Routing

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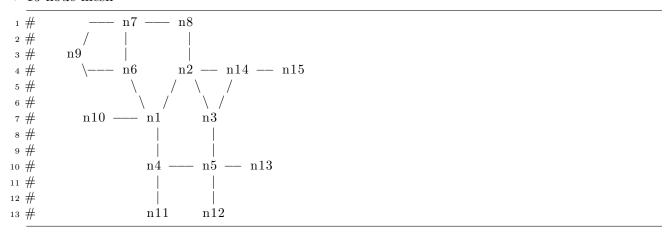# 1 Introduction

Intro here

2 Experiments

To demonstrate that our routing protocol implementation works as it should, we ran a series of routing tests. We built three different networks and outputed the distance vectors for each node as the forwarding tables were built. The three networks we used were as follows:

- 5 nodes in a line

```
1  n1—n2—n3—n4—n5
```

- 5 node in a ring

```
1          n3
2        /    \
3      n2      n4
4      |       |
5      n1 —— n5
```

- 15 node mesh

```
1  #         —— n7 —— n8
2  #       /     |      |
3  #     n9      |      |
4  #       \—— n6     n2 —— n14 —— n15
5  #          \     / \    /
6  #           \ /    \ /
7  #     n10 —— n1     n3
8  #            |       |
9  #            |       |
10 #          n4 —— n5 —— n13
11 #            |       |
12 #            |       |
13 #          n11     n12
```

2.1 Five Node Line

```
1 ================================
2 n2 receiving a new dv from address 1
3 Vector received: {1: 0}
4 DV before update: {2: 0, 3: 0}
5 DV after update: {1: 1, 2: 0, 3: 0}
6 ================================
7 ================================
8 n4 receiving a new dv from address 8
9 Vector received: {8: 0}
10 DV before update: {6: 0, 7: 0}
11 DV after update: {8: 1, 6: 0, 7: 0}
12 ================================
13 ================================
14 n1 receiving a new dv from address 2
15 Vector received: {2: 0, 3: 0}
16 DV before update: {1: 0}
17 DV after update: {1: 0, 2: 1, 3: 1}
18 ================================
19 ================================
20 n3 receiving a new dv from address 3
21 Vector received: {2: 0, 3: 0}
22 DV before update: {4: 0, 5: 0}
23 DV after update: {2: 1, 3: 1, 4: 0, 5: 0}
24 ================================
25 ================================
26 n2 receiving a new dv from address 4
27 Vector received: {4: 0, 5: 0}
28 DV before update: {1: 1, 2: 0, 3: 0}
29 DV after update: {1: 1, 2: 0, 3: 0, 4: 1, 5: 1}
30 ================================
```

```
1 ================================
2 Final DV for n1: {1: 0, 2: 1, 3: 1, 4: 2, 5: 2, 6: 3, 7: 3, 8: 4}
3 Final DV for n2: {1: 1, 2: 0, 3: 0, 4: 1, 5: 1, 6: 2, 7: 2, 8: 3}
4 Final DV for n3: {1: 2, 2: 1, 3: 1, 4: 0, 5: 0, 6: 1, 7: 1, 8: 2}
5 Final DV for n4: {1: 3, 2: 2, 3: 2, 4: 1, 5: 1, 6: 0, 7: 0, 8: 1}
6 Final DV for n5: {1: 4, 2: 3, 3: 3, 4: 2, 5: 2, 6: 1, 7: 1, 8: 0}
7 ================================
8 Final forwarding table for n1: {2: 1, 3: 1, 4: 1, 5: 1, 6: 1, 7: 1, 8: 1}
9 Final forwarding table for n2: {1: 2, 4: 3, 5: 3, 6: 3, 7: 3, 8: 3}
10 Final forwarding table for n3: {1: 4, 2: 4, 3: 4, 6: 5, 7: 5, 8: 5}
11 Final forwarding table for n4: {1: 6, 2: 6, 3: 6, 4: 6, 5: 6, 8: 7}
12 Final forwarding table for n5: {1: 8, 2: 8, 3: 8, 4: 8, 5: 8, 6: 8, 7: 8}
```

```
1 ================================
2 600.001064 n1 forwarding packet to 8
3 600.002864 n2 forwarding packet to 8
4 600.004664 n3 forwarding packet to 8
5 600.006464 n4 forwarding packet to 8
6 600.008264 n5 received packet
```

2.2   Five Node Ring

Five Node Ring explain here

2.3   Fifteen Node

```
1  300.001288 n1 forwarding packet to 31
2  300.003088 n4 forwarding packet to 31
3  300.004888 n5 forwarding packet to 31
4  300.006688 n12 received packet
5  310.001288 Deactivating link from n5 to n4
6  310.001288 Deactivating link from n4 to n5
7  610.002576 n1 forwarding packet to 31
8  610.004376 n2 forwarding packet to 31
9  610.006176 n3 forwarding packet to 31
10 610.007976 n5 forwarding packet to 31
11 610.009776 n12 received packet
12 620.002576 Activating link from n5 to n4
13 620.002576 Activating link from n4 to n5
14 920.003864 n1 forwarding packet to 31
15 920.005664 n4 forwarding packet to 31
16 920.007464 n5 forwarding packet to 31
17 920.009264 n12 received packet
```

```
1  ================================
2  n5 receiving a new dv from address 31
3  Vector received: {31: 0}
4  DV before update: {16: 0, 17: 0, 18: 0, 15: 0}
5  DV after update: {16: 0, 17: 0, 18: 0, 31: 1, 15: 0}
6  ================================
7  ================================
8  n5 receiving a new dv from address 32
9  Vector received: {32: 0}
10 DV before update: {16: 0, 17: 0, 18: 0, 31: 1, 15: 0}
11 DV after update: {32: 1, 15: 0, 16: 0, 17: 0, 18: 0, 31: 1}
12 ================================
13 ================================
14 n5 receiving a new dv from address 10
15 Vector received: {9: 0, 10: 0, 11: 0}
16 DV before update: {32: 1, 15: 0, 16: 0, 17: 0, 18: 0, 31: 1}
17 DV after update: {32: 1, 9: 1, 10: 1, 11: 1, 15: 0, 16: 0, 17: 0, 18: 0, 31: 1}
18 ================================
19
20 ...
21 ...
22
23 ================================
24 n5 receiving a new dv from address 10
25 Vector received: {33: 1, 34: 1, 35: 1, 36: 2, 5: 1, 6: 1, 7: 1, 8: 1, 9: 0, 10: 0,
       11: 0, 15: 1, 16: 1, 17: 1, 18: 1}
26 DV before update: {1: 2, 2: 2, 3: 2, 4: 2, 5: 2, 6: 2, 7: 2, 8: 2, 9: 1, 10: 1, 11:
       1, 12: 1, 13: 1, 14: 1, 15: 0, 16: 0, 17: 0, 18: 0, 29: 3, 30: 2, 31: 1, 32: 1,
       33: 2, 34: 2, 35: 2}
```

27 DV after update: {1: 2, 2: 2, 3: 2, 4: 2, 5: 2, 6: 2, 7: 2, 8: 2, 9: 1, 10: 1, 11: 1, 12: 1, 13: 1, 14: 1, 15: 0, 16: 0, 17: 0, 18: 0, 29: 3, 30: 2, 31: 1, 32: 1, 33: 2, 34: 2, 35: 2, 36: 3}

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29 ══════════════════════════════════

30 n5 receiving a new dv **from** address 31

31 Vector received: {32: 2, 9: 2, 10: 2, 11: 2, 15: 1, 16: 1, 17: 1, 18: 1, 31: 0}

32 DV before update: {1: 2, 2: 2, 3: 2, 4: 2, 5: 2, 6: 2, 7: 2, 8: 2, 9: 1, 10: 1, 11: 1, 12: 1, 13: 1, 14: 1, 15: 0, 16: 0, 17: 0, 18: 0, 29: 3, 30: 2, 31: 1, 32: 1, 33: 2, 34: 2, 35: 2, 36: 3}

33 DV after update: {1: 2, 2: 2, 3: 2, 4: 2, 5: 2, 6: 2, 7: 2, 8: 2, 9: 1, 10: 1, 11: 1, 12: 1, 13: 1, 14: 1, 15: 0, 16: 0, 17: 0, 18: 0, 29: 3, 30: 2, 31: 1, 32: 1, 33: 2, 34: 2, 35: 2, 36: 3}

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