Comparative Analysis of LIMAD-II Protocol over conventional MORP in Wireless Sensor Networks based on Throughput Efficiency.

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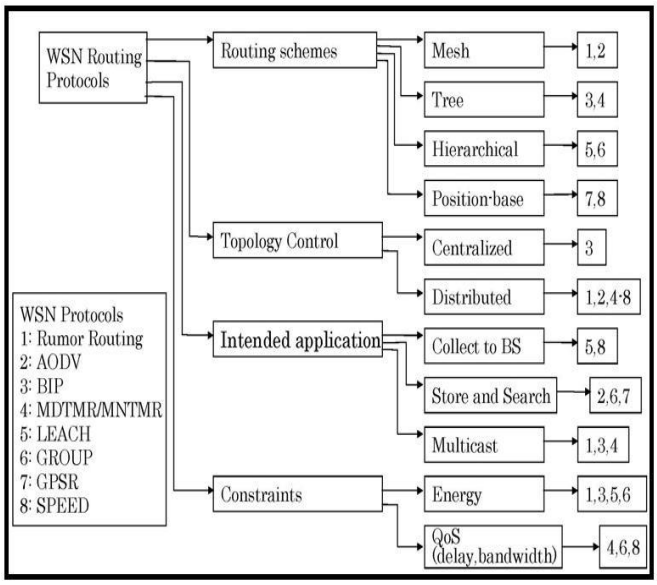
***Abstract*— The performance evaluation of LIMAD-II (Lightweight Intuitive multicast adaptive demand-Driven-II) protocol for WSN is being outlined briefly in this research article. It can be concluded here that LIMAD-II protocol is capable to adapt itself to the demand-driven multicast scenario and is independent of sensing. So the proposed model aptly is lightweight and intuitive and adaptive. Wireless Sensor Networks have been used as one of the most important technologies of the twenty first century [1]. A Multicasting protocol in WSN is used to deliver messages from one source to another source(s) to a set of sink(s). The aim is to decrease the consumption of a crucial resource mainly energy. Number of applications are there in which the use of multicasting protocol is the best for routing. In such cases, it is very much essential to design an efficient multicasting routing protocol for reducing energy consumption and simultaneously increasing the network performance.**

***Keywords*— Multicast Protocol, Dynamic allocation bandwidth, frequency reuse, Demand driven, Adaptive, Unicast transmission. .**

I INTRODUCTION

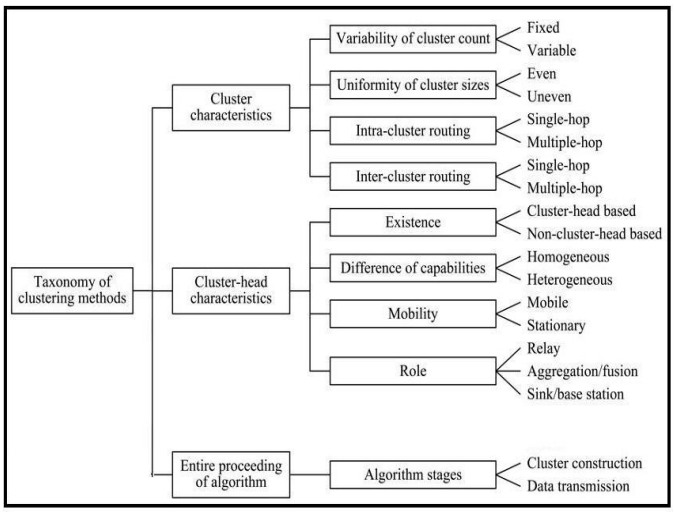
Wireless Sensor Networks consists of a number of low cost and low power sensor motes which can sense its surrounding efficiently. These nodes are deployed in a physical area which communicates seamlessly through wireless interfaces. In the network the sensors sense the surrounding environment depending on the request originated from the source Base Station and the outcome sensed is then sent back to the sink Base Stations which were then forwarded appropriately to other operations for further processing [2]. World wide web can be used in Wireless Sensor Networks to provide real time data for a variety of sensitive applications such as military and civilian applications which may also include wild life observation, environmental monitoring and other such surveillance applications [3]. The different types of routing protocols found in the literature are namely unicast, broadcast and multicast routing. When a sensor node sends a message to a single sink that is known as Unicast routing. Broadcasting is used when a message is sent from one node to all other nodes in the entire network.



With the Emerging latest technologies of multi-cast wireless sensor networks, various technologies have been proposed in creating and retaining nodal trees for the said LIMAD-II protocol. This protocol is uncertain and multi-dynamic by nature. This articled lays a modeled dynamic scheme for multi-casting in WSN nodes which is suitable for large enough data and high end streams of live multimedia (audio/video). The approach discussed is a generalization scalable and it works under unicast routing networks in WSN. This article illustrates underlying LIMAD-II protocol in highly adaptive and desirable for association of multi-cast nodes in a given session. The basis of this LIMAD-II approach is the multicast tree of mobile nodes which are extremely lightweight and intuitive. A node in the tree is capableof associating or differentiating by duplicating the information automatically along a particular branch. The present World Wide Web is a vital platform to analyze very large data which include bulky and high-end multimedia that includes audio as well as video.[6]

The former approaches require resource relay systems to minimize one of the major resources that is the bandwidth requirements where a node in a branch requests for association

in order to effectively share a basis for connection with multiple trees. Large data packets must conserve energy required for accessing desired network resource. Wireless Sensor Networks (WSNs) are non-infra-structure-based wireless nodes that are linked over mobile nodes which have a transceiver unlike wired networks.[9] Multi-casting in WSN is very risky but versatile approach which forwards datagrams in short distance sensors which attributes to carrier sensing (CSMA technology). These are short range nodes with packet delivery based on multiple-hopping protocol which forms the basis of distribution structure in the tree using unicasting routing protocol. The branching decision is mainly based on relay link approach to freely create further nodes in a particular branch.



II. MULTICAST ON-DEMAND ROUTING PROTOCOL (MORP)

MORP is usually a demand driven protocol based on mesh routing. It incorporates a sub-nodal approach to forward characteristics of multicasting in wireless sensor networks in adaptive environment. A static approach is initiated at the very first step.[3] The process is dynamic in the sense that continuity is followed when nodes continuously encounter demand to multicast adaptive control. A node membership becomes essential in this regard of multicast routing. As shown in figure-1 the source at the data center is always ready to broadcasts query based on data packets that control entire mesh of networking. A ID is generated which is required in such packet that generates Join Reply flag (JR). JR holds the root of entire mesh network. Only updated datagrams in the form of packets are given pass by that has the correct and a valid Id. The transceiver of this node at the destination is often provided with the same JR packet for receiving multiple packets after a communication is fully complete. The validation of broadcast message is also vital if the right flag value (FG) is to be set at neighboring mesh of sub-trees. The origin parents must also be validated at the receiver where the intermediate mesh node checks the JR packet. The Id of this concurrent node must have a forwarding flag in the same mesh group which is previously listed at the said parent node. The redundancy of iterative siblings in a node can be further checked by setting JR flag as multicasting in nature before it expires. Controlling data packets that could access the JR flag are also checked by this JR surrounding group before it leaves the source group if present at all.

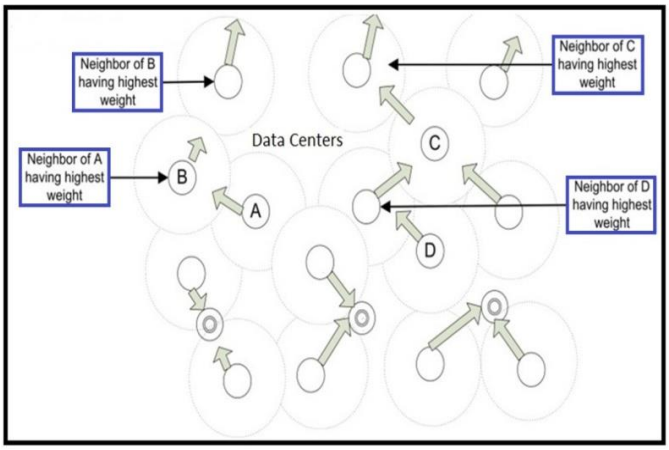


Fig. 1 Pictorial representation of satellite cellular networks.

III LIMAD-II PROTOCOL - PROPOSED MODEL

Lightweight Intuitive Multicast Adaptive Demand-Driven (LIMAD-II) protocol in the context of wireless sensor networks is described in this section using a novel approach for this research article.

The typical cases that makes LIMAD-II protocol to come to picture is shown in figure 2 & 3. The transceiving nodes entertain the ongoing request at 0.10 seconds each. [10]The entry of JR flags are needed every (0.10 +T). For resolving this ambiguity a demand- driven adaptive multicasting scheme is introduced that lays the basis of LIMAD-II protocol. In this model the parent node say node 13 of figure 1 has to take the host parent which is node 3 in this case. Node 3 is the multicasting node which is responsible mainly for node multiplication. In this proposed scheme, virtual parents can also be created without remaining dependent upon node 3. As shown in figure 3 virtual parent nodes are being created at nodes 12, 15 and 18 with the adaption of LIMAD-II protocol. This has to be initiated every .01 seconds since in model it is considered that a throughput of 100 is compared with 10,000 network cycles. This method is itself iterative in nature and spreads like a mesh tree scale. The scaling of LIMAD-II protocol in nodes 12, 15 and 18 of figure 2 will make more virtual parents in the next 10,000 network cycles.

A novel adaptive and dynamic model that creates and retains trees for multicasting scenario is being elaborated in this section. The current Wireless Sensor Network scheme uses generalized approach in which current parent passes the whole data packets to subsequent nodes thereby creating virtual parents. In this method the node which is intermediate transceiving packets in the range of wireless sensor of the demand driven network transmits multicasting data packets that are already listening to the current scenario of branch trees. The receivers are retained in a hold state using unique identity based flag. This flag is light-weight and intuitive in nature. The adaptability of the network can be best judged

from the fact that the period of active transmission is towards the source all the time.

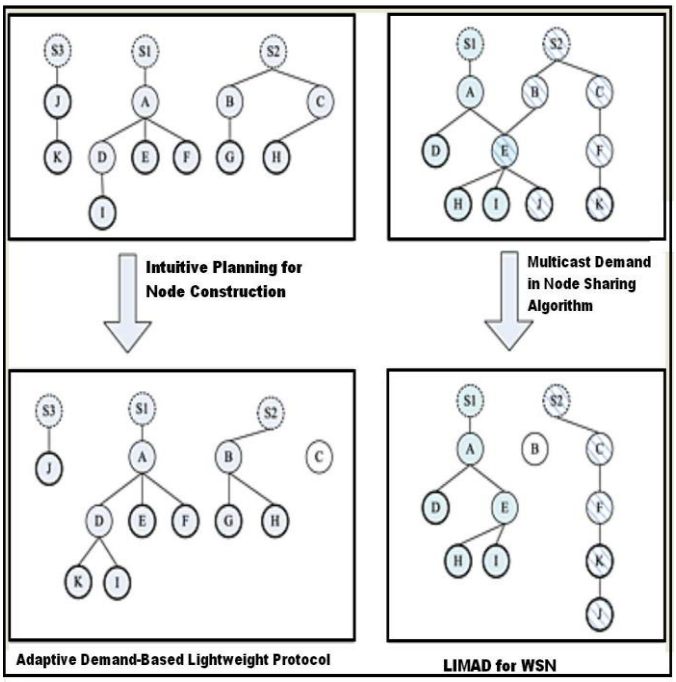


Fig. 2 & 3 LIMAD-II Protocol – The proposed model.

In the proposed model, the incoming and assigned nodes are always made to set so that they can be routed in the multi-casting range of WSN antennas (transceivers). The network cycle for these nodes play vital role for streaming the received data to these transceivers. A typical scenario is shown above.

IV PERFORMANCE EVALUATION

The parameters evaluated are the energy efficiency in MORP and LIMAD-II techniques. Traffic ratio is also calculated for a probabilistic proposed model where random calls take place and the ratio is calculated as the ratio of the traffic of each cell divided by that of the cell of interest. Fig. 4 Study of energy efficiency versus low load bandwidth slots.

Figure 4 shows the plot between energy efficiency and bandwidth slots. Total 80 satellite stations were allocated in 10 available slots. And 20 satellite stations were allocated for low load bandwidth slot having 5 available slots.

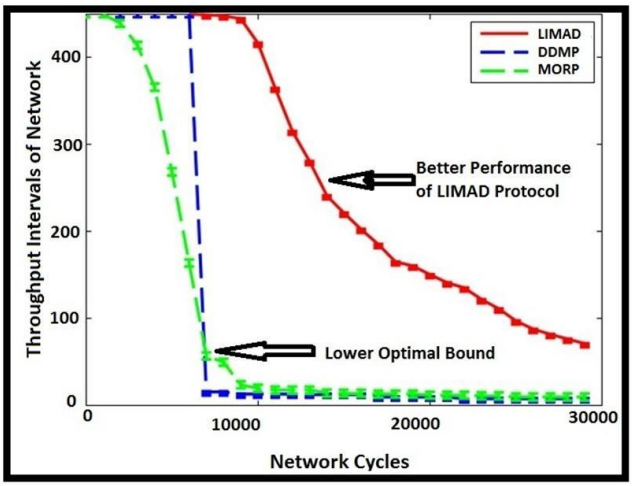


Fig. 4 Energy efficiency versus bandwidth slots.

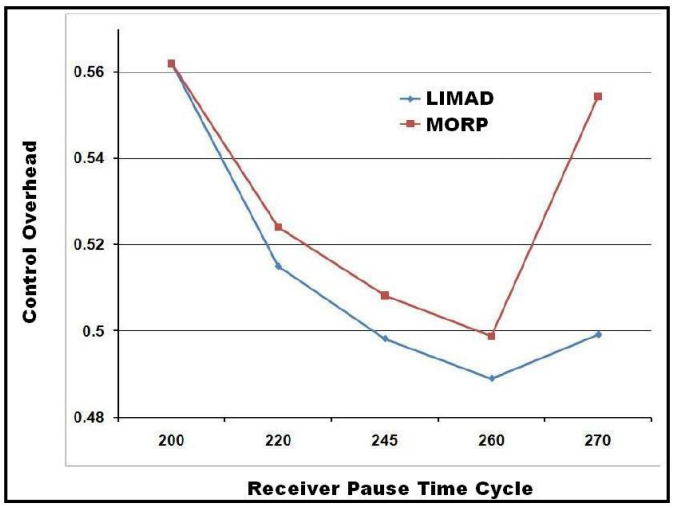


Fig. 5 Comparison between MORP and LIMAD-II

V CONCLUDING REMARKS

A wide and multiple range of protocols are nowadays available for studying multicasting in WSN. These have been discussed in subsequent segments. [1] It may be also noted that only a few protocols are efficiently using the technological aspects of local broadcasting principle. This research article deliberately discusses Lightweight Intuitive Multicast Adaptive Demand-Driven (LIMAD-II) protocol[8]. This research article illustrates the unicasting method which is designed especially for demand driven WSN networks. Multicast Adaptive Demand-Driven Protocol in the World Wide Web minimizes the requirement of identity needed in receivers side. Packets using LIMAD-II protocols may be delivered to clients requesting for the same. [4]Many algorithms are available which make use of multicast group in the discussed scenario.

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