

Table Driven Routing Algorithms- DVR, Modified DVR

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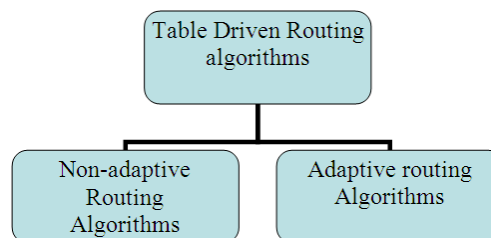
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Abstract: Computer networks are becoming indispensable need of today's world. With growth of networks, routing protocols started allure attraction of researchers. This paper presents review of two tables driven routing protocols-distance vector routing (DVR) and modified distance vector routing algorithm. Rip protocol is an important implementation of distance vector routing protocol but can have only up to 15 nodes in its network due to the count-to-infinity problem of DVR. This paper explains how modified DVR overcomes the problem of count-to-infinity. This paper also compares two protocols.

Keywords: Routing, DVR, RIP, Packet, Networks, Count-To-Infinity, Protocol.

1. Introduction

A computer network is a collection of nodes connected with physical links. These nodes can be computer or network devices and share information. Simply computer networks can be segregated in wired and wireless networks. In wired networks connecting medium between nodes is guided physical media. Whereas wireless networks use radio frequency channels as their physical medium for communications. Routing protocols in computer networks are used to route information from source node to destination node. Table driven routing protocols uses table to find out the route to destinations and can be split up into two categories.



Non adaptive routing algorithms (static) uses static tables to find out the next node ,to which packet is transferred. In this scheme static tables are created manually and loaded at boot time. One drawback is if there is any change in network topology then the changes must be reflected to the routing table manually by network administrative. On other side adaptive algorithms as name indicates adapts their routing decision on basis of current network traffic and current network topology. Adaptive routing algorithms reflects any changes in network topology and data traffic in their packet forwarding decision. They are dynamic in nature. Adaptive routing protocols are used in ad-hoc networks. Either non adaptive or adaptive table driven algorithm uses routing table to make a route decision.

This paper discusses two table driven algorithms, one is very popular algorithm DVR and another is modification to DVR in section 2 and 3. Section 4 put light on a serious problem of DVR, count to infinity. Section 5 compares DVR and modified DVR followed by conclusion.

2. Table driven routing protocols: DVR

DVR is static table driven protocol uses tables to create routes from source node to destination node. DVR is based on famous algorithm for finding shortest distance bellman-ford. It uses metrics like cost to send packet to neighbor node or distance to neighbor node. At starting each table create its table and then share its table with all neighbors. Sharing can be done periodically or at a change in network topology. One implementation of DVR is rip.

3. Modified DVR

This algorithm is a modification in distance vector routing algorithm. Proposed algorithm adds an extra field to table of distance vector routing algorithms. New field is history node and overcomes the problem of count to infinity in DVR.

Destination	Cost	Hn	N
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Here hn is history node and n is next node.

At initialization time each node copies its own name under the column hn.

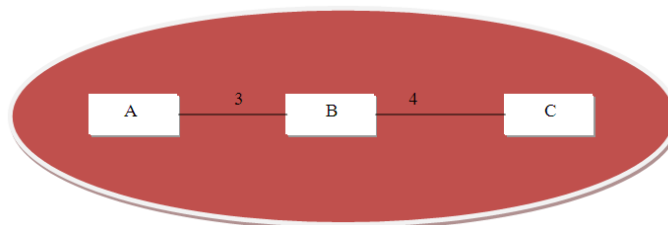
Alike DVR in modified DVR each node share its table with neighbors periodically or at any change in topology of network (link failure). The receiving node update its table only if following conditions are met consider the node i sends its table to node j then node j update its table entry for all destinations k if and only if following two conditions are false

- 1) if $n[k(j)] == \text{'(null)'} \ \&\& \ hn[k(j)] == n[k(i)]$
- 2) if $cost[k(j)] <= cost[k(i)]$

Here $n[k(j)]$ represent the next node entry for destination node k in table of node j. so as hn and cost. If both of the conditions fail then j updated its table as: n in current table of receiving node j becomes hn in new table of j and the sending node becomes n in new table for each updating entry in node j.

Example

Consider three node given in below figure



The initial table for node b is

Destination	Cost	Hn	N
A	3	B	-
B	0	B	-
C	4	B	-

Similarly node a and b also initialize their starting table according to DVR having hn field. Now when link between a and b break then b immediately reflect these changes in its routing table according to update conditions of modified DVR and also informs c about this change. C node receive this update from node b and reflect it to its own table as according to modified DVR as shown below

C's original table before link failuire

Destination	Cost	Hn	N
A	7	-	B
B	4	C	-
C	0	C	-

Table received by c from b

Destination	Cost	Hn	N
A	∞	B	-
B	0	B	-
C	4	B	-

C's updated table according to modified DVR updation conditions

Destination	Cost	Hn	N
A	∞	-	B
B	4	C	-
C	0	C	-

So now c knows there is no path to reach to a.

But if in any case node c sends its table to b after failuire of link between a and b before receive update fgrom b ,the node b does not update its table as the updation conditions of modified DVR does not allow b to do so[1].

4. count to infinity problem

DVR protocol endure two node instability and count to infinity problem. Some solutions to this problem are split horizon, poison reverse and path hold-down mechanisms. Unfortunately these solutions add some other problems to protocol. One other solution is defining a low value for infinity.. Rip an attractive implementation of DVR define 16 as value of infinity. So the maximum node that rip can include is 15. This sets an upper limit of nodes in network.

On other side of coin the modified distance vector protocol is free from two or three node instability problem so as from count to infinity problem. So nodes in the network can be extended from 15.

5. comparisons of two algorithms

Where DVR as explained above sections is suffered from count to infinity problem, the modified distance vector algorithm overcome this problem of DVR. DVR is simple algorithm to use. Modified DVR on the other hand adds extra field hn to tables. It also add two updating conditions which somehow makes algo complex to implement.

Conclusion

This paper studies two table driven algorithms distance vector routing algorithms and modified distance vector routing algorithms. DVR algorithm posses count to infinity problems. Rip protocol ,an implementation of DVR can extend nodes in its network upto 15 just because of count to infinity problem. Modified distance vector routing algorithm overcome count to infinity problem of DVR. But modified DVR adds some complexities to DVR like extra field to table and updating conditions.

References

- [1] ashwani kush, karmjit kaur. Modified distance vector routing algorithm. Ijarcse(2014),856-886.
- [2] guoyou he. Destination-sequenced distance vector (dsv) protocol. Network laboratory, helsinki university of technology
- [3] elizabeth m. Royer, chai-keong toh. A review of current routing protocols for ad hoc mobile wireless networks. Ieee personal communications ,april 1999.
- [4] d cavendish, m gerla. Internet qos routing using bellman ford algorithm - high performance networking, 1998 – springer
- [5] tanenbaum andrew s.: computer networks, prentice hall, inc., 1996, isbn 7-302-02410-3
- [6] db johnson, da maltz. Dynamic source routing in ad hoc wireless networks - mobile computing, 1996 – springer
- [7] perkins charles e., bhagwat pravin: highly dynamic destination-sequenced distance- vector routing (dsv) for mobile computers, london england uk, sigcomm 94-8/94.
- [8] c.jeyalakshmi,dr.r.sukumar. An experimental study on optimized link state routing protocol for underground mines. C jeyalakshmi et al ,int.j.computer technology & applications,vol 3 (6), 1886-1893
- [9] royer elizabeth m.: a review of current routing protocols for ad hoc mobile wireless networks, ieee personal communications, april 1999.
- [10] ko, y., and vaidya, n. Location-aided routing in mobilead hoc networks. In proceedings of the fourth annualacm/ieee international conference on mobile computingand networking(mobicom '98) (dallas, texas, usa, aug.1998).
- [11] behrouz a. Forouzan. Data communications and networking tata mcgraw hill . Isbn: 0072967757.
- [12] schmid andreas and steigner: avoiding counting to infinity in distance vector routing, kluwer academic publishers, netherlands, 2001.

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