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A Heuristic Approach for Dominating Set and Network Coding-based Routing in Wireless Mesh Networks

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Abstract- *Network coding is up and coming technology that can improve the performance of wireless mesh networks. Wireless mesh networks are mostly applied in multiple fields such as industrial controlling, ecology and armed forces operations. The wireless mesh network is used because of its solid backbone and the unlimited energy. Hence network coding is suitable for wireless mesh network. The main obstruction that affecting the network performance is that the coding collision. To avoid this, routing should be absolutely designed to an optimum combination of coding opportunity and coding validity. In this paper, a Connected Dominating Set (CDS) based and Flow-oriented Coding-aware Routing (CFCR) mechanism is proposed to actively rebound potential coding opportunities.*

Keywords: Network coding; Dominating set; Flow Oriented Coding Aware Routing; Wireless Mesh Networks.

I. INTRODUCTION

Network coding is a communication technique which can provide enhancement in throughput and a very high efficiency. Network coding properly mix data packets using some mathematical techniques. It can reduce the number of transmissions in data packet forwarding. If the routing is based with an efficient optimum path we can improve the performance of the system. Many researchers consider it as an efficient technology for wireless mesh networks. Network throughput can efficiently increase coding opportunities with less end to end delay and enhanced throughput. Through exact estimation of directing parameters, CDS based Dijkstra‟s strategy can accomplish a superior transmission of parcels by means of the best briefest way. What's more, it can without much of a stretch choose an ideal coding opportunity in the way. Primary advances engaged with this work are Creation of two system streams, discover CDS directing hubs, Apply CDS based FCR and CDS based Dijkstra‟s procedure, look at the steering parameters for the two methods and so on. Correlation should be possible with end to end postpone and throughput parameters.

II .LITERATURE REVIEW

Many schemes established with the idea of network coding which is more convenient to wireless mesh networks. An opportunistic coding approach is proposed in [1].This technique can be implemented with opportunistic coding scheme and opportunistic noticing scheme. This technique is applicable for two hop region only. In this work throughput is increased

An efficient network coding aware routing scheme NCAR is proposed in [2].A suitable coding solution is presented in this work, when more than one flow stands. Way accessibility,

way determination steps are engaged with this work. Coding opportunity is altogether enhanced in this work.

Distributed coding aware routing scheme is proposed in[3].This technique is fully based on the coding opportunity. It identifies all possible paths in between sender and receiver. The potential coding opportunities presented in this paper is based on the flow of network traffic

An adaptive packet control scheme, ACPO is proposed in[4].An adaptive W scheme in this work improves the network throughput. In this work waiting interval of heard data packets in a flow is controlled. Waiting interval of this scheme is modified with a specific duration. This work is applicable with two hop region only.In this work packet overhead is significantly reduced.

Many existing schemes based on network coding considers coding opportunity. However, there is an execution corruption in wording throughput and end to end delay. Also, a portion of the current plans having two bounce district constraint. To remunerate the bad marks of the current plans, CDS based Dijkstra ‟s calculation can be utilized.

III. Implemnetaion:

A .Connected Dominating Set Connected Dominating Set is a part of graph theory. We can assume the nodes in a network as a part of a graph. Consider G= (V, E) Where G is the graph, V represents the vertex node set and E represents the edge node set. Consider vertices‟D‟ in a graph which must satisfy the following properties.

- A node in „D‟ can attain any other node in‟D‟via a route which belongs to‟D‟. It means „D‟ makes a connected subgraph of G.
- Each vertex in G belongs to‟D‟ otherwise which is adjacent to a vertex in‟D‟.Then „D‟ is a dominating set of G.

For example consider a CDS set in figure 1.First select one source and destination. Let 16 be the destination and 12 be the souce.There are many ways to reach from source 16 to destination 12.To get an efficient path we can select a CDS routing path. In this 18, 10, 8, 5, 4 are the connected dominating set nodes. In this figure 16-18-10-8-12 is a CDS routing.16-18-13-12 is not a CDS routing. It‟s because 11 is not a CDS node.Dominating nodes can easily cover structure of wireless mesh network. It can act a wireless backbone in networking.

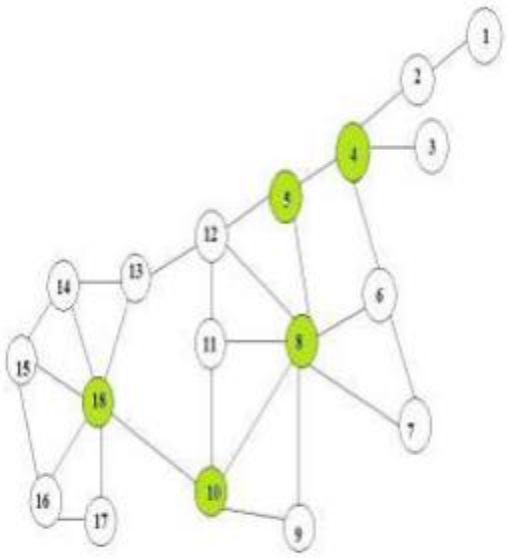

Fig.1: Connected Dominating Set

B . CDS Compact discs Based Dijkstra's Technique We need to locate the most effective way to bundle exchange. To locate an ideal coding opportunity way CDS is a standout amongst other alternative, which having more number of edges in the system. We can utilize CDS based Dijkstra‟s method to enhance the execution of the most brief way.In this technique, first create two flows with 17 nodes. All 17 nodes are deployed in a random manner. Two source nodes and to destination nodes are created here. Now we have to find a suitable

efficient shortest path. Since CDS is a better way to cover the topology of WMNs, we have to find the connected dominating set nodes. To check a connected dominating set node routing first calculating their node degree. The degree of a node is is the number of edges connected to the node. Choose the middle range value from the all available degrees as a threshold value. Here iam considering the nodes whose node degree greater than five as dominating nodes. For a node, the number of backward and forward nodes are matching that node will be the coding agent. For two flows which meets at coding agent node, if the following conditions are satisfied; First condition is,the destination node 1 should be the back warding node of the coding agent in the first flow and at the same time the destination node 1 should be the single hope neighbor of the source hub 2,which is the sending hub of the coding operator in the second stream. Second condition is, the goal hub 2 ought to be the back warding hub of the coding operator in second stream and in the meantime goal hub 2 ought to be the single bounce neighbor of the source hub 1, which is the sending hub of the coding specialist in first stream. If these two conditions are matching there will be a coding agent for flow 1 and 2.Next step in this technique is to find the gamma ratio. γ=r1/r2 If the event is „receive" then find the length of the coding agent and two source nodes. These two length"s matching factor is gamma ratio. Next , find the shortest CDS based FCR value path with the help of gamma ratio. And compare the hop count of the CFCR value path for two flows. If the hop count of the CFCR1 is smaller means first flow is the shortest value path and vice versa. Apply Dijkstra"s algorithm to the smallest value path, to further reduce number of hops between source and destination. Now we can send packet via the efficient shortest path with high throughput and less end to end delay .Compare the CDS based FCR shortest path with CDS based Dijktra" technique. The flow of the proposed system is shown in figure.2.The technique used here is Dijkstra which is the shortest path algorithm. This algorithm considers the unaccessed node with a shortest distance and it finds the path through it to each unaccessed neighbor vertex.And it updates each neighbor vertex„s distance. When the desired destination is reached then we can stop the process. Dijkstra"s technique further reduces the number of hops in the flow.

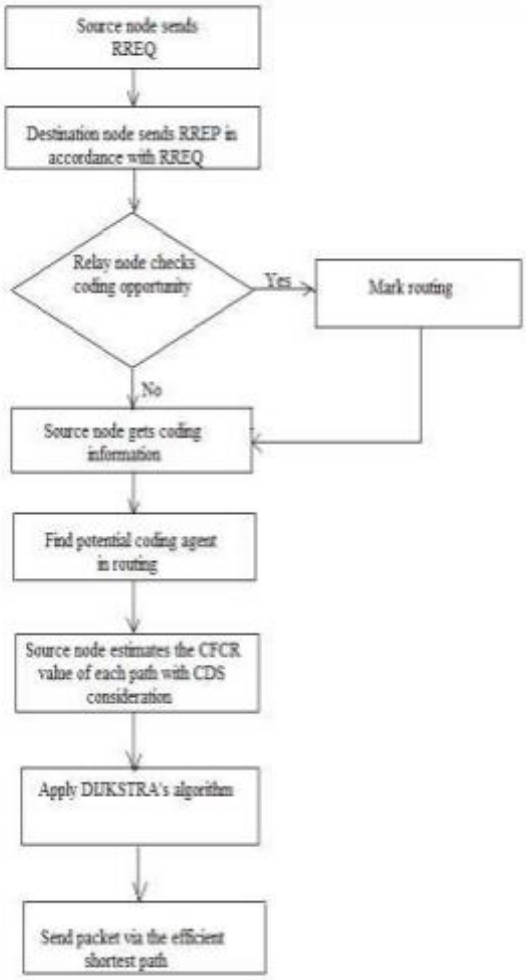

Fig.2 Proposed system

V .CONCLUSION AND FUTURE SCOPE

A CDS based Dijkstra‟s throughput enhancement scheme is proposed in this work. This scheme outperforms the existing system in terms of end to end delay and throughput. A better throughput enhancement is achieved by suitable shortest path data forwarding. Currently, this work associated with two flows in a network. In future, this technique can be implemented with more than two flows with reduced coding collision and enhanced throughput.

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