2. Related Works

Improving energy efficiency is an important concept in the wireless local area networks. For avoiding collision the MAC protocol requires the node need to be in listening (sensing) mode whenever nodes complete the transmission. This sensing mode consume large amount of energy. IEEE 802.11 PSM technique [5] was introduced for overcome this problem. In PSM the mobile nodes periodically enter to sleep mode by turning off the Wireless Network Interface Card (WNIC) and wake up for downloading the buffered packets from the AP. QOS requirements are a challenging issues in PSM, because the fixed length sleep period introduces additional delay which is undesirable for delay constraint applications such as VoIP and video streaming. Dynamic sleep scheduling was proposed for overcome the problems associated with the fixed length sleep period.

Automatic Power Saving Delivery (APSD) [5] and Green Call algorithms are based on the dynamic sleep scheduling. In scheduled APSD the AP determines the service period (SP) of each node, this centralized scheduling reduces the overlapping of SP. For minimizing the possible overlap between multiple nodes Lee and Hsieh propose an APSD-based algorithm [6], but this algorithm only gives less priority for the delay constraints. Unscheduled APSD is based on a distributed scheduling method in which each node triggers the downlink process from AP by uplink packets. Green call algorithm [7] was proposed by Namboodiri and Gao, this algorithm use dynamic sleep scheduling for satisfying the delay constraint. Green call algorithm is well designed for single user scenario, but in multi node scenario this algorithm is less efficient. When one node wake up and try to download the buffered packet from the AP channel may not be free due to the transmission between Some other nodes and AP, this will introduce additional delay to the packet and cause playout time violation. Lu Liu, , Xianghui Cao, Yu Cheng takes the advantage of Green call algorithm and design a Energy Efficient Sleep scheduling algorithm [2] for supporting the multi node scenario.

3. Problem Statement

Energy saving in the wireless local area network is an important concern. Some of the power saving methods reduces energy consumption by switching the node from idle sensing mode to sleep mode. However, an energy-efficient design should also meet the network quality-of-service (QOS) requirements such as end-to-end delay [8]. If sleep time is not properly scheduled it may cause overlapping of service period of different node in the WLAN, also improper sleep scheduling introduce additional delay, which will affect the proper working of delay-constrained applications. Therefore, these power-saving techniques need to be enhanced to accommodate sensitive delay constraints.

Furthermore, the energy is consumed for the idle listening process. The energy consumed by a wireless module in listening to the network is only slightly lower than that of transmitting and receiving data. To achieve better energy efficiency the ideal listening is reduced and maximizes the sleep period without affecting the QOS requirement such as end-to-end delay.

4. Architecture

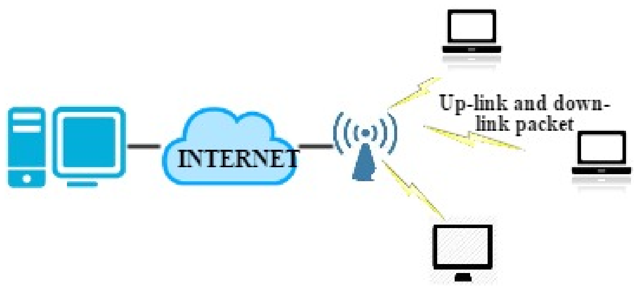

Figure 1: Architecture of WLAN

5. Exiting System

In the existing system, an energy-saving technique is developed for delay constrained applications over WLANs by dynamically switching a node to sleep mode, where the goal is maximize the length of sleep time under packet deadline constraints.

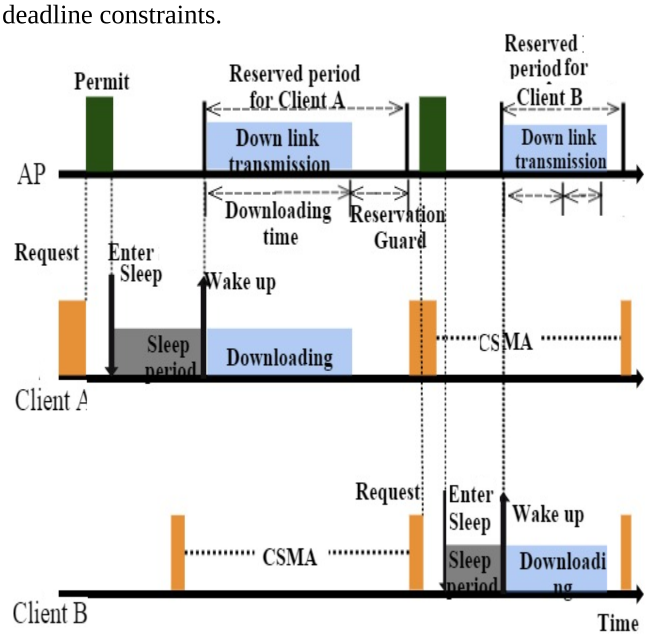

Figure 2: Sleep scheduling in Multi node scenario using Energy Efficient Sleep Scheduling Algorithm

Take VoIP for example. Normally a VoIP packet can arrive at the destination ahead of its play out deadline. The Green Call algorithm takes advantage of this fact and puts the node into sleep mode according to the amount of spare time before the play out deadline. While sleeping, the downlink packets to the nodes are buffered at the access point (AP).When a node wakes up, it then retrieves the buffered packets from the AP and plays them out. The length of sleep time is calculated to ensure timely retrieving of the packets. To maximize energy savings, the length of the sleep period is to be chosen so that the packets are played out right before the deadline. With such an algorithm, a sleep/wake-up schedule can be computed that allows the node to remain in sleep mode for significant periods of time.

6. Proposed System

The existing system significantly increase the length of sleep period, but the problem associated with the existing system is, it will increase the ideal listing time of nodes. In WLAN 90 percentage of energy is consumed for the ideal listening mode. So, in the proposed system, in order to enhance energy efficiency and improve throughput by reducing the ideal listening time an innovative technique is introduced called Optimized Energy conservation algorithm for wireless LANs.

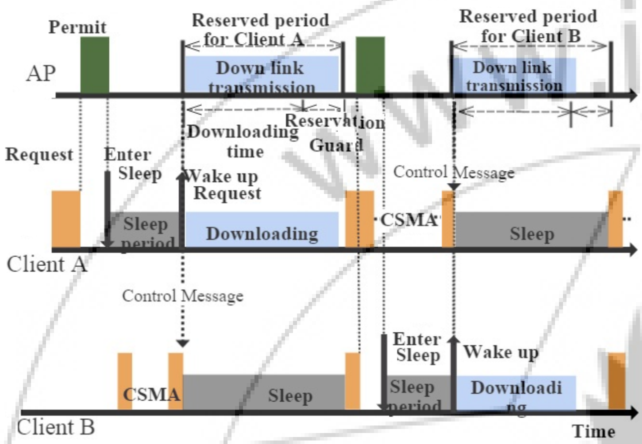

Figure 3: Sleep scheduling in Multi node scenario using Optimized Energy Conservation algorithm

In the existing multi-user scenario, during the reserved period of one node reaming nodes are in idle listening state. The energy depleted by a wireless module in listening to the network is only slightly lower than that of transmitting and receiving data. If there are seldom transmissions destined to the station, idle listening would waste significant amount of energy. So, in order to improve the energy efficiency, whenever the AP start a reserved session for a particular node, AP multicast a control message to other nodes. The control message includes the length of the downloading period (reserved period) of the active node (Node that ready to start a reserved session with the AP). When the nodes receive a control message it will immediately go from listening state to sleeping mode. The duration of sleep period is equal to the length of the reserved session of the active node. After the Reserved session the AP and active node will return to the normal mode, at the same time the remaining sleeping nodes will also return to the normal mode. So the data loss rate is less when comparing to the existing system. In this way the proposed system reduces the ideal listening time and save more energy than the existing system.

7. Conclusion

In the existing work, an energy-efficient sleep scheduling algorithm is used for delay-constrained applications over WLAN. Each node calculates its sleep period under packet delay constraint and requests that the AP reserve a future period for exclusive transmission. The AP examines the scheduling of all the nodes and make sure that there are no overlapping of reservation periods. But the existing system does not reduce the ideal listening time of nodes. For most of the time the nodes in WLAN are in listening mode which is unnecessary this result in energy wastage. So, we develop an optimized energy conservation protocol for reducing the ideal listening time for the nodes. By using this protocol energy consumption is significantly reduced.

References

[1] http://www.cisco.com/c/en/us/tech/wireless-2f mobility/wireless-lan-wlan/index.html
[2] Lu Liu, Student Member, IEEE, Xianghui Cao, Member, IEEE, Yu Cheng, Senior Member, IEEE, and Zhisheng Niu, Fellow, IEEE Energy-Efficient Sleep Scheduling for Delay-Constrained Applications Over WLANs IEEE Transactions On Vehicular Technology, Vol. 63, No. 5, June 2014
[3] Y. He, R. Yuan, andW. Gong, “Modeling power saving protocols for multicast services in 802.11 wireless LANs,” IEEE Trans. Mobile Comput., vol. 9, no. 5, pp. 657–671, May 2010.
[4] You-Lin Chen and Shiao-Li Tsao , Energy-efficient Sleep-mode Operations for Broadband Wireless Access Systems.
[5] X. Prez-Costa and D. Camps-Mur, “IEEE 802.11E QoS and power saving features overview and analysis of combined performance,” IEEE Wireless Commun., vol. 17, no. 4, pp. 88–96, Aug. 2010.
[6] T. Lee and J. Hsieh, “Low complexity class-based scheduling algorithm for scheduled automatic power-save delivery for wireless LANs,” *IEEE Trans. Mobile Comput.*, vol. 12, no. 3, pp. 571–580, Mar. 2013.
[7] V. Namboodiri and L. Gao, “Energy-efficient VoIP over wireless LANs,” IEEE Trans. Mobile Comput., vol. 9, no. 4, pp. 566–581, Apr. 2010.
[8] Shruti Chaurasia, Kamal Kant, Dr. Abhay Bansal, Adaptive Coding and Energy Efficient Packet Rate Transmission over Wireless LAN Friendly VOIP , IOSR Journal of Engineering May. 2012, Vol. 2(5) pp: 994-999.
[9] IEEE Standard for Information Technology - Telecommunications and Information Exchange Between Systems - Local and Metropolitan Area Networks - Specific Requirements Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications, IEEE Std 802.11-2007, Jun. 2007.
[10] IEEE Standard for Information Technology - Telecommunications and Information Exchange Between Systems - Local and Metropolitan Area Networks - Specific Requirements Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications Amendment 8: Medium Access Control (MAC) Quality of Service Enhancements, IEEE Std 802.11e-2005, 2005.
[11] Niranjan Kumar Ray and Ashok Kumar Turuk, A Survey on Energy-Aware MAC for Wireless Network, 12th International conference on Information Technology, ICIT-2009, Pages 276-272.

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