# JOINT WIRELESS AND OPTICAL POWER STATES SCHEDULING FOR GREEN MULTIRADIO FIBER WIRELESS ACCESS NETWORK

[1]V. Manimegalai, M.Phil Scholar, Bharathiyar Arts And Science College For Women, Deviyakurichi, Thalaivasal, Salem.

[2]K. Anbumathi, Asst. Professor, Bharathiyar Arts And Science College For Women, Deviyakurichi, Thalaivasal, Salem.

**Abstract**:

Due to the emergence of numerous bandwidth-hungry applications, we are motivated to investigate cheaper and faster Internet access solutions to serve in a neighborhood. We concentrate on the convergence of optical and wireless networks for the deployment of Internet access networks so that we can exploit the opportunities of both technologies. We focus on network dimensioning and placement of equipment in hybrid optical-wireless access networks. A number of integrated optical-wireless architectures have been investigated for the greenfield deployment of future access networks. A novel hybrid network infrastructure, namely PON-LTE access network, has been proposed where fiber will be deployed as deeply as affordable/practical and then, wireless systems will be used to extend this connectivity to a large number of locations and ultimately connect the wire- less end users.

**Keywords:** PON, Novel, Numerous.

## 1. INTRODUCTION

Modern society, now a days, relies heavily on the Internet for instant access to information. Although current network technologies offer affordable solutions for residential users, they still pose fundamental quality of service and bandwidth limitations, particularly for high- end business users. Moreover, most of the public Internet service providers (ISPs) still offer best effort capabilities which result in considerable bandwidth limitation and latencies. Inevitably, these factors limit a wide range of users including private industry, government, educational, and scientific institutions from effectively achieving timely information delivery over larger distances. Due to the tremendous demand for high speed data networks, we are motivated to investigate inexpensive and faster Internet access solutions which will still be scalable, resilient, and capable of achieving guaranteed performance Optical fiber enabled technologies can definitely be considered as an attractive solution for access networks to face the challenges of the new era. Optical fiber, considered as the last step for the future all-optic network revolution, has already been deployed in the backbone and the metropolitan networks. It is now penetrating into the access network domain mitigating the bandwidth bottleneck between the end users and the high capacity backbone network. Optical access networks, often termed as FTTX (Fiber-to-the Home/Premises/Curb), may consist of either active or passive architecture [1]. An active architecture is usually established by deploying a remote curb switch close to the neighborhood, a single fiber from the central office (CO) to a switch, and a number of short branching fibers from the switch to each end user. But such an active star architecture does not attract ISPs as the curb switch requires electric power which is the most significant operational cost for the local ISP. On the other hand, passive architectures draw sensational attention not only from the ISPs but also from the researcher communities around the world as these are the most cost- effective solutions for optical access networks. While the wireline solutions for the access networks are dominating the mainstream, wireless solutions are fairly recent phenomenon representing divergent and challenging technology. Recently, LTE (Long Term Evolution), WiMAX (Worldwide Interoperability for Microwave Access) and Wi-Fi (Wireless Fidelity) have evolved as promising wireless access networks. LTE is the latest standard in mobile as well as wireless access network technology which combines the high data rate local area network with the high mobility cellular net- work. The infrastructure and elements of LTE network are termed as Evolved Packet System (EPS) which consists of Evolved Packet Core

## 2. RELATED WORK

In WiFi technology, any device containing the functionality of the 802.11 protocol is usually defined as a station; a group of stations that can communicate with one another under the direct control of a single coordination function (distributed coordinate function [DCF] or point coordinate function [PCF]) is termed as a basic service set (BSS); the geographic area covered by the BSS is known as the basic service area (BSA) [5].The fundamental building block of WiFi architecture supports the following two topologies [6]: Independent basic service set (IBSS) and Extended service set (ESS) networks. IBSS is an ad hoc network in which self-managed stations are grouped under the umbrella of a single BSS without the aid of any administrator. IBSS is considered as a limited range network due to its single BSS constraint.

On the other hand, ESS is an infrastructure network which requires a central authority known as Access Point (AP) to manage the network and to provide specific wireless services to the users. ESS is formed by integrating together multiple BSSs using a common distribution system (DS) in which APs function as the integration points required for network connectivity between multiple BSSs. In this paper, we concentrate on the convergence of optical and wireless networks for the deployment of Internet access networks so that we can exploit the opportunities of both technologies. We focus on network dimensioning and placement of equipment in hybrid optical-wireless Access Networks. of BSs and ONUs in a WOBAN environment. They formulate the problem as a “Mixed Integer Programming (MIP)” model. But the authors do not describe the strategy of identifying the groups of BSs in which all BSs of a group should be supported by a single ONU. Moreover, the proposed algorithm does not have any scheme to determine the optimum locations of the ONUs required to satisfy the traffic demands from BSs.

## 3. PROPOSED SYSTEM

The optical backhaul is a tree network connecting the central office (CO) and wireless front-end. The optical backhaul is comprised of an optical line terminal (OLT) at the CO, an SMF, a remote node (RN), and multiple access points (APs). The wireless front-end consists of widespread APs to penetrate numerous wireless end users (WEUs). There are two main methods to transmit the wireless signals over the FiWi systems: ROF transmission and digitized radio-over-fiber (DROF) transmission. Designing security in wireless network is a challenge. Among others, key security issues in wireless networks are the shared wireless medium, severe resource constraints, dynamic network topology, reliable and trusted infrastructure, open peer- to-peer network architecture, roaming, handover as well as interference in co-channel and adjacent cells. Security issues have also been studied in optical networks considering different scenarios such as in-band-jamming, out-of jamming, tapping attacks, channel attacks, denial and theft of service, eavesdropping, and masquerading. For detecting and preventing these threats and security holes in optical networks, a variety of authentication and encryption protocols may be used, e.g., Rivest Shamir Algorithm, Advanced Encryption Standard(AES), and Elliptic Curve Cryptography (ECC). then to the egress ONU close to the destination wireless client, and finally delivered to the destination wireless client. Such wireless-optical-wireless communication mode introduced by FiWi access networks can reduce the

 

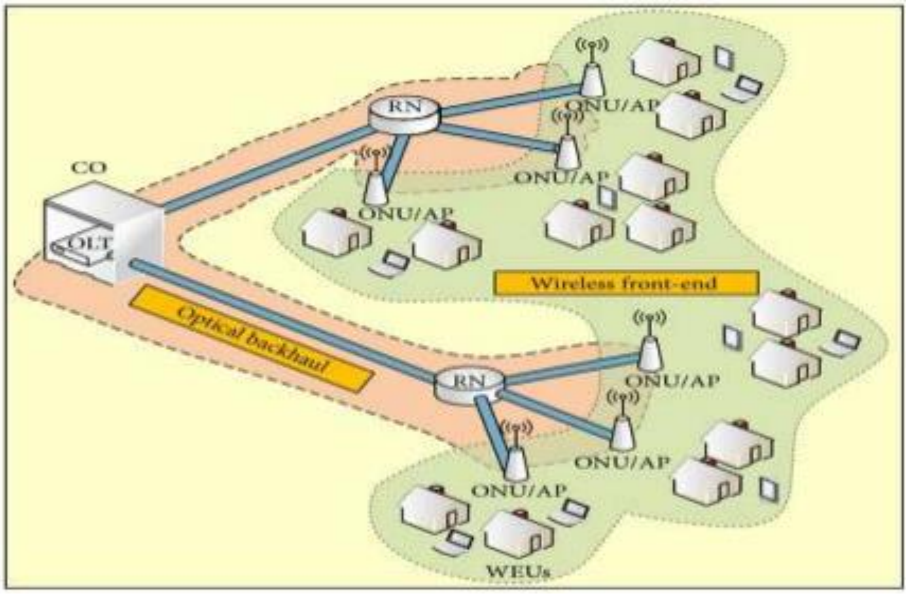


**Fig.1.Architecture**

interference in wireless subnetwork, thus improving network throughput. With the support for direct inter-ONU communication in the optical subnetwork, throughput of peer-to-peer communication in a FiWi access network can be further improved. In this paper, we propose a novel hybrid wavelength division multiplexed/time division multiplexed passive optical network (WDM/TDM PON) architecture supporting direct inter-ONU communication.

## 4. ANALYSIS

The project investigate the performance ofWOES in the RI standby ratio under different network loads. RI standby ratio is defined as the ratio ofstandby period to simulation duration for each RI on average. Higher RI standby ratio indicates betterenergy savings in the wireless front-end. Both NES and OES schemes exhibit zero RI standby ratiobecause they do not cover wireless energy savings. In our WOES scheme, we enable the energy savingsin the wireless front-end by putting the idle RIs into standby state. the performance of the WOES scheme inaverage end-to-end delay and compare it with the NES and OES schemes. Here, we define the averageend-to-end delay as the time that each packet goes from source node to destination node on average,including all queuing delay and transmission delay. With the network load growing, all three schemesshow the gradually increasing average end- to-end delay. In the OES and WOES schemes, the ONUsleep mechanism encourages more connections to share the active ONUs, such that more low-load ONUscan be put into sleep state for energy savings. As a result, each connection is allocated less bandwidthcapacity, which causes larger transmission delay in ONUs. Thus, we observe that the OES and WOESschemes exhibit larger average end-to-end delay than the NES scheme. In theWOES scheme, RIs standbydiminishes the connectivity of wireless topology in the front-end. Each connection has to transfer its trafficthrough the longer wireless path and thus experiences larger delay for wireless transmission. In our WOES scheme, we develop the EEOM module for the energy savings in the optical back-end ofFiWi. According to EEOM, the OLT will maintain a pair of thresholds LT and HT to control the ONUstate. Each ONU needs to transmit the bandwidth request to the OLT periodically. The bandwidthrequest is an indicator for the traffic load of the ONU. Thus, the OLT has the knowledge of the trafficload of all ONUs in the network. In a periodic way, the OLT will iteratively detect the active ONU,e.g., ONU-i, whose normalized traffic load is lower than or equal to LT and transmit the sleep triggersignal to it.

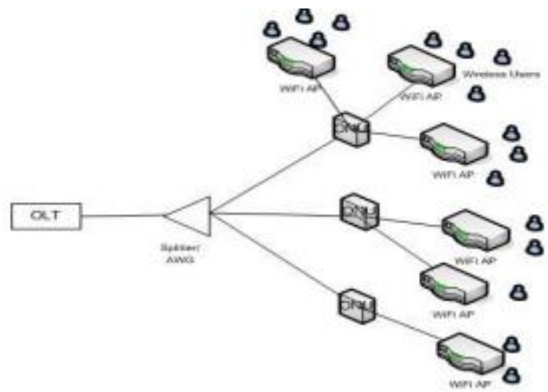


**Fig.2.Flow fugure**

GA has been demonstrated to be an efficient approach to solve the nonlinear optimization problem.For the first time, we propose a GA based approach to compute the best RIs standby solution for eachOSS in EATC. Given the wth OSS, the proposed GA represents each of the RIs standby solutions for thewth OSS as an individual.

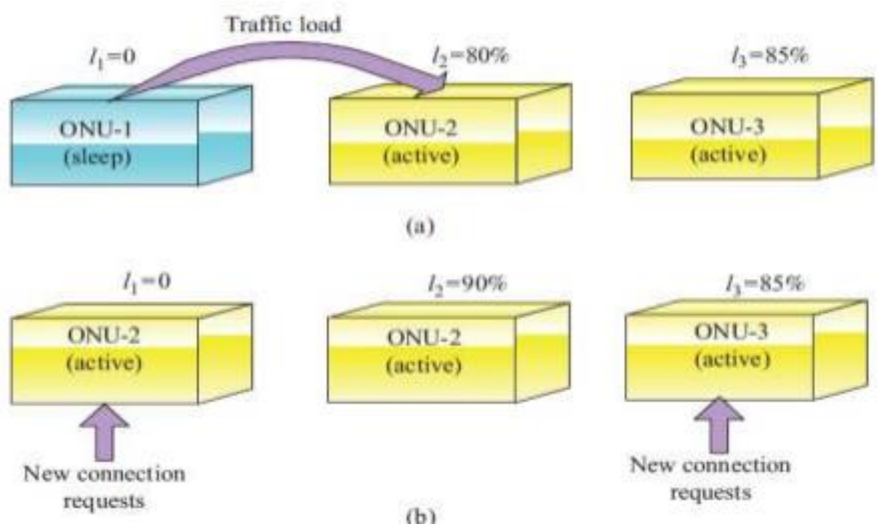


**Fig.3.System Structure**

We iteratively implement the genetic operators including selection, crossoverand mutation on the parent individuals to bear the new individuals. The new individuals usually havehigher fitness than that of the parent individuals. Thus, the RIs standby solution for the wth OSS willevolve towards better with lower wireless energy consumption. Finally, we obtain the best RIs standbysolution for the wth OSS when the iteration of GA terminates.

## CONCLUSION

The area of FiWi networks is central to the current evolution path of networks but presents significant challenges, in particular in integrating disparate systems. This project provides a cogent and highly useful exposition of the main technologies in FiWi, including not only traditional techniques, but also very recent developments such as network coding. This project is a tool both for working engineers and for researchers entering the FiWi area from the optics or from the wireless domains.

## REFERENCES

[1] F. Aurzada, M. Scheutzow, M. Reisslein, and M. Maier, "Towards a fundamental understanding of the stability and delay of offline WDM EPONs," IEEE/OSA J. Optical Communications and Networking, vol. 2, no. 1, pp. 51–66, Jan. 2010.

[2] Frank Aurzada, Martin L´evesque, Martin Maier and Martin Reisslein," FiWi Access Networks Based on Next-Generation PON and Gigabit-Class WLAN Technologies: A Capacity and Delay Analysis (Extended Version)", IEEE transaction paper, Pg.No:1-15

[3] N. Antunes, C. Fricker, P. Roberts, and J. Roberts, "Traffic capacity of large WDM passive optical networks," in Proc., Int. Teletraffic Congress, Sep. 2010.

[4] X. Liu, E. Chong, and N. Shroff. Transmission scheduling for efficient wireless resource utilization with minimum-utility guarantees. In IEEE Vehicular Technology Conference, Atlantic City, October 2001.

[5] M. Xiao, N. Shroff, and E. Chong. Utility-based power control in cellular wireless systems. In Proceedings of IEEE INFOCOM 2001, volume 1,2001.

[6] Kazovsky L G, Ayhan T, Ribeiro M R N, et al. Energy efficient optical-wireless residential access/in-house networks. In: Proceedings of International Conference on Transparent Optical Networks (ICTON), Stockholm, 2011. 1–4.