Claims

What is claimed is:

1. A method to determine a rank value associated with a first network node, the method comprising:

processing a first rank value to determine a second rank value, the first rank value corresponding to a path from a second network node to a destination network node, the processing including rounding up the first rank value in a predetermined manner to at least a second next higher integral rank value than the first rank value, to determine the second rank value, wherein the second network node is indicated as being a preferred parent node for the first network node; and

processing the second rank value along with at least a third rank value to determine the rank value associated with the first network node, the third rank value associated with a path from one of a plurality of candidate parent network nodes, for the first network node, to the destination network node.

2. The method of claim 1, wherein:

the one of the plurality of candidate parent network nodes has a highest rank value of a rank value associated with each other of the plurality of candidate parent network nodes.

3. The method of claim 1, further comprising:

determining the third rank value by processing a fourth rank value, corresponding to the path from the one of the plurality of candidate parent network nodes, the processing including rounding up the fourth rank value to a next higher integral rank value.

4. The method of claim 3, wherein:

the fourth rank value is a highest rank value of rank values associated with each of the plurality of candidate parent network nodes.

5. The method of claim 3, wherein:

the fourth rank value corresponds to at least one metric value for the path from the one of the plurality of candidate parent network nodes, for the first network node, to the destination network node.

6. The method of claim 5, wherein:

the at least one metric value comprises an Expected Transmission Count (ETX) value.

7. The method of claim 1, wherein:

the second rank value corresponds to at least one metric value for the path from the second network node to the destination network node.

8. The method of claim 7, wherein:

the at least one metric value comprises an Expected Transmission Count (ETX) value.

9. A network communication device, comprising:

one or more processors; and

memory coupled to the one or more processors, the memory storing instructions executable by the one or more processors to perform operations to determine a rank value associated with a first network node, the operations including:

processing a first rank value to determine a second rank value, the first rank value corresponding to a path from a second network node to a destination network node, the processing including rounding up the first rank value in a predetermined manner to at least a second next higher integral rank value than the first rank value, to determine the second rank value, wherein the second network node is indicated as being a preferred parent node for the first network node; and

processing the second rank value along with at least a third rank value to determine the rank value associated with the first network node, the third rank value associated with a path from one of a plurality of candidate parent network nodes, for the first network node, to the destination network node.

10. The network communication device of claim 9, wherein:

the one of the plurality of candidate parent network nodes has a highest rank value of a rank value associated with each other of the plurality of candidate parent network nodes.

11. The network communication device of claim 9, the operations further comprising:

determining the third rank value by processing a fourth rank value, corresponding to the path from the one of the plurality of candidate parent network nodes, the processing including rounding up the fourth rank value to a next higher integral rank value.

12. The network communication device of claim 11, wherein:

the fourth rank value is a highest rank value of rank values associated with each of the plurality of candidate parent network nodes.

13. The network communication device of claim 11, wherein:

the fourth rank value corresponds to at least one metric value for the path from the one of the plurality of candidate parent network nodes, for the first network node, to the destination network node.

14. The network communication device of claim 9, wherein:

the second rank value corresponds to at least one metric value for the path from the second network node to the destination network node.

15. One or more computer-readable media storing instructions that, when executed by one or more processors of a node, configure the node to perform operations to determine a rank value associated with a first network node, the operations comprising:

processing a first rank value to determine a second rank value, the first rank value corresponding to a path from a second network node to a destination network node, the processing including rounding up the first rank value in a predetermined manner to at least a second next higher integral rank value than the first rank value, to determine the second rank value, wherein the second network node is indicated as being a preferred parent node for the first network node; and

processing the second rank value along with at least a third rank value to determine the rank value associated with the first network node, the third rank value associated with a

path from one of a plurality of candidate parent network nodes, for the first network node, to the destination network node.

16. The one or more computer-readable media of claim 15, wherein:

the one of the plurality of candidate parent network nodes has a highest rank value of a rank value associated with each other of the plurality of candidate parent network nodes.

17. The one or more computer-readable media of claim 15, the operations further comprising:

determining the third rank value by processing a fourth rank value, corresponding to the path from the one of the plurality of candidate parent network nodes, the processing including rounding up the fourth rank value to a next higher integral rank value.

18. The one or more computer-readable media of claim 17, wherein:

the fourth rank value is a highest rank value of rank values associated with each of the plurality of candidate parent network nodes.

19. The one or more computer-readable media of claim 17, wherein:

the fourth rank value corresponds to at least one metric value for the path from the one of the plurality of candidate parent network nodes, for the first network node, to the destination network node.

20. The one or more computer-readable media of claim 15, wherein:

the second rank value corresponds to at least one metric value for the path from the second network node to the destination network node.

CLAIMS

WHAT IS CLAIMED IS:

1. A method to determine a rank value associated with a first network node, the rank value tolerant to increases in a link cost between the first network node and its preferred parent network node with respect to routing, the method comprising:

rounding up a first rank value in a predetermined manner to at least two integral rank values higher than the first rank value, wherein the first rank value corresponds to a path from a second network node to a destination network node and the second network node is indicated as being a preferred parent node for the first network node;

determining a second rank value based at least in part on the rounded-up first rank value;

determining the rank value associated with the first network node based at least in part on the second rank value along with at least a third rank value, the third rank value associated with a path from one of a plurality of candidate parent network nodes, for the first network node, to the destination network node; and

advertising the rank value associated with the first network node to neighbor nodes of the first network node.

2. The method of claim 1, wherein:

the one of the plurality of candidate parent network nodes has a highest rank value of a rank value associated with each other of the plurality of candidate parent network nodes.

3. The method of claim 1, further comprising:

determining the third rank value by rounding up a fourth rank value to a next higher integral rank value, the fourth rank value corresponding to the path from the one of the plurality of candidate parent network nodes.

4. The method of claim 3, wherein:

the fourth rank value is a highest rank value of rank values associated with each of the plurality of candidate parent network nodes.

5. The method of claim 3, wherein:

the fourth rank value corresponds to at least one metric value for the path from the one of the plurality of candidate parent network nodes, for the first network node, to the destination network node.

6. The method of claim 5, wherein:

the at least one metric value comprises an Expected Transmission Count (ETX) value.

7. The method of claim 1, wherein:

the second rank value corresponds to at least one metric value for the path from the second network node to the destination network node.

8. The method of claim 7, wherein:

the at least one metric value comprises an Expected Transmission Count (ETX) value.

9. A network communication device, comprising:

one or more processors; and

memory coupled to the one or more processors, the memory storing instructions executable by the one or more processors to perform operations to determine a rank value associated with a first network node, the rank value tolerant to increases in a link cost between the first network node and its preferred parent network node with respect to routing, the operations including:

rounding up a first rank value in a predetermined manner to at least two integral rank values higher than the first rank value, wherein the first rank value corresponds to a path from a second network node to a destination network node and the second network node is indicated as being a preferred parent node for the first network node;

determining a second rank value based at least in part on the rounded-up first rank value;

determining the rank value associated with the first network node based at least in part on the second rank value along with at least a third rank value, the third rank value associated with a path from one of a plurality of candidate parent network nodes, for the first network node, to the destination network node; and

advertising the rank value associated with the first network node to neighbor nodes of the first network node.

10. The network communication device of claim 9, wherein:

the one of the plurality of candidate parent network nodes has a highest rank value of a rank value associated with each other of the plurality of candidate parent network nodes.

11. The network communication device of claim 9, the operations further comprising:

determining the third rank value by rounding up a fourth rank value to a next higher integral rank value, the fourth rank value corresponding to the path from the one of the plurality of candidate parent network nodes.

12. The network communication device of claim 11, wherein:

the fourth rank value is a highest rank value of rank values associated with each of the plurality of candidate parent network nodes.

13. The network communication device of claim 11, wherein:

the fourth rank value corresponds to at least one metric value for the path from the one of the plurality of candidate parent network nodes, for the first network node, to the destination network node.

14. The network communication device of claim 9, wherein:

the second rank value corresponds to at least one metric value for the path from the second network node to the destination network node.

15. One or more computer-readable media storing instructions that, when executed by one or more processors of a node, configure the node to perform operations to determine a rank value associated with a first network node, the rank value tolerant to increases in a link cost between the first network node and its preferred parent network node with respect to routing, the operations comprising:

rounding up a first rank value in a predetermined manner to at least two integral rank values higher than the first rank value, wherein the first rank value corresponds to a path from a second network node to a destination network node and the second network node is indicated as being a preferred parent node for the first network node;

determining a second rank value based at least in part on the rounded-up first rank value;

determining the rank value associated with the first network node based at least in part on the second rank value along with at least a third rank value, the third rank value associated with a path from one of a plurality of candidate parent network nodes, for the first network node, to the destination network node; and

advertising the rank value associated with the first network node to neighbor nodes of the first network node.

16. The one or more computer-readable media of claim 15, wherein:

the one of the plurality of candidate parent network nodes has a highest rank value of a rank value associated with each other of the plurality of candidate parent network nodes.

17. The one or more computer-readable media of claim 15, the operations further comprising:

determining the third rank value by rounding up a fourth rank value to a next higher integral rank value, the fourth rank value corresponding to the path from the one of the plurality of candidate parent network nodes.

18. The one or more computer-readable media of claim 17, wherein:

the fourth rank value is a highest rank value of rank values associated with each of the plurality of candidate parent network nodes.

19. The one or more computer-readable media of claim 17, wherein:

the fourth rank value corresponds to at least one metric value for the path from the one of the plurality of candidate parent network nodes, for the first network node, to the destination network node.

20. The one or more computer-readable media of claim 15, wherein:

the second rank value corresponds to at least one metric value for the path from the second network node to the destination network node.