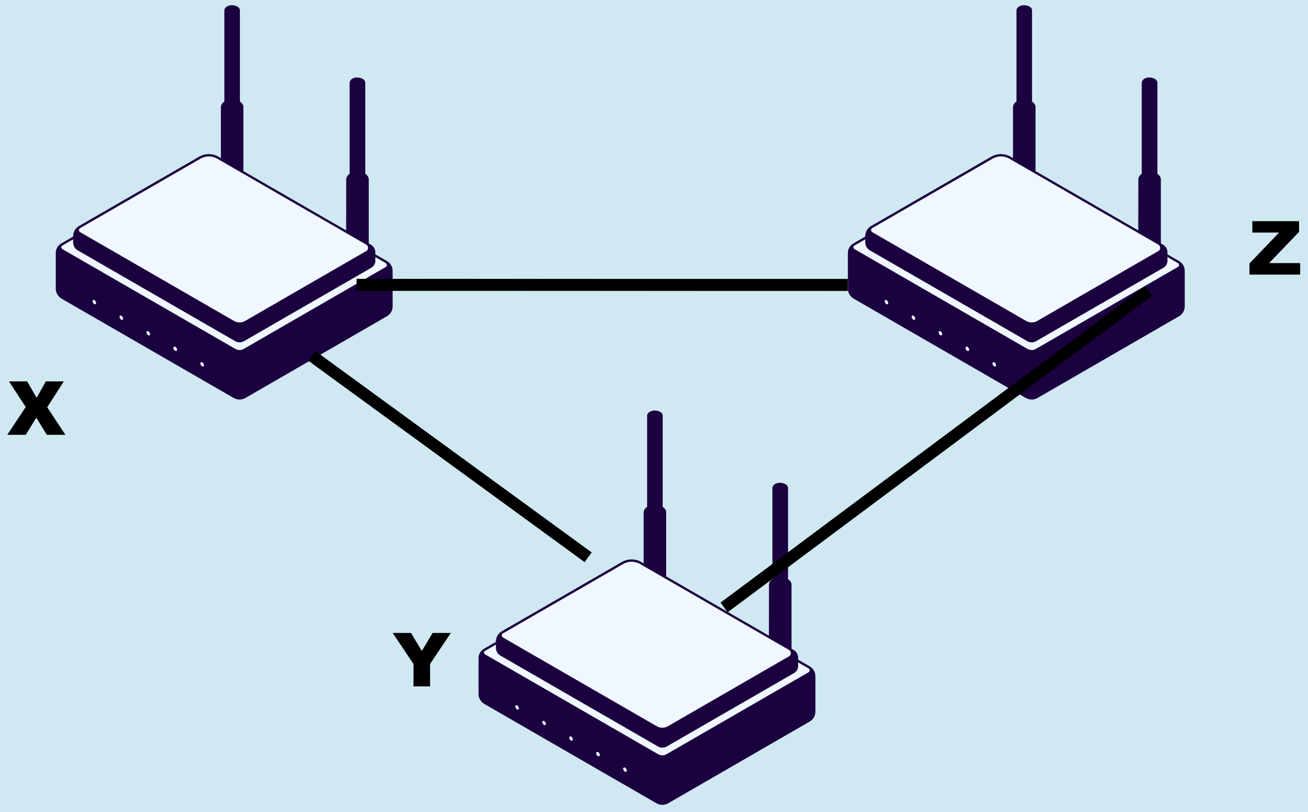
COUNT TO INFINITY PROBLEM



Shortest Path For X:

X->Y is 4

X->Z is 5 (X->Y-Z)

Shortest Path For Y:

Y->X is 4

Y->Z is 1

Shortest Path For Z:

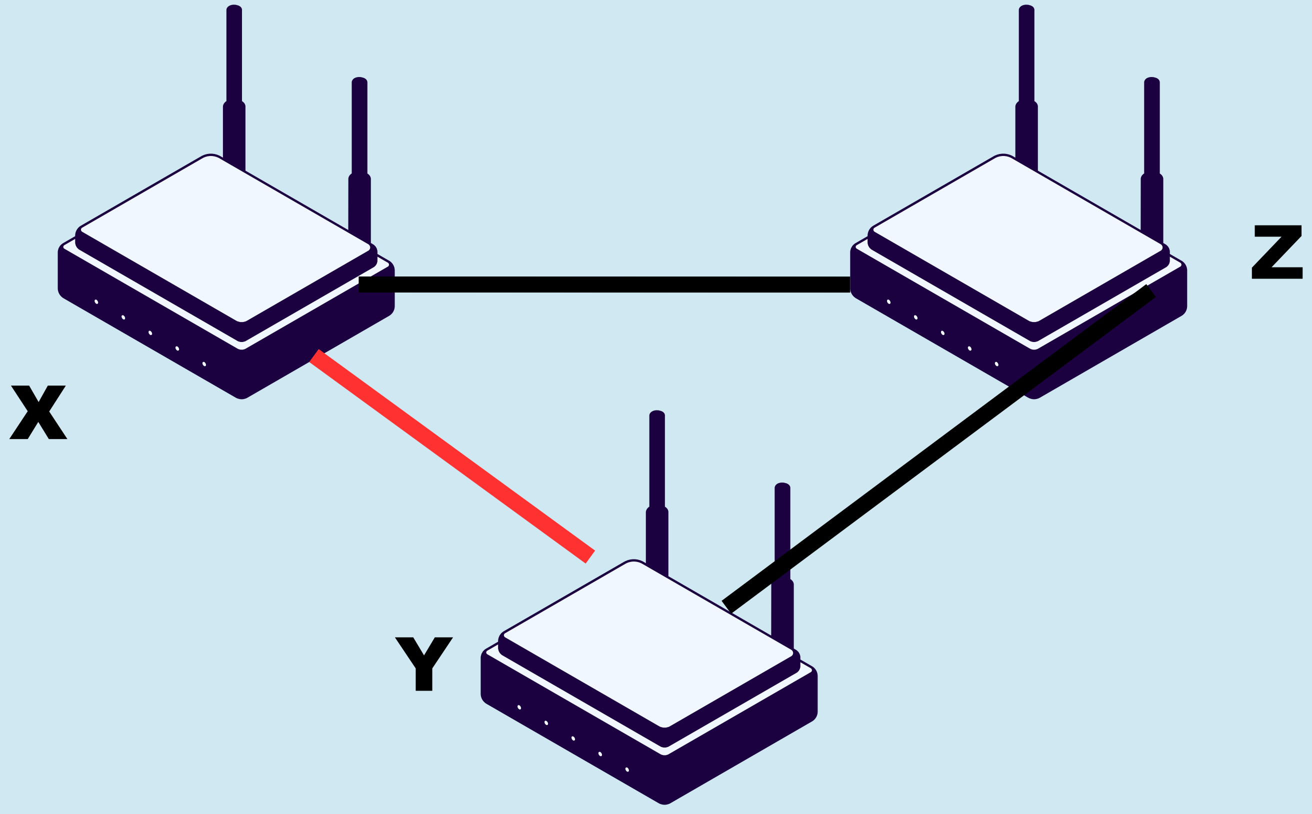
Z->X is 5 (Z->Y->X)

Z->Y is 1

case:

What will happen if the link cost c(X,Y) is increased to 60?

COUNT TO INFINITY PROBLEM



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Shortest Path For Z:

Z->X is 5 (Z->Y->X)

Z->Y is 1

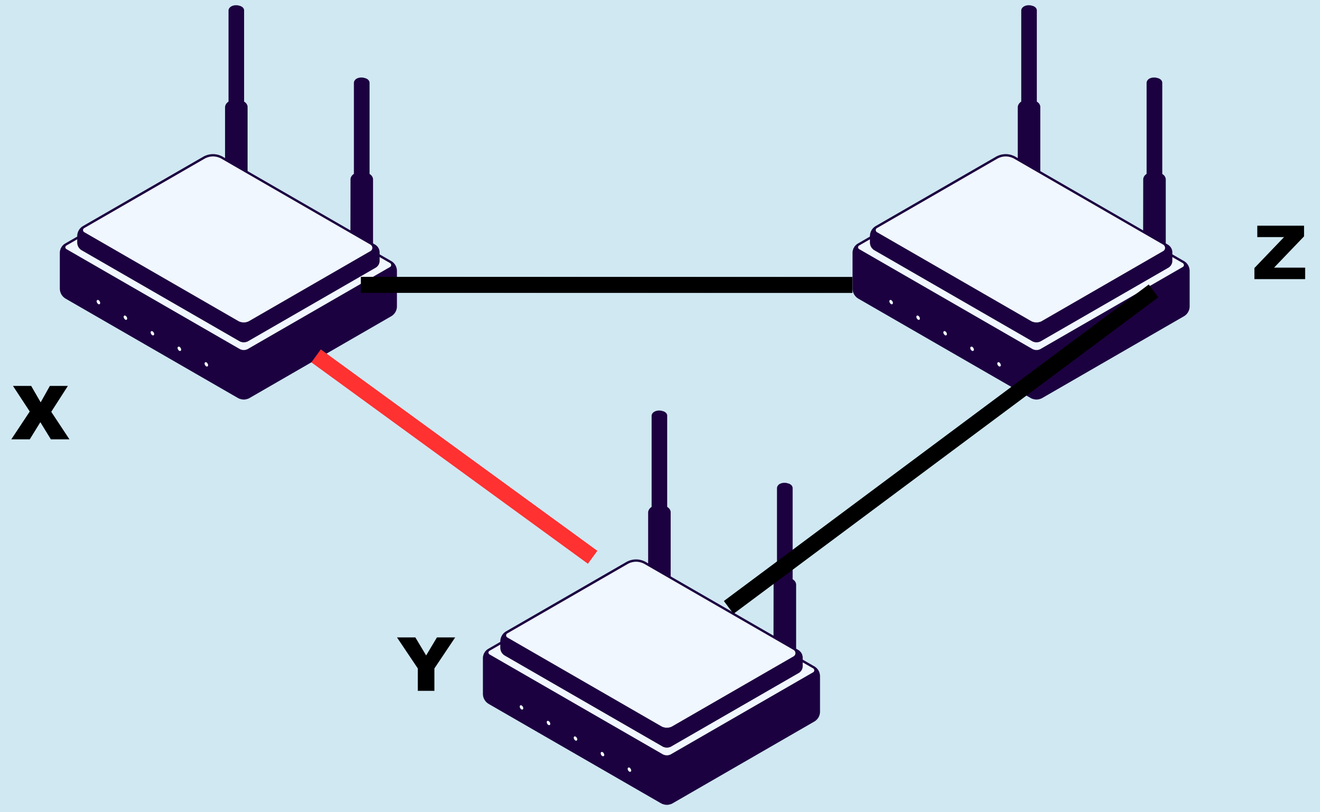
At t_0: Y detects cost change

- **Y's calculation: D_Y(X) = min{60+0, 1+5} = 6**
- **Y decides: Route to X via Z (cost 6 vs direct cost 60)**
- **Problem: Creates routing loop! Y→Z→Y→Z...**

At t_1: Y informs Z

- **Y tells Z: "My distance to X is now 6"**
- **Z calculates: D_Z(X) = min{50+0, 1+6} = 7**
- **Z updates: "My distance to X is now 7"**

COUNT TO INFINITY PROBLEM



The Counting Loop:

- t_2: Y gets Z's update → D_Y(X) = 1+7 = 8
- t_3: Z gets Y's update → D_Z(X) = 1+8 = 9
- t_4: Y gets Z's update → D_Y(X) = 1+9 = 10
- ...continues for 44 iterations...

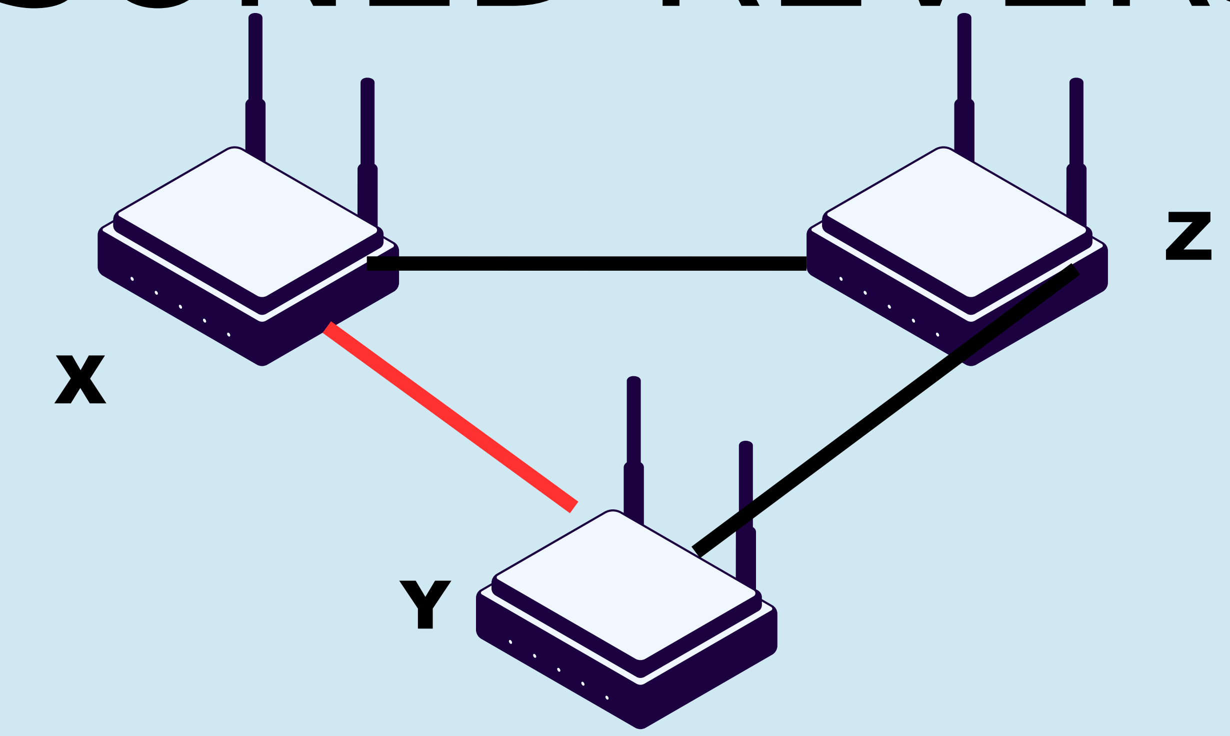
When Does It Stop?

- Stops when: Z's cost via Y > 50 (direct cost)
- After 44 rounds: Z finally chooses direct path to X
- Total time: Until costs count up from 6 to 50+

But we can improve this by using

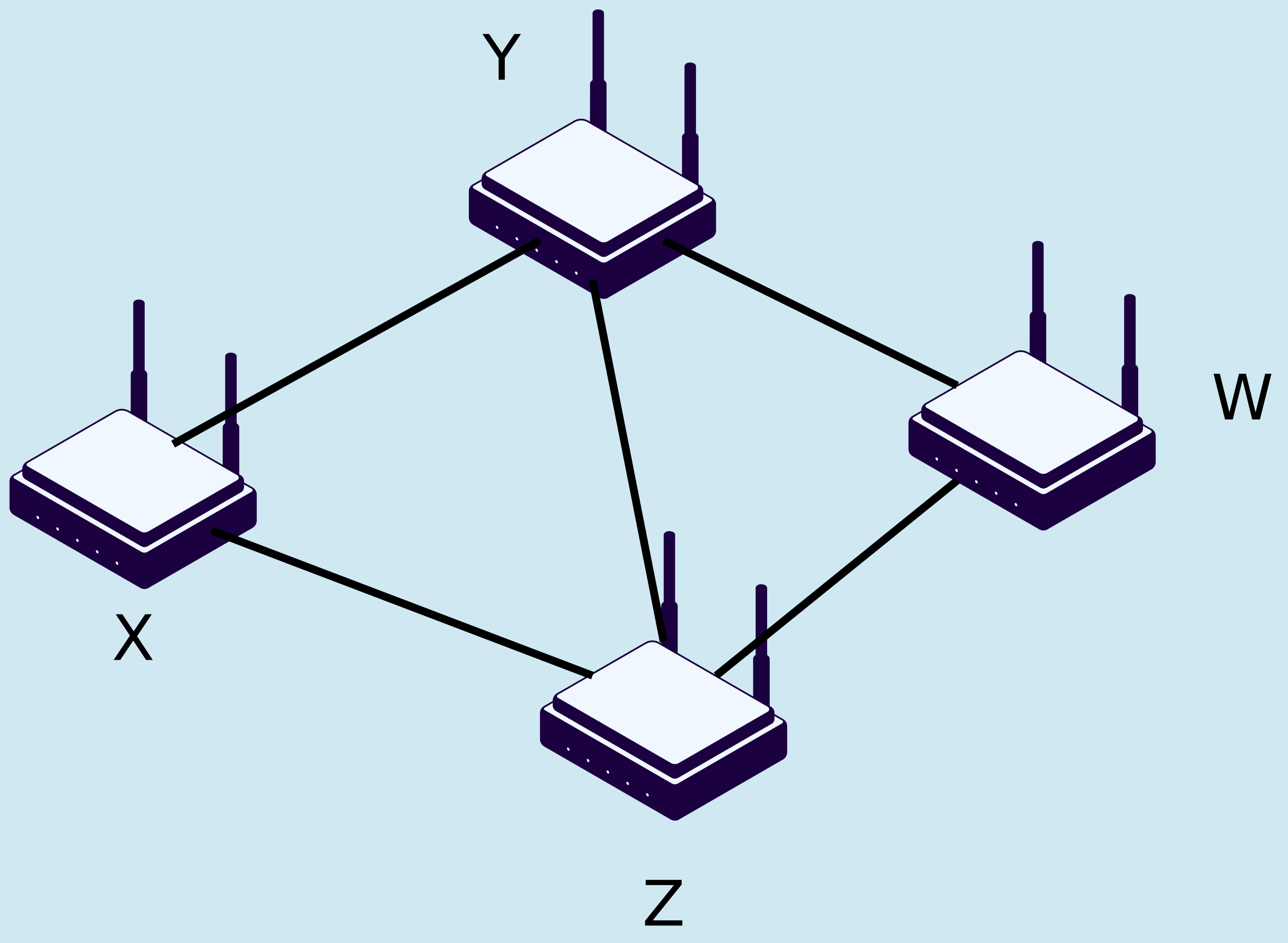
Poisoned Reverse Technique

POISONED REVERSE



DELIBERATELIE	**If router Z routes to X via Y, Z tells Y that its distance to X is ∞. (Z lies even though it knows D_Z(X) = 6)**
WHY LIE ?	**Prevents Y from thinking Z is a valid route to X** **Y avoids routing to X via Z, preventing routing loops**
HOW LONG LIE?	**Z continues to advertise D_Z(X) = ∞ to Y as long as Z routes to X via Y** **Once Z finds a better direct path, it stops lying and tells the truth.**

POISONED REVERSE

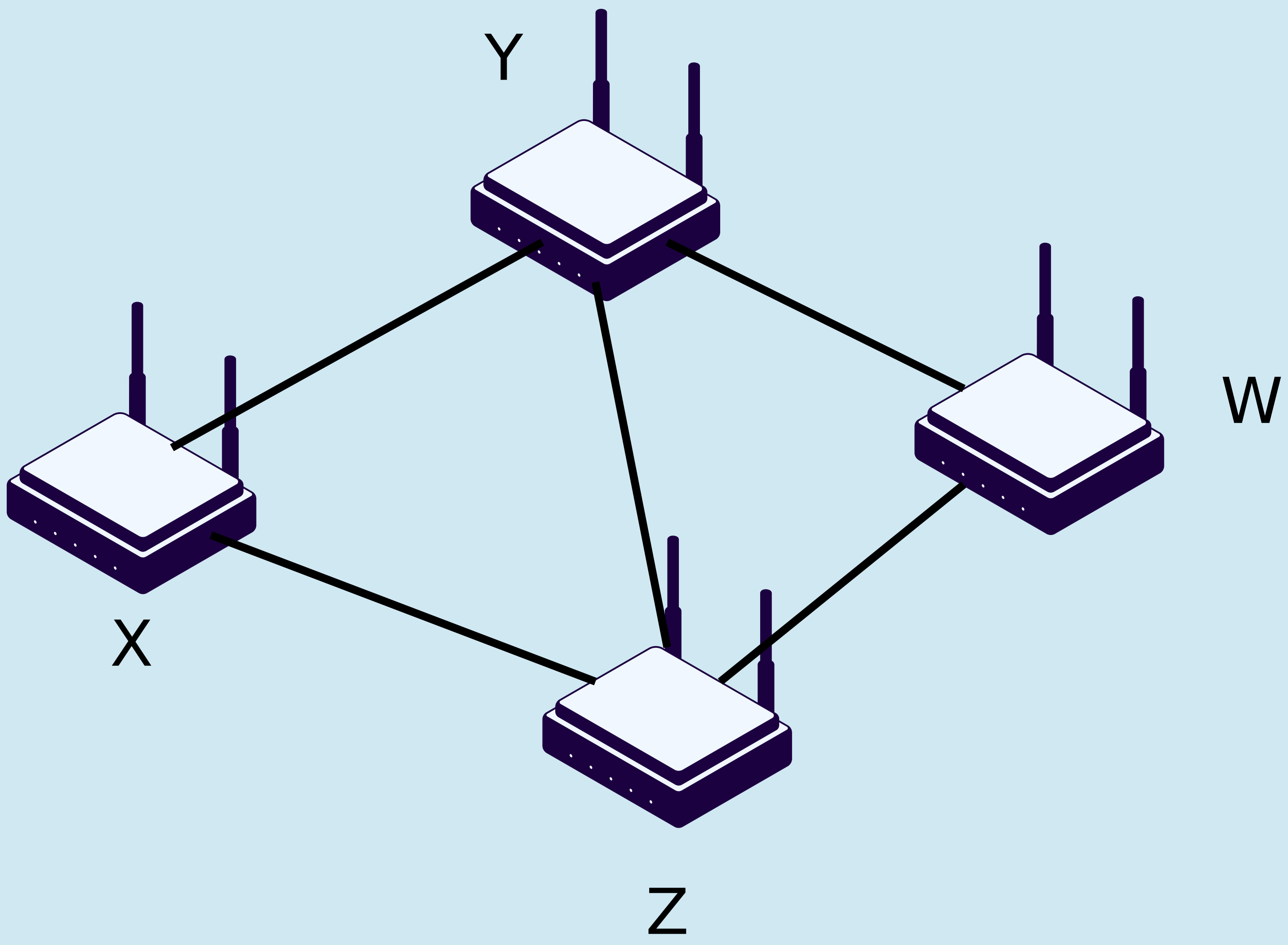


LIMITATION

It can only stop loops between two directly connected routers.

If the loop involves more than two routers, this method does not work.

PROBLEM 11.A



Poison reversed is used in Distance vector algorithm

- **When the distance vector routing is stabilized, router w, y, and z inform their distances to x to each other. What distance values do they tell each other?**

SOLUTION 11.A

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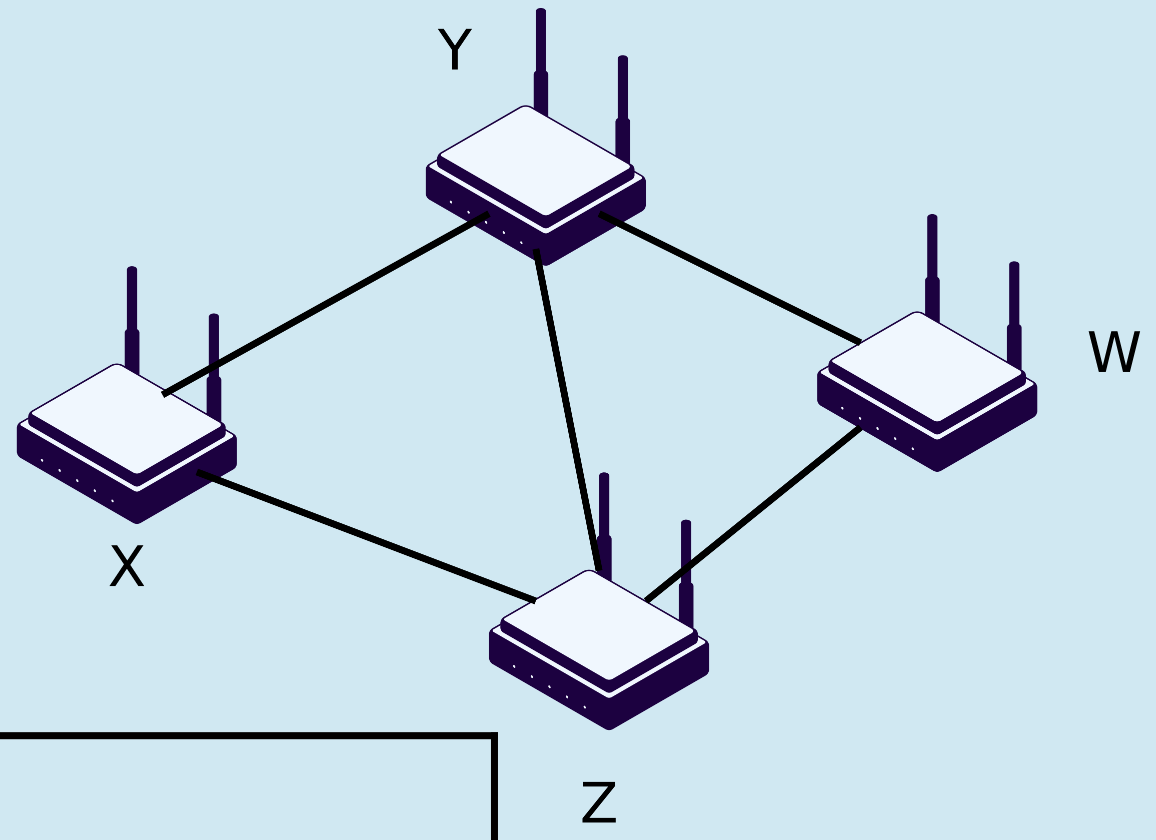
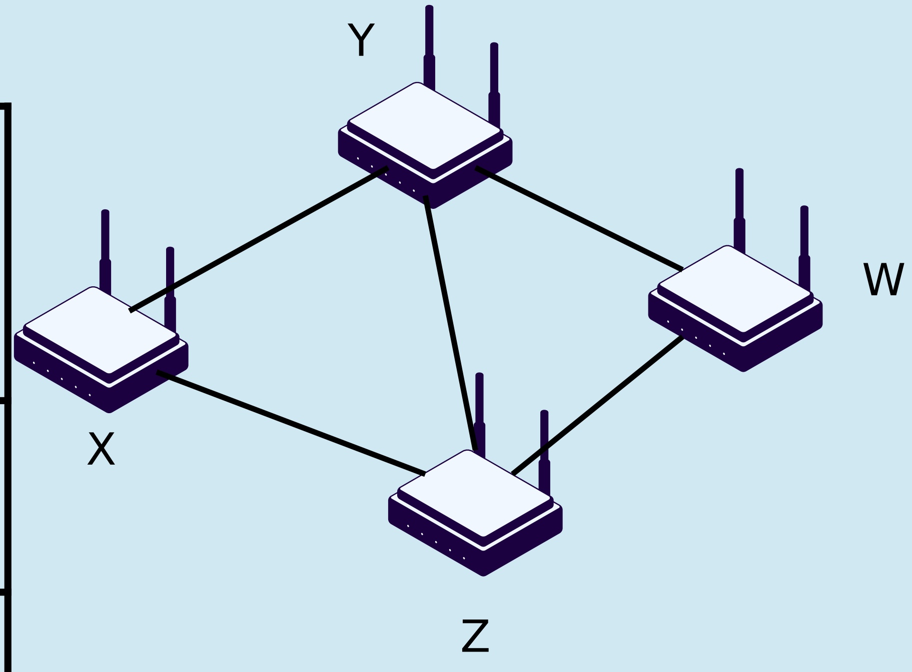


Source Router	Destinatio n	Cost	Next Hop	Shortest Path
W	X	5	Y	W->Y->X
Y	X	4	X	Y->X
Z	X	6	Y	Z->Y->X

PROBLEM 11.A

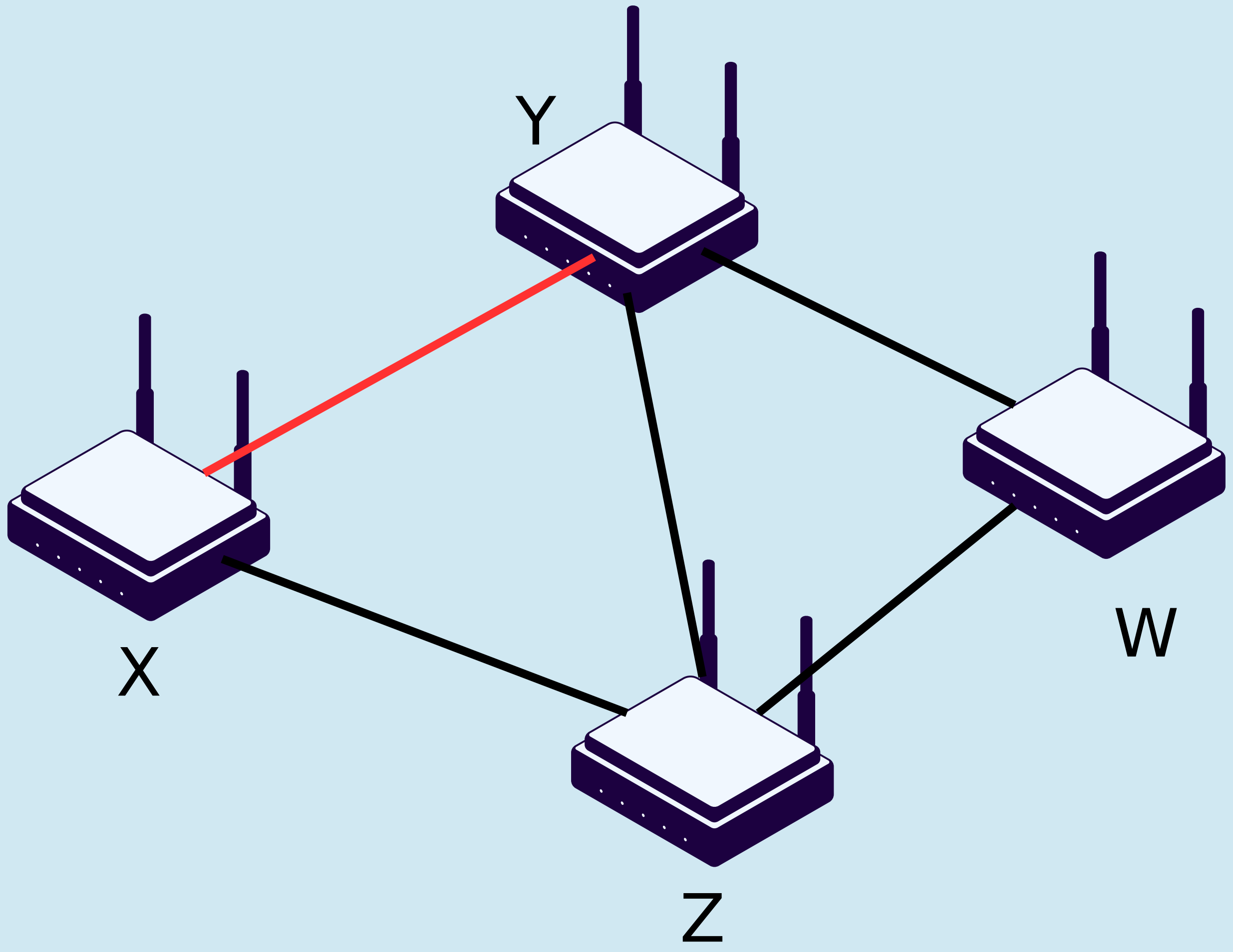
Source Router	Destinatio n	Cost	Next Hop	Shortest Path
W	X	5	Y	W->Y->X
Y	X	4	X	Y->X
Z	X	6	Y	Z->Y->X



Router w, y, and z inform their distances to x to each other:

Router Z	Informs W: Dz(X)=6	Informs Y: Dz(X)=∞
Router W	Informs Y, Dw(X)=∞	Informs z, Dw(X)=5
Router Y	Informs W, Dy(X)=4	Informs z, Dy(X)=4

PROBLEM 11.B



Poison reversed is used in Distance vector algorithm

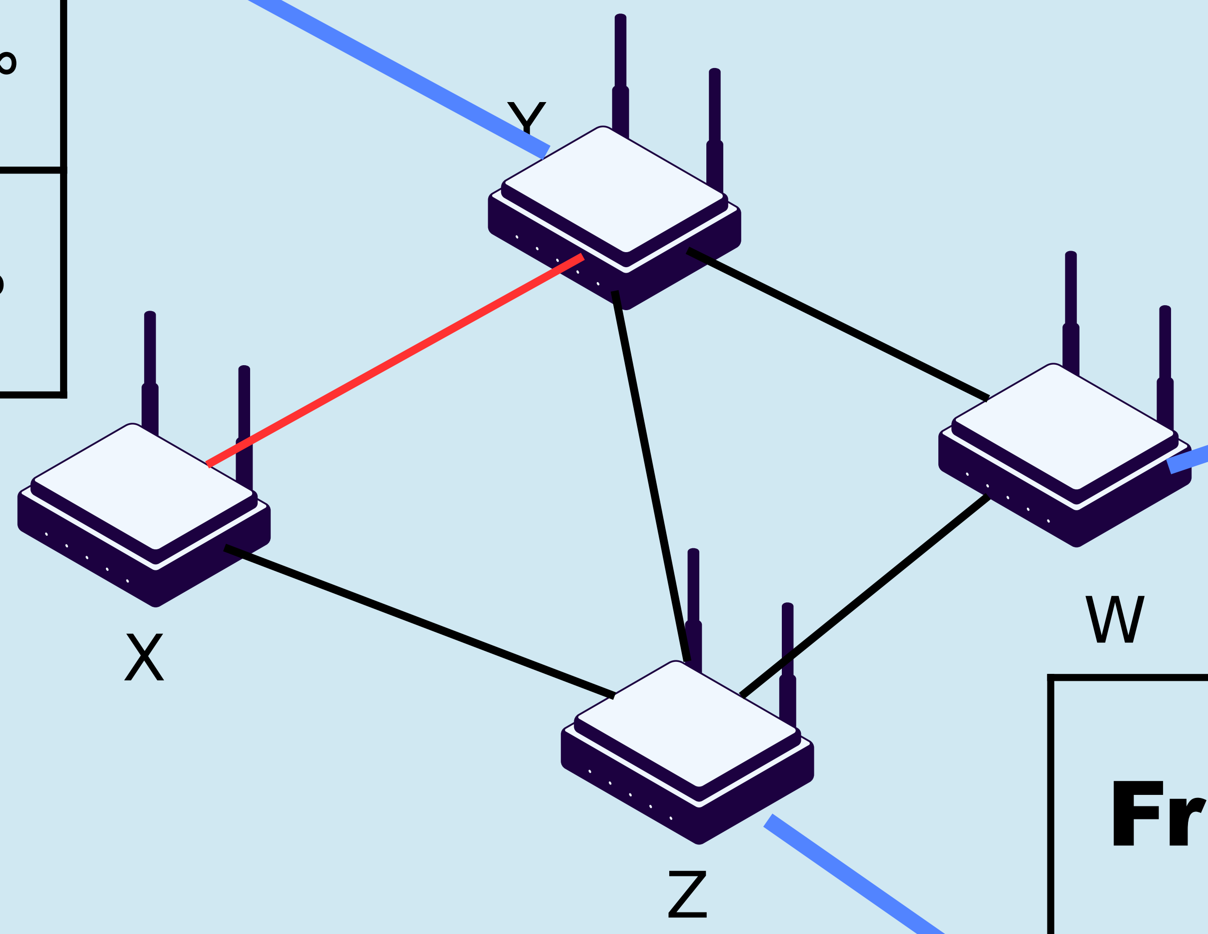
- **Now suppose that the link cost between x and y increases to 60. Will there be a count-to-infinity problem even if poisoned reverse is used? Why or why not? If there is a count-to-infinity problem, then how many iterations are needed for the distance-vector routing to reach a stable state again?**

SOLUTION 11.B

1.

From	Message
W	Dw(X)=∞
Z	Dz(X)=∞

Dy(X)=60
Next hop=X



3.

From	Message
Y	Dy(X)=60
Z	Dz(X)=∞

Dw(X)=60+1
=61
Next hop=Y

2.

From	Message
W	Dw(X)=5
Y	Dy(X)=60

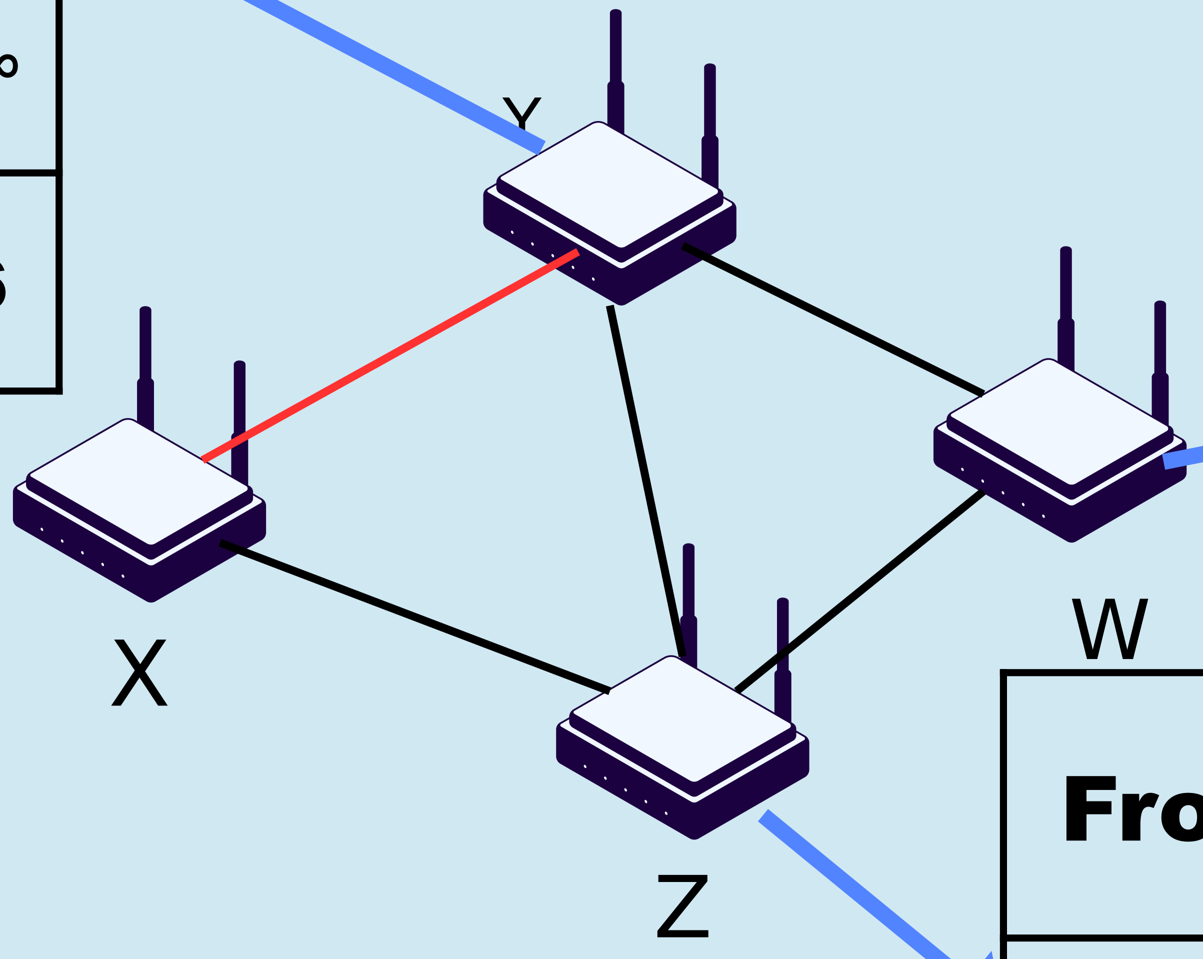
Dz(X)=5+1
=6
Next hop=W

SOLUTION 11.B

4.

From	Message
W	Dw(X)=∞
Z	Dz(X)=6

Dy(X)=6+2 =8
Next hop=Z



6.

From	Message
Y	Dy(X)=8
Z	Dz(X)=∞

Dw(X)=8+1 =9
Next hop=Z

5.

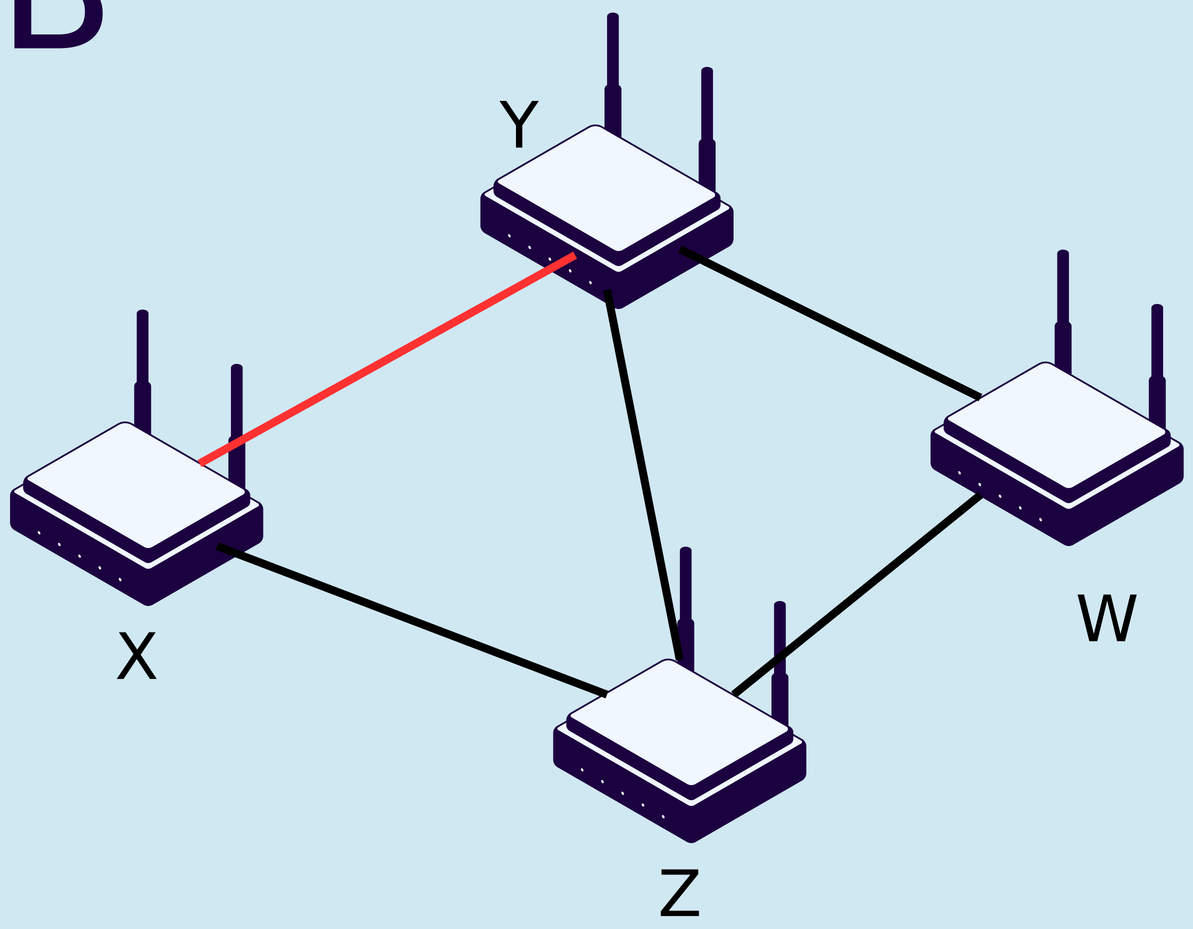
From	Message
W	Dw(X)=61
Y	Dy(X)=∞

Dz(X)=61+1 =62
Next hop=W

SOLUTION 11.B

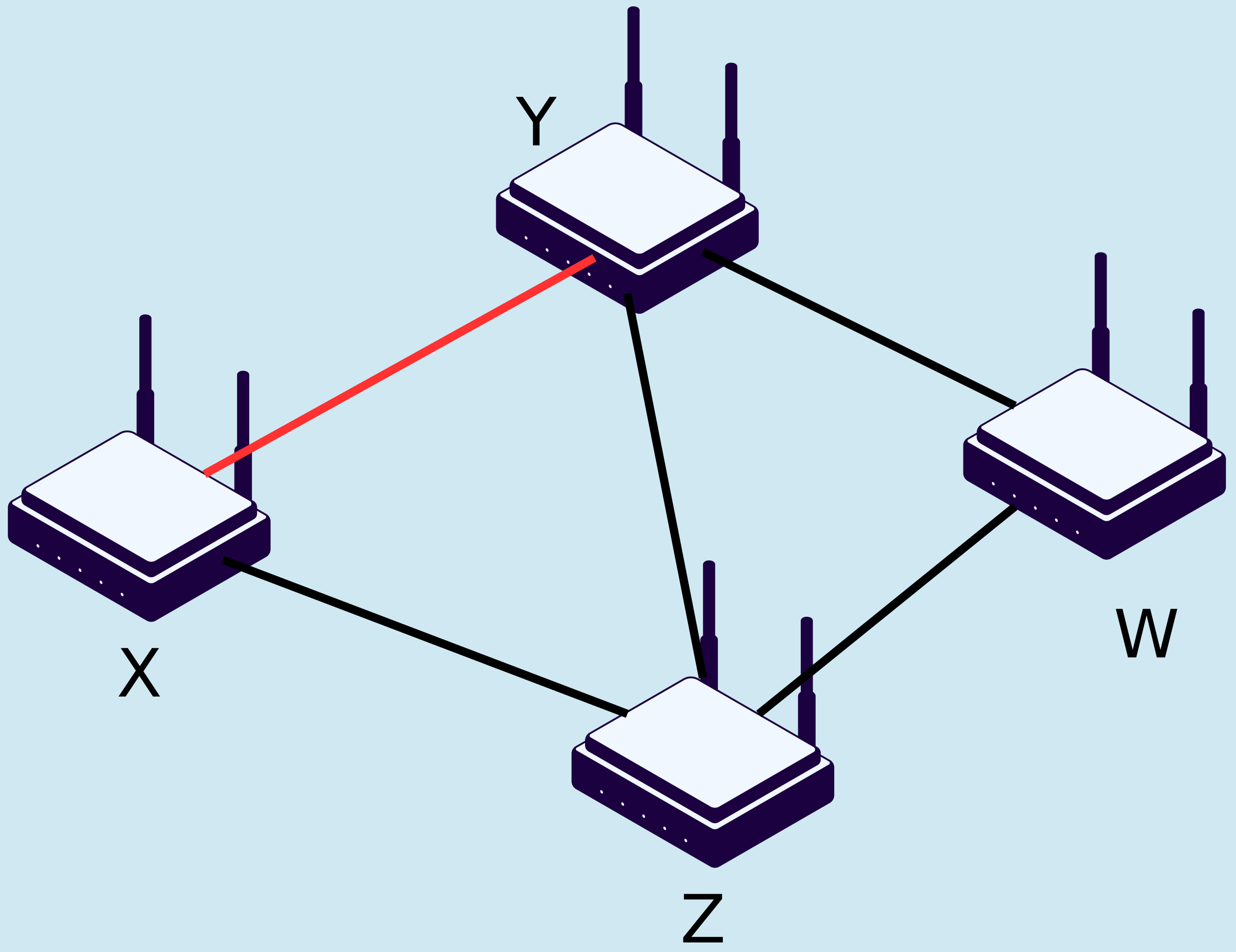
After 44 iterations, table converged:

From/To	X	Y	Z	W
X	0	52	50	51
Y	52	0	2	1
Z	50	2	0	1
W	51	1	1	0



Count to infinity problem occured although poisoned reverse is used!!

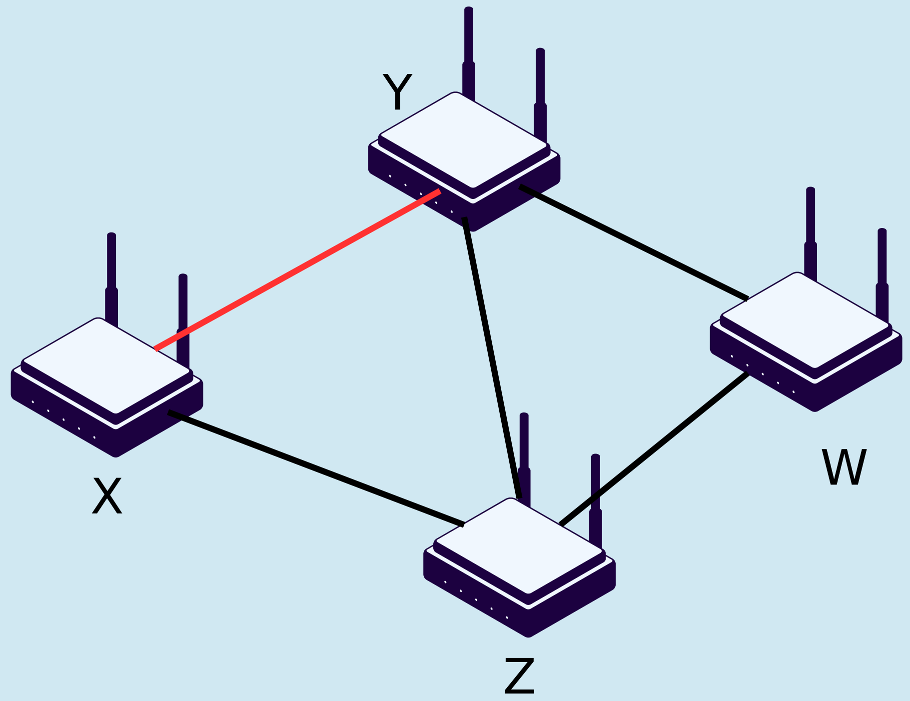
PROBLEM 11.C



Poison reversed is used in Distance vector algorithm

- **How do you modify c(y,z) such that there is no count-to-infinity problem at all if c(y,x) changes from 4 to 60?**

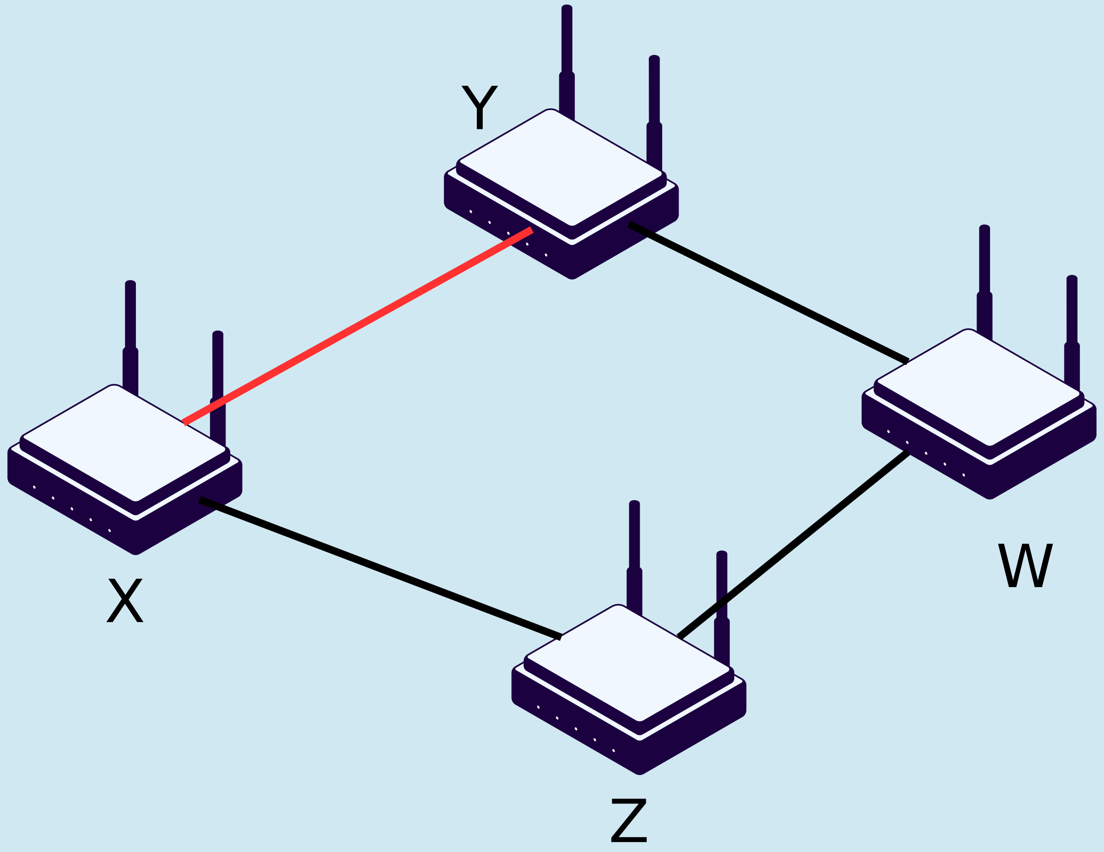
SOLUTION 11.C



- **How do you modify c(y,z) such that there is no count-to-infinity problem at all if c(y,x) changes from 4 to 60?**

Answer:

We will cut the cut the link between y and z.



ANY QUESTION?

THANK YOU