ARTER: A REFINED ROUTING TECHNIQUE FOR EFFICIENT ROUTE DISCOVERY IN WIRED NETWORKS

Dr. P. Calduwel Newton[a], A. Anand Selvakumar[b],
[a] Assistant Professor ,[b]M.Phil. Scholar,
Department of Computer Science,Bishop Heber College (Autonomous), Tiruchirapalli, India.

Abstract

The wired network is a collection of two or more computers andother devices linked by cables. Wired network provides users with plenty of security and the ability to move lots of data very quickly. Wired networks are typically faster than wireless networks. In wired networks, data is transferred in the form of circuit switching. Several aspects affect computer networks. They are congestion, malicious activities and getting more time to discover the route .The aim of this paper is to propose a Refined Routing Technique for efficient Route Discovery in Wired Networks (ARTER.) The ARTER minimizes the number of iterations in route discovery by selecting an efficient route from source to the destination. It reduces the delay and identifies the optimum path in an efficient manner. The ARTER is performing better than the existing algorithm.

Keywords: Bandwidth, Algorithm, Network Efficiency, routing Discovery.

I. INTRODUCTION

In computer terminology, the definition for the networks is a group of computers logically connected for the sharing of information. The connection between the nodes is established using (ether cable) wired media .Wired local area networks includes several technologies like token ring, bus, fiber distributed data interface and asynchronous transfer mode local area networks. Most wired network use Ethernet cables to transfer data between connected nodes. A router uses its routing table to determine where to forward packets. In the packet switched networks, packets are routed through intermediate nodes. The routing process usually forwards data on the basis of routing tables, which maintain a record of routes to various network destinations. Large networks often involve multiple routers or switches that connect to each other. The major issues are created due to collisions, intrusions and malware, connectivity issues, delay, packet loss or the blocking of new connections.These kinds of issues make the network to be unstable. In order to overcome the above issues, ARTER helps to discover quality route to improve the network performance.

II. Related Works

Many researchers researching in the field of computer networks and providing the ideas to find the shortest Route using differentkinds of algorithms. They gave solutions to identify the route. One of the route selection algorithms is Dijkstra's algorithm which is used to find the shortest routes. But it takes more time to calculate the routing table. Efficiently selecting the shortest route is the challenging area in computer networks.

Calduwel Newton et al.,[1] proposed the algorithm that identifies the shortest route faster than existing algorithm. Which increases the efficiency of the network suggesting new ideas in constructing source to destination by refining the steps in existing algorithm. In Dijkstra's algorithm, the Link state routing algorithm uses to find shortest route. But, it takes long time for each router to compute its routing table[2][6]

Kannan Varadhan et al.,[4] presented a simulation study on the effect of route changes. They show that small route changes during a TCP session lead to significant reordering and a consequent reduction in performance[3] ShaluSraw and Gurpreet Singh et al.,[5] proposed Multicast Routing protocol to use the bandwidth efficiently. It reduces the cost and the Network resources. Ikram Ud Din et al.,[7] When the two devices transmit at the same time the collision can occur. This collision generates a jam signal that causes all nodes on the segment to stop sending data, which informs all the devices that a collision has occurred.

Balakrishnan et al.,[8] proposed to find significant temporal stability in bandwidth measurements collected from the IBM Olympic Web servers. Further, they show that hosts which share portions of a path tend to obtain similar amounts of bandwidth.

C.Qiao et al.,[9] proposed The current rapid pace of developments in both IP-Centric networks and optical networking are inevitably bringing the two domains closer together Solutions to provide the next generation network with high bandwidth, good scalability and easy management are being constantly searched from both IP and optical technology world including OBS-based method, Big Fat Router-based method

Francis et al.,[10] explored the possibility of using end-to-end measurements to construct maps of the minimum Internet propagation delay between hosts. Their methodology is to predict the minimum propagation delay between a pair of hosts by triangulation using a series of pair-wise measurements.

R K Bansal et al.,[11] proposed to provide an ease of predicting and estimating the performance of networks. among the various network simulators available, The metrics like throughput, delay and retransmission attempts have been overviewed for performance analysis of the and wired computer networks using soft computing techniques.

Paxson et al.,[12] examined the characteristics of a larger set of paths using an automated analysis of Transmission Control Protocol (TCP) data transfers. Paxson's results indicate that there is a wide variation in path characteristics such as round-time, packet loss, and bandwidth. However, he also finds that the amount of available bandwidth tends to be stable for time periods up to several hours

III. ARTER: A PROPOSED TECHNIQUE

The proposed technique, ARTER selects the minimum distance path and eliminates the maximum distance path from the source to destination to reduce the data transfer delay.

The ARTER technique takes the following steps to reach the destination in an efficient manner.

Step 1: Consider the network scenario &determine source and destination node.

Step 2: During the route discovery process, possible Route are calculated by using Distance factor.

Step 3: The neighbor nodes of the source node and its neighbor nodes are calculated based on distance factor until it reaches the destination. But it considers only the minimum distance among the available Routes.

Step 4: If the distance is maximum, it drops the Route and selects the route with the minimum distance.

Step 5: optimum route is selected and the data is transferred through this route .

Step 6: Repeat the step 2-5 until optimum route is selected

IV.Results and Discussions

The ARTER is proposed to select the optimum path among the multiple paths. It is described by considering the following network scenario as shown in Figure 1.There are 12 nodes considered in the network scenario. They are, A, B, C, D, F, G, H, I, J, K, L .A is the source node and E is the destination node other nodes are intermediate nodes. The number on the edges denotes the distances of each node.

The ARTER identifies the efficient route as discussed below. First, it identifies the efficient route from Source to Destination. Second, it sends the data.

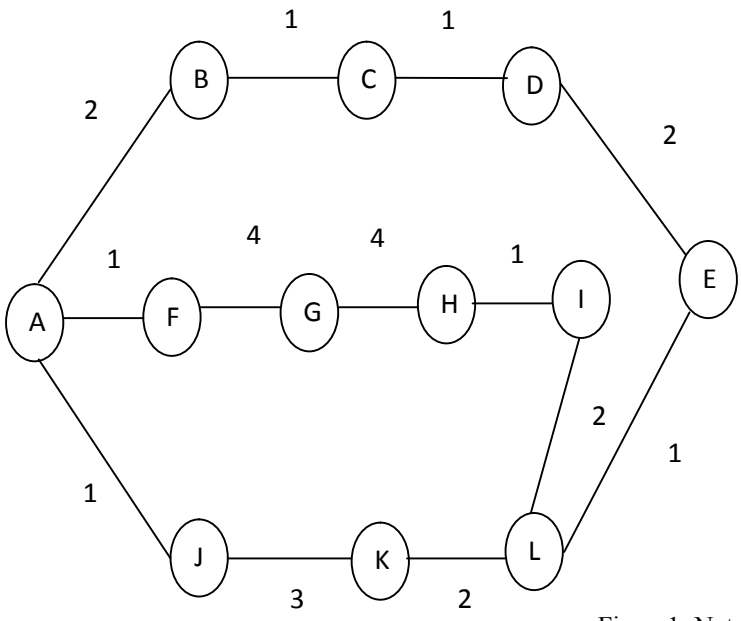

Figure1: Network Scenario

Case 1

The initial routes are identified based on the distance parameter (i.e. A →B=2,A →F=1and A → J=1).

Case 2

ARTER identifies the alternate routes by comparing node's distance. Here, the alternate routes are calculated as follows A→B→C =>2+1=3, A→F→G => 1+4=5 and A→J→K =>1+3=4. Here, the alternate routes are calculated A→B→C & A→J→K as it has minimum distance when compared with A→F→G.

Case 3

The ARTER gives first preference to the minimum distance. From the above two calculated routes (i.e. A→B→C and A→J→K). Finally, the route A→B→C→D→E is selected as it has minimum distance.

Table 1 shows that the comparison between Dijkstra's & ARTER. Dijkstra's algorithm takes 15 iterations to discover the efficient route. But in case of ARTER takes only 9 iterations to discover the efficient route.

Table 1: Comparison between Dijkstra's and ARTER

Dijkstra's Technique	Proposed Technique (ARTER)
Step 1: A →B=2 A →F=1 A → J=1	**Step 1:** A →B=2 A →F=1 A → J=1
Step 2: A→B→C => 2+1=3 A→F→G => 1+4=5 A→J→K => 1+3=4	**Step 2:** A→B→C => 2+1=3 A→F→G => 1+4=5 A→J→K => 1+3=4
Step 3: A→B→C→D =>2+1+1=4 A→J→K→L => 1+3+2=6 A→F→G→H=1+4+4+1=10	**Step 3:** A→B→C→D =>2+1+1=4 A→J→K→L => 1+3+2=6
Step 4: A→B→C→D→E =>2+1+1+2=6 A→F→G→H→I=1+4+4+1=10 A→J→K→L→E=> 1+3+2+2=8	**Step 4:** A→B→C→D→E=2+1+1+2=6
Step 5: A→B→C→D→E =>2+1+1+2=6 A→F→G→H→I→L=1+4+4+1+2=12 A→J→K→L→E=> 1+3+2+2=8	
Step 6: A→B→C→D→E =>2+1+1+2=6 A→F→G→H→I→L→E=1+4+4+1+2+2=14 A→J→K→L→E=> 1+3+2+2=8	

Here, the Figure 2 shows number of iterations between Dijkstra's and ARTER

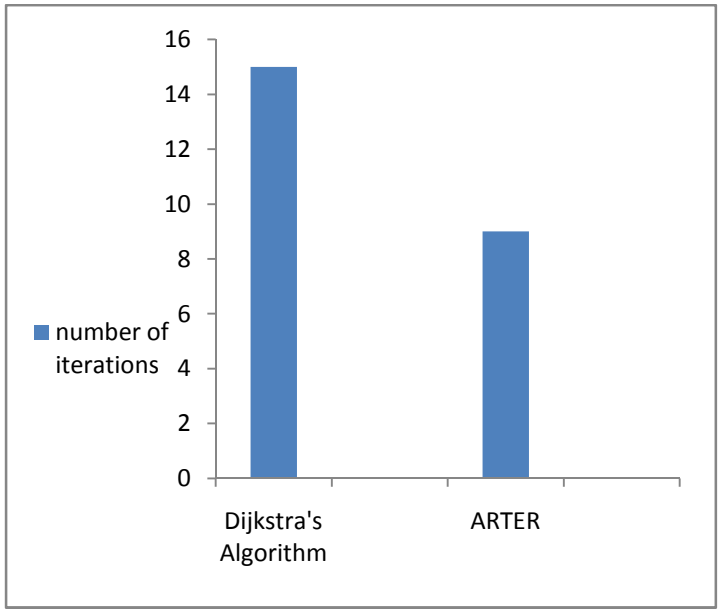

Figure 2: Dijkstra's Vs ARTER

V. Conclusion

Wired network gives reliable, constant download and upload speed than wireless networks. In wired networks discovering the route is quite complicated. But, the ARTER greatly reduces the route identifying iterations compared with Dijkstra's shortest route algorithm.This technique finds the optimum path very quickly. Ultimately, it enhances the QoS in Wired Networks

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