International Journal of Recent Development in Engineering and Technology
Website: www.ijrdet.com (ISSN 2347-6435(Online) Volume 5, Issue 12, December 2016)

Sub-1 GHz Frequency Spectrum Utilization in India

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Abstract-- **Cognitive radios are designed in order to provide highly reliable communication for all users of the network, wherever and whenever needed and to facilitate effective utilization of the radio spectrum. The issue of spectrum underutilization in wireless communication can be solved in a better way using Cognitive radio (CR) technology. Because of fading or shading of the channel there will be uncertainties in the received signal strength which will lead to wrong interpretation. To avoid this, we propose spectrum sensing scheme for efficient data transmission for both primary and secondary users. For spectrum sensing we use Centralized Coordinated Techniques. Here in this technique we have Cognitive Radio controller. Propose spectrum sensing scheme for efficient data transmission for both primary and secondary users. For spectrum sensing we use Centralized Coordinated Techniques. Here in this technique we have Cognitive Radio controller. When one Cognitive Radio detects the presence of primary user then it allocates the channel for that user. When primary user free, it allocates the available spectrum to secondary users**

***Keywords*-cognitive radio, sub-1GHZ**

I. INTRODUCTION

The available electromagnetic radio spectrum is a limited natural resource and getting crowded day by day due to increase in wireless devices and applications. It has been also found that the allocated spectrum is underutilized because of the static allocation of the spectrum. Also, the conventional approach to spectrum management is very inflexible in the sense that each wireless operator is assigned an exclusive license to operate in a certain frequency band. And, with most of the useful radio spectrum already allocated, it is difficult to find vacant bands to either deploy new services or to enhance existing ones. In order to overcome this situation, we need to come up with a means for improved utilization of the spectrum creating opportunities for dynamic spectrum access.

The issue of spectrum underutilization in wireless communication can be solved in a better way using Cognitive radio (CR) technology. Cognitive radios are designed in order to provide highly reliable communication for all users of the network, wherever and whenever needed and to facilitate effective utilization of the radio spectrum. Figure 1 and 2 show relatively low utilization of the licensed spectrum which is largely due to inefficient fixed frequency allocations rather than any physical shortage of spectrum.

This observation has forced the regulatory bodies to search a method where secondary (unlicensed) systems are allowed to opportunistically utilize the unused primary (licensed) bands commonly referred to as white spaces. Cognitive radio can change its transmitter parameters based on interaction with environment in which it operates. Cognitive radio includes four main functional blocks: spectrum sensing, spectrum management, spectrum sharing and spectrum mobility. Spectrum sensing aims to determine spectrum availability and the presence of the licensed users (also known as primary users). Spectrum management is to predict how long the spectrum holes are likely to remain available for use to the unlicensed users (also called cognitive radio users or secondary users). Spectrum sharing is to distribute the spectrum holes fairly among the secondary users bearing in mind usage cost. Spectrum mobility is to maintain seamless communication requirements during the transition to better spectrum. .

Among all other functions, Spectrum sensing is believed as the most crucial task to establish cognitive radio networks. The various spectrum sensing techniques includes primary transmitter detection, cooperative detection and interference detection. A wireless ad-hoc network is comprised of nodes that forward data packets in a decentralized manner over multiple hops to the destination. The increasing deployment of such networks in military applications, vehicular surveillance ,and disaster relief, commercial messaging, among others have led to a growing congestion and spectrum scarcity in theunlicensed.4GHzISM band Section one has given the basic introduction. In next section, we have provided related work. In third section, theme of our proposed system is presented. In last section, conclusion is given which is followed by the reference.

II. RELATED WORK

Arash Azarfar, Jean-Franc¸ois Frigon, Brunilde Sans`o, present a new queueing model providing the accurate average system time for packets transmitted over a cognitive radio (CR) link for multiple traffic classes with the preemptive and non-preemptive priority service disciplines.

The analysis considers general packet service time, general distributions for the channel availability periods and service interruption periods, and a service-resume transmission S. Sathiyapriya and G. Sivaranjani Cognitive Radio (CR) is the modest technology to make the unlicensed users to make use of licensed spectrum in the opportunistic manner. Collision and throughput are the main parameters to be checked while performing handoff. Proactive Spectrum is proposed to address these Concerns. Various Channel sensing methodologies were simulated and comparison was made between proactive, Reactive Spectrum. Simulation results show that our proactive spectrum handoff outperforms the reactive spectrum handoff and wireless networks approach in terms of higher throughput and fewer collisions to licensed users. Cognitive radio is an emerging and promising technology for getting the most out of consumption of the limited radio bandwidth while accommodating the increasing amount of network services and applications in wireless network techniques Juan J. GalvezNitin Vaidya developed wireless system, the performance of a link depends on many factors. The link quality is subject to temporal, spatial and spectral diversity, i.e. the SNR is time varying, link-dependent and channel-dependent. In addition, the performance also depends on MAC dynamics and the degree of congestion present in the channel. As a result, different link scan experience different performance on the same channel, and the performance of a link varies across channels and time. An effective way to exploit and cope with the diversity in the wireless system is to use opportunistic channel switching. This technique allows a link to dynamically search for a channel/spectrum where it can maximize its performance at a given point of time Zhongliang Liang, Shan Feng, Dongmei Zhao, and Xuemin (Sherman) Shen proposed Traditional wireless sensor networks (WSNs) working in the license-free spectrum suffer from uncontrolled interference as the license-free spectrum becomes increasingly crowded. Designing a WSN based on cognitive radio can be promising in the near future in order to provide data transmissions with quality of service requirements. In this paper we introduce a cognitive radio sensor network (CRSN) and analyze its performance for supporting real-time traffic. The network opportunistically accesses vacant channels in the licensed spectrum. When the current channel becomes unavailable, the devices can switch to another available channel.

Two types of channel switching's arec onsidered, in periodic switching (PS) the devices can switch to a new channel only at the beginning of each channel switching(CS) interval, while in triggered switching (TS) the devices can switch to a new channel as soon as the current channel is lost. Kilhwan Kim propose a new priority discipline called the T -preemptive priority discipline. Under this discipline ,during the service of a customer, at every T time units the server periodically reviews the queue states of each class with different queue-review processing times. If the server finds any customers with higher priorities than the customer being serviced during the queue-review process, then the service of the customer being serviced is preempted and the service for customers with higher priorities is started immediately. We derive the waiting-time distributions of each class in the M/G/1 priority queue with multiple classes of customers under the proposed T -preemptive priority discipline. We also present lower and upper bounds on the offered loads and the mean waiting time of each class, which hold regardless of the arrival processes and service-time distributions of lower-class customers

III. PROPOSED SYSTEM

We propose the system for high performance of the wireless network through the link stability concept use of the routing algorithm. The issues are scalable to a large number of nodes, design of data handling techniques, localization techniques, real time communication, data availability, fault tolerance, etc. Routing algorithms calculate the best path per destination in a distance vector or link-state basis. In a distance vector protocol, optimality is computed incrementally along a path. The sensors calculate the routes locally, based on their current, partial network state. By default, link-state protocols are more robust to network changes: they have sufficient state to route packets around broken links. Furthermore, sensors are usually immobile, or they move infrequently. Thus, they do not experience the thrashing of routing tables seen in mobile ad hoc networks. Traffic management is often overlooked. This application awareness of the communication stack matches the data aggregation paradigm in sensor networks. The goal is to minimize transmissions by eliminating data redundancy, if present, during the collection process. Each node discovers all the links with its neighbor nodes. Each node periodically floods a message containing its entire afferent links (Link State Message). Each node constructs a topology map of the network, in the form of a graph.

Then, each node independently calculates the next best hop for every other node in the network using a shortest-pathalgorithm

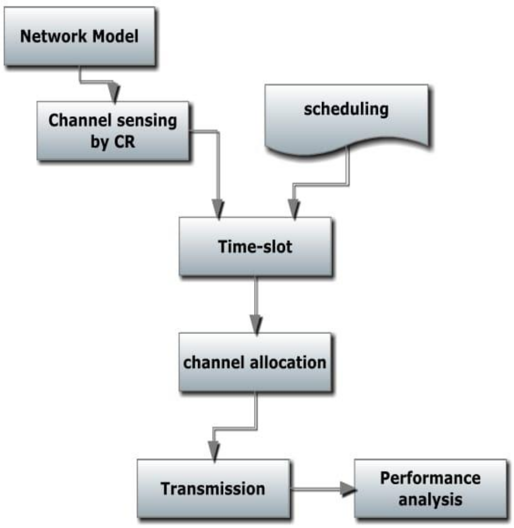

Figure. 1: System Architecture

IV. CONCLUSION

We achieves better data transmission using spectrum sensing scheme. Our proposed system utilize the remaining channel frequency for its Secondary users .For this we achieves delay free and efficient transmission. We also integrate trust management also provides better malicious free environment in network. In future, we extend our Cognitive radio network with cryptographic security mechanism. Cryptography hash function schemes that provide authentication and data privacy can detect when an internal node provides false routing information, or where a node does not cooperate with the other nodes to save its resources

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