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APPLICATION OF ENERGY CONSERVING TECHNIQUES IN WIRELESS AD-HOC NETWORKS

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ABSTRACT

One of the areas of the telecommunications industry with the greatest growth is wireless communication. Wireless local area networks (WLAN), cordless phones, and other such devices are becoming commonplace in people's daily lives. Using various tools and systems, such as Users using PDAs, computers, and cell phones have access to all the necessary data whenever and wherever they need it. These systems all require some kind of fixed infrastructure. The appropriate infrastructure must be set up, which can be expensive and time consuming. When the user-required networking connections are not available in a specific geographic location, it can be extremely difficult to provide the necessary connectivity and network services. Therefore, the ideal option in this scenario is a mobile communication network without an existing network infrastructure. The absence of established infrastructures distinguishes the wireless Ad Hoc Networks from other types of networks. Mobile Ad-hoc Network 's goal is to assist mobile wireless networks' reliable and effective functioning. This paper reflects Energy Efficient techniques used in Wireless ad-hoc networks.

Keywords: Energy, Technique, Conserving, Mechanism, Protocol.

ENERGY EFFICIENT TECHNIQUES

Wireless ad-hoc networks use a wide range of energy conserving techniques. The PAMAS (Power Aware Multi-Access protocol with Signaling) protocol [SR98] uses a separate signaling channel to determine when and how long the nodes can power off themselves. In PSM [JV02a] (Power Saving Mode) of 802.11, when a node transmits or receives an ATIM (Ad-hoc Traffic Indication Map) frame

during an ATIM window, it must be in active mode during the entire beacon interval that results in a much higher energy consumption. In DPSM [JV02a] (Dynamic Power Saving Mechanism) scheme, the ATIM window size is adjusted dynamically based on current network conditions.

A NPSM [JV02b] (New Power Saving Mechanism) introduces some parameters indicating the amount of data in each station. Power saving mechanism is hard to be implemented in partially connected like mobile multi-hop network. In On Demand Power Management technique (ODPM) [ZK03], soft state timers are set or refreshed on-demand based on control messages and data transmission. In [LL05], number of AM nodes (Active Mode) is reduced based on backbone probability. TITAN (Traffic-Informed Topology-Adaptive Network) improves ODPM in which PS (Power Saving) nodes sleep for longer duration and save energy [SK05].

Rcast technique [LYD05] implements randomized overhearing but not randomized rebroadcast. Fast wakeup mechanism is implemented [DS04] so that latency for route discovery is reduced. Random Cast [LYD09] significantly outperforms ODPM, which is the most competitive scheme developed for multihop networks employing on-demand routing algorithms, without affecting the general network performance such as PDR. In addition, it reduces redundant rebroadcasts for every broadcast packet, and thus, saves more energy. This Random Cast algorithm is integrated into DSR routing protocol.

In DSR, overhearing leads to bad situation because stale route concept is applied to all unconditional overheard nodes and wastes energy resource while transmitting, receiving, rebroadcasting and overhearing. DSR broadcasts control packets which waste channel capacity because it generates redundant rebroadcasts. Hence AODV and AOMDV (Ad-hoc On demand Multipath Distance Vector) routing protocols are proposed for energy efficient method.

AODV has attracted great attention because of its simplicity, low computational complexity and low processing overhead. It is an on-demand routing protocol, so that a route is only discovered when required by a source node. This eliminates periodic routing updates and only necessary information is propagated to minimize control overhead. In AODV, each node maintains a routing table to record routing information obtained from routing packets [MH04].

AODV requires a new route discovery whenever a path breaks. Frequent route discoveries cause a delay due to route discovery latency. To overcome this problem, a multipath routing protocol is suggested which provides the alternate path immediately. It can ensure reliable communication by discovering and selecting reliable paths. To tolerate the faults due to node failure, a multipath routing protocol has been proposed in this research that attempts to find link-disjoint paths in a route discovery.

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