DOI: 10.21917/ijct.2022.0414

A SMART RESOURCE UTILIZATION ALGORITHM FOR HIGH SPEED 5G COMMUNICATION NETWORKS BASED ON CLOUD SERVERS

Syed Ibad Ali[1], Jagannathan[2], R. Arunkumar[3] and N. Kanagavalli[4]

[1]*Department of Electronics and Communication Engineering, Panimalar Engineering College, India*
[2]*Department of Electronic and Communication Engineering, Rajalakshmi Institute of Technology, India*
[3,4]*Department of Computer Science and Engineering, Rajalakshmi Institute of Technology, India*

Abstract

The 5G technology will become a truly integrated technology. It's becoming the most famous technology because of its optimal system computing complex and transforming a group of individual network components. Adequate resources must be provided for the various devices that are typically on the same network. The various functions in the data system also require resource allocation to suit its needs. This will ensure that the various devices on that network perform different types of work effectively. It also represents the various device functionalites to ensure the estimated resources onetime manner. Only then will it be convenient to carry out a variety of jobs depending on their speed and selection. And its various data requirements vary according to the functionality of the various devices featured in this series segment dynamic configuration. In this paper a smart resource utilization scheme was proposed. Its main purpose is to better manage the off-the-shelf resources available here. And provide it where it is needed and streamline data delivery to users on the network. This ensures that all data goes to the users in the correct manner. The proposed method getting 49% energy consumption, 90% resource utilization, 92% resource reservation and 91% Quality of services.

Keywords:

5G Technology, Resource Utilization, Communication Networks, Complex System, Data Streamline

1. INTRODUCTION

In the dawn of rapid and rapid development of telecommunications, it is already difficult to submit to life without mobile systems [1]. In 2012, LTE Advanced Technology (LTE-a) and WiMAX 2 (WMAX-ADVATE, IEEE 802.16M) were presented at the meeting in Geneva and WiMAX 2, which were approved or already recognized by the fourth-generation technologies 4G generation 4G - call them Not accustomed [5-7]. These technologies allow data transfer at speeds exceeding 100 Mbps - subscribers and 1 GBID / S - standard. And operators do not have time to translate the spirit, there are news about the development of the next generation 5G networks in 2015 [8]. What is 5g and do we need most of these technologies? On top of that though there is no clear standard for fifth generation networks at the moment, however, telecom companies, including: Hawaii, Ericsson, Nokia, have already provided feedback on future 5G networks [9]. 5G is expected to become the last and most common standard for wireless technologies [10]. The main feature that returns to the conversation about fourth generation networks (4G) has become the high speed to attract subscribers [11]. But, as practice has shown, speed is not a key factor. You should not forget about such parameters as the capacity of a network, pockets, and other factors that hijacker's delays [12].

From 5G networks to coffee machines, from refrigerators to coffee machines, refrigerators and cars, it is necessary to radically improve the basic parameters of wireless networks, i.e. increase in data transfer rate to increase subscribers diversity, reduce network efficiency and delays [13]. It is planned to achieve this as follows:

- Increase network bandwidth above 10 GB / s;
- The number of simultaneous connections per 100 million devices per 1 sq. Km; A
- The reduction in delay in the network is 1 ms.
- Each service is assigned a specific ability.

One of the key technologies in fifth generation networks will be the Internet [15]. The Internet does not have a lot of different devices and sensors, along with wired and wireless communication channels connected to the Internet, which is a close integration of real and virtual worlds, in which people and devices communicate between real and virtual worlds [16]. To enable this, technologies such as wireless touch networks and RFID will be used (automatic identification of objects). Thus, the introduction of the Internet to the 5th generation network of 5G is a human function that allows not only gadgets and devices to communicate on a network (smart clock, VR devices, tablets and smart phones) but also to cover all Areas. It's all based on - a data transfer network implemented by a data transfer network and software separated from data transfer devices and the whole class of network nodes can be integrated with telecommunication services (services) that form components of a network structure that recommends using NVF virtualization technologies. It does not matter if you use a Smartphone on Android, iOS or Windows Phone while activating your mobile internet, there are many columns indicating the power of your mobile network, as well as a magic letter [17]. Sometimes it's E, sometimes 3G, and sometimes H or H +. However, this is not an alphabetical soup. The variation of data transfer protocol is connected for each period, providing different connection speeds with different protocols Internet.

2. LITERATURE REVIEW

Ji et al. [1] developed a Markov chain-based throughput model to investigate the effects of co-channel interference between individual 5G communication networks, assuming the worst-case scenario of co-channel interference. According to the findings of the study, a decrease in throughput is observed as the number of channels is increased.

After conducting a theoretical analysis as well as numerical simulations in the presence of multiple channels, Chung et al. [2] demonstrated that their solution, known as a Dual Channel Transmission (DCT), reduces the Packet Error Rate (PER) due to inter-symbol interference to the greatest extent possible. A single-

channel transmission would require twice the transmission power required for a two-channel transmission, and the packet would be transmitted over two distinct frequency-hopped channels at the same time.

Bulut et al. [3] proposed a straightforward reactive spectrum organisation technique for use in multi-radio networks. As a result of the interference, nodes respond by altering channel conditions by varying parameters such as power level, data rate, and channel number in order to reduce the amount of interference they receive. These solutions are particularly advantageous for multi-radio networks since they reduce complexity while also eliminating the need for processing equipment. This strategy, on the other hand, doesn't work as well in densely populated areas as it does in less crowded areas.

In the paper [4] discussed the use of an interference-nulling strategy. This strategy forces narrowband devices to share the available spectrum because it forces them to do so. This method necessitates the modification of hardware in order to execute customised signal processing. There must be a way for devices to interact with one another in order for the spectrum to be cleared.

According to the author [14], heterogeneous radio technologies make use of half of the spectrum when operating in a multi-radio environment. It is possible to have two different forms of interference problems: The interference was caused by the radios that were co-located on the platform. Furthermore, interference is caused by the close proximity of several wireless platforms. In a densely crowded multiuser environment, it is hard to find the gaps between bursts of spectrum use for interference avoidance with simple reactive methods.

3. PROPOSED METHOD

This move will cause the network finish and access issues to be modified so that it can better meet the needs of its subscribers when compared to previous generation networks. In order to be used in this system, antenna solids that have the ability to modify the selective maps of antenna systems are being developed. The company plans to use all of the frequencies that are available, especially at short distances. To the question of 5G network architecture, three subsystems (clouds) are worth allocating, and yes - to them in Cloud Technologies shown in Fig.1.

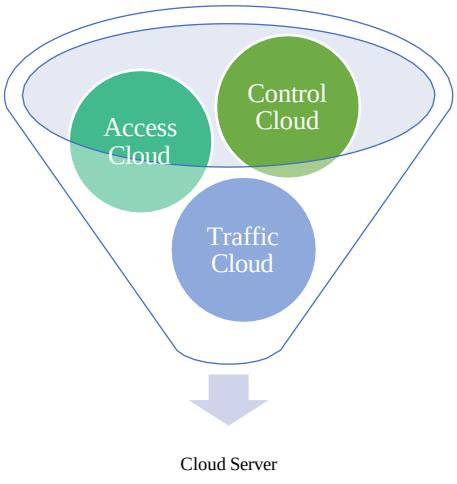

Fig.1. Types of different clouds in 5G

- **Cloud Access (Access)**: Cloud Access is a term used to describe technology and systems that are both scattered and centralised (Access). It is also suggested to maintain backward compatibility with 3G and 4G networks.
- **Control cloud (control):** The overall quality of cloud-based sessions, operations, and services (command and control).
- **Traffic cloud (forward):** When data is sent from one place to another, it goes through a physical system called a traffic cloud. This system is very reliable, fast, and even distributes the load.

Radio Interface: As for the 5G radio interface, it is planned to increase the spectral performance 3 times compared to the fourth-generation networks (4G). This contributes to the fact that under the same bandwidth, 3 times as much data is transmitted, i.e. 6 bits / s for 1 hz. The new radio interface is designed to be flexible, easily configurable, and compatible with 4G and 3G networks.

Scattered Code Multiple Accesses (SCMA) - A segment of subscribers based on a rare code that does not need to confirm distribution. In this technology, bit streams of different users on a frequency source are converted directly from a specific set to code word using a code called code. These codes are conditionally referred to as the Quasiologist and the number of these codes is referred to as very large, and has a two-dimensional structure. That is, the source signal is embedded in the code book and the modified signal is already in the radio interface shown in below fig (2). The signal recovery on the receiving side is also done step by step in the code

Flexible OFDM: It is an advanced OFDM technology that allows you to organize a flexible section of subcarriers into a flexible section, with a flexible transition along the length of the characters and a flexible transition to the rotation prefix. That is, a set of parameters will be used in each task.

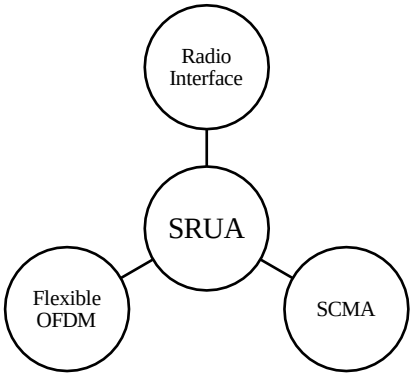

Fig.2. Proposed system design

Consider subscriber to 8 data streams. Massive MIMO subscriber can work with a large number of antennas at the same time, creating very sharp shapes. Production and spectral capability that allows multiple multilayered multi-electing applications to amplify the signal you receive and suppress interference from other users, thus magnifying it;

Step 1: NOVEL Multiple Access - New access technologies such as SCMA;

Step 2: New full duplex - a frequency of different cells for different tasks (uplink and downlink);

Step 3: Flexible Duplex - Allows you to organize flexible traffic transfers. I.e., for example, less for Uplink transfers information;

Step 4: FBMC / UFMC - enhances spectral performance, enhances channel selection, allows for use in Intelligent Radio;

Step 5: Coding and Modulation - a set of modulation and coding techniques and application of coding techniques;

Step 6: Ultra-dense networking - Allows you to organize Superlight networks at the expense of virtualization, due to which subscribers can work in the N-OH region, which allows you to create complex network hierarchies. Moreover, this technology allows simultaneous communication between them

Step 7: Low Disadvantage and High Reliability - Reducing Delay and Improving Reliability;

Step 8: M2M / D2D - Direct transmission between devices (machines, devices) without human contribution. Coating expansion at the expense of subscriber devices Building a decentralized network;

Step 9: High Frequency Communication - Frequencies below 6 GHz are the primary limits for a 5G network. Frequencies above 6GHz for global access and key bond. It is planned to use the frequency range up to 100 GHz, as can be seen from the image below;

Step 10: Spectrum Sharing - Different access technologies at different levels on the sharing spectrum.

Network management in 5G Delivery will be at the expense of inflation. This is what different businesses and user segments use as a platform to access network infrastructure.

4. RESULTS AND DISCUSSION

The proposed smart resource utilization algorithm (SRUA) was compared with the existing Hybrid Optical Wireless-mmWave (HOWM), High speed WDM-PON (WDMPON), Optical Wireless Hybrid Networks (OWHN) and Genetic Algorithm for Effective Service Mapping (GAESM). Then network simulator is the tool used here to estimate the enhance the resource allocation of various devices. This tool provides the efficient calculation of multiple device management and resource allocation.

4.1 ENERGY CONSUMPTION

The amount of energy used has an impact on the amount of energy used. In other words, by multiplying the number of units of power that have been consumed over a period of time. The following formula can be used to do this:

$$\text{Energy Consumption } (E) = P * (t/1000) \quad (1)$$

where,

E - Energy consumption

P = Power utilized

t = time for power consumption.

The Fig.3 shows the results of proposed SRUA and existing HOWM, WDMPON, OWHN and GAESM. The proposed simulation results are shown that the implemented algorithm provides the reduced rate of energy consumption than other methods.

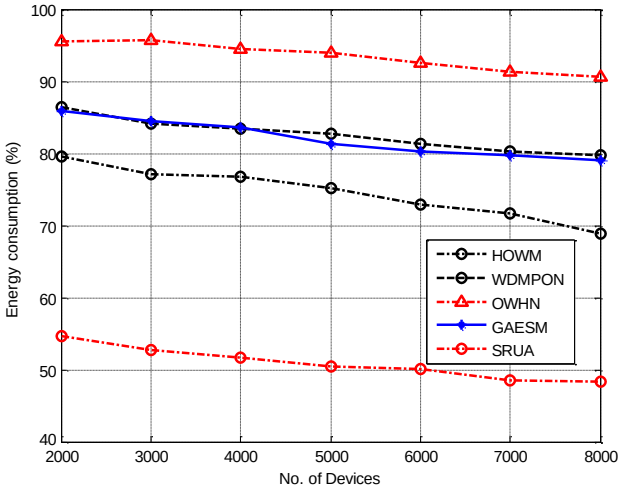

Fig.3. Comparison of Energy consumption (%)

4.2 RESOURCE UTILIZATION

The resource utilization is the ratio between the executed resources and the given total available resources. Once the utilization was increased then the given network components utilized the maximum given resources. Hence the system and equipment are performed well.

$$RU = RE/TR*100 \quad (2)$$

where,

RU = Resource Utilization

RE = Executed resources

TR = Total resources

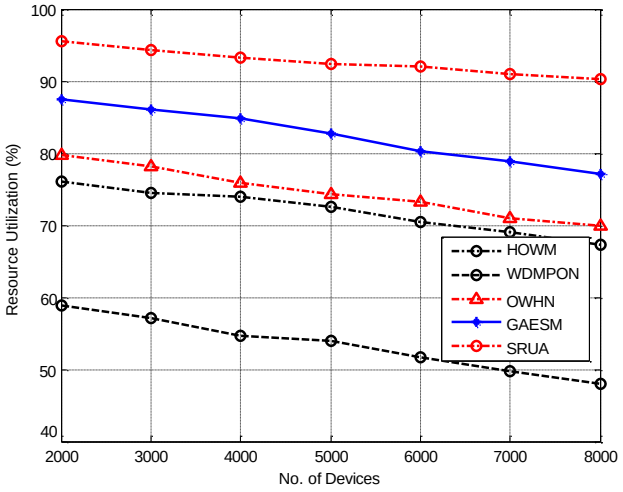

Fig.4. Comparison of Resource Utilization (%)

The Fig.4 shows the results of resource utilization between the proposed SRUA and existing HOWM, WDMPON, OWHN and GAESM. The proposed simulation results are shown that the implemented algorithm provides the higher rate of resource utilization than other methods.

4.3 RESOURCE RESERVATION

Resource reservation is the act of saving the resource leg needed to do a particular job in advance and delivering it when needed or at critical time. These reserved resources are helpful in times of crisis or data processing problems due to this process.

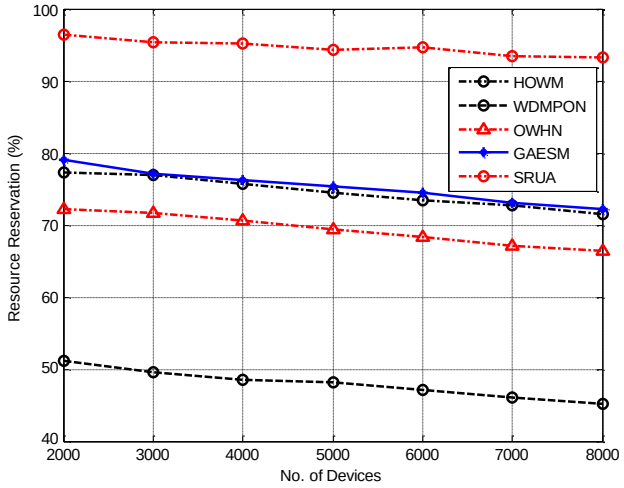

Fig.5. Comparison of Resource Reservation (%)

The Fig.5 shows the results of resource reservation in % between the proposed SRUA and existing HOWM, WDMPON, OWHN and GAESM. The proposed simulation results are shown that the implemented algorithm provides the higher rate of resource reservation than other methods.

4.4 QUALITY OF SERVICE

The quality of a particular service in a network is a system that represents the number of diverse services that exist in that area. It does a lot of work to sound low resources. If the networks have the higher the quality of service, then the numbers of users are also increased. This shows the greater the reliability of the network.

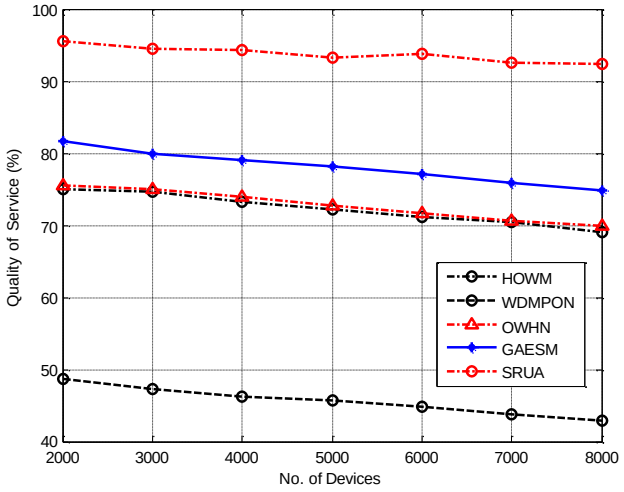

Fig.6. Comparison of QoS (%)

The Fig.6 shows the results of QoS between the proposed SRUA and existing HOWM, WDMPON, OWHN and GAESM. The proposed simulation results are shown that the implemented algorithm provides the higher rate of QoS provisioning than other methods.

4.5 COMPUTATIONAL TIME

The Measurement duration is nothing, but the time taken to calculate the prediction of two different resource executions.

Recognition Duration = (input services)/(Network Speed) (3)

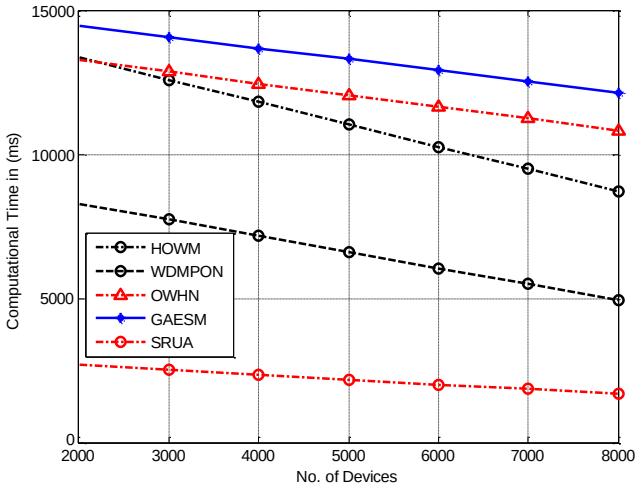

Fig.7. Comparison of Computational time (ms)

The Fig.7 shows the results of computational time between the proposed SRUA and existing HOWM, WDMPON, OWHN and GAESM. The proposed simulation results are shown that the implemented algorithm provides the reduced rate of computational time than other methods.

5. CONCLUSION

The possibilities and time to implement 5G commercial networks, provided that the standard has not even been introduced, but the manufacturers have taken the new generation networks very sharply, and their development is ahead of the standard output. If the companies participating in the project are to succeed in achieving their goals, the world will be able to acquire a single, stable, gritty and high-cost network of a new generation, which for a long time will need to build and build a new generation network that has been introduced for a long time. However, representatives of the International Telecommunication Union declare their hopes that 5G will become a turning point in the development of 5G wireless networks, with only a small refinement of radio frequencies awaiting a significant change in architecture. The future enhancement of this algorithm is to develop an energy and power utilization model for different devices. This will be helpful to identify the network efficiency.

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