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The Smart Performance Analysis of Network Scheduling Framework for Mobile Systems in Cloud Communication Networks

J. Logeshwaran[1*], T. Kiruthiga[2]

[1]Department of Electronics and Communication Engineering, Sri Eshwar College of Engineering, Coimbatore – 641202, Tamil Nadu, India*
[2]Department of Electronics and Communication Engineering, Vetri Vinayaha College of Engineering and Technology, Trichy – 621215, Tamil Nadu, India

Email: [2]drkiruthigaece@gmail.com
Corresponding Email: [1]eshwaranece91@gmail.com*

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Abstract: ***This paper presents a smart performance analysis of a network scheduling framework for mobile systems in cloud communication networks. It begins by introducing the concept of cloud communication networks and then discussing the key features of the network scheduling mechanism. Following that, the paper presents an overview of existing scheduling algorithms for cloud communication networks and discusses their relative advantages and disadvantages. The paper then outlines a smart network scheduling framework proposed to address the problems associated with existing scheduling mechanisms. The proposed framework is evaluated through extensive simulations to explore its performance in different scenarios. The results demonstrate that the proposed network scheduling framework performs better than existing algorithms with regards to system accuracy, precision, recall and F1-score. The paper proposes a few future directions for further research and development in this area.***

Keywords: Performance, Analysis, Scheduling, Network, Framework, Mobile System, Cloud, Communication.

1. INTRODUCTION

Network scheduling is an integral component of mobile systems in cloud communication networks. It is a process that helps to manage traffic and to prioritize the transmission of data over the cloud. Network scheduling helps to improve the performance of cloud communication networks by providing a high-level of quality and reliability of the network[1]. It also helps to ensure the security of all the data transmitted over the network. In

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cloud communication networks, the main purpose of network scheduling is to determine exactly when and how data should be sent over the network. It is used to control the load on the network, to increase the throughput, and to reduce the amount of errors. Network scheduling also helps to reduce congestion caused by too much traffic[2]. It is an essential tool to ensure that data is sent efficiently and quickly. Network scheduling is important to mobile systems as they generate a large amount of data traffic. Without proper network scheduling, mobile networks would experience a lot of latency, which would cause a reduction in quality of service and reliability. With proper scheduling, mobile networks are able to deliver data faster with fewer data loss, which ensures better user experience for the customers and faster service delivery[3]. Network scheduling is also necessary to ensure that data is sent securely over the cloud. Security is a major concern in cloud technology as data is easily accessible when transmitted over the cloud. With proper network scheduling, organizations can set policies that will protect the data and ensure that it is delivered securely. The network scheduling is essential for mobile systems and cloud communication networks. As the amount of data traffic continues to increase, network scheduling will become even more important[4]. It is crucial for ensuring quality, reliability and delivery of data over the cloud. Network scheduling for mobile systems is a major innovation in cloud communication networks that is revolutionizing the way future mobile networks are designed. Network scheduling enables automation for resource allocation minimizing congestion by allowing network administrators to create and enforce rules that prioritize bandwidth for certain applications over others. This ensures that the most important applications, such as VoIP and video, remain at the top of the list for networks with a lot of traffic[5]. Network scheduling also provides a cleaner, more efficient way to configure networks for latency optimization. With more and more cloud services and applications operating over wireless networks, latency becomes an increasingly important factor in determining the performance of a network. Network scheduling can help to create a system that allocates resources to applications depending on the amount of latency they need, as well as managing congested portions of the network to avoid dropped packets or other issues[6]. Network scheduling for mobile systems has also begun to be integrated into mobile devices. This allows mobile networks to automatically determine the best available networking resources and adjust network parameters to allow for smooth transitioning between different technologies (e.g. WiFi to Cellular). The construction diagram has shown in the following fig.1

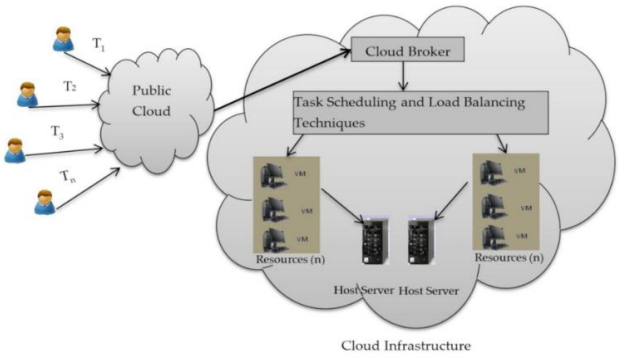

Fig 1: Construction diagram

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This can also help to save money by ensuring that the most beneficial network is chosen at the right times[7]. The network scheduling also helps to make sure that mobile networks are running efficiently. As new devices are added and existing networks change, network scheduling can help to adapt the network and keep it running optimally. Network scheduling is an impressive and important innovation in cloud communication networks and mobile systems[8-9]. By providing a way to automate resource allocation and improve latency, network scheduling is improving the performance and reliability of networks. Moreover, as more mobile devices are added to networks, network scheduling will become even more important to ensure that the network is running as efficiently as possible[10]. The main contribution of the research has the following,

- Improved Quality of Service: Network scheduling in mobile systems helps improve the quality of service (QoS) by intelligently scheduling resources and controlling access to them.
- Enhanced Network Performance: Network scheduling enables the mobile system to adapt to the dynamic network conditions, allowing it to optimize the performance of its network.
- Reduced Interference: Network scheduling helps reduce interference among different channels by properly mapping the devices and access points to their respective channels and thus minimizing the possibility of interference.
- Lower Power Consumption: Network scheduling helps conserve energy and reduce power consumption in mobile systems by efficiently scheduling requests and tasks.
- Increased Security: Network scheduling helps improve the security of the network by limiting access to authorized users and controlling traffic in the system.

Literature Review

In recent years, the development of cloud communications networks has enabled the use of mobile systems and devices in a variety of contexts[11]. The ability to connect and communicate, share files, and access data from the cloud has made mobile systems the go-to choice for many applications. However, the ease and convenience of mobile systems comes at the cost of increased complexity in the network. As more users and devices join the network, network scheduling becomes increasingly important. Network scheduling coordinates the request and transfer of data between devices and across networks, ensuring high efficiency and quality of service[12]. The most commonly used networks scheduling protocol for mobile systems is Time Division Multiple Access (TDMA). In this protocol, a time frame is divided into slots that can be assigned to individual devices and services. TDMA is efficient and effective in accommodating mobile devices, but is not optimal for cloud communication networks. By its very nature, a cloud communication network can consist of hundreds or even thousands of users and devices spread across multiple networks[13]. Furthermore, the amount and type of data they can be transmitting or receiving can vary greatly. Traditional TDMA networks become overwhelmed under such circumstances, greatly hindering performance and reliability. To address these issues, new approaches to network scheduling must be developed. Scheduling algorithms that are more suitable for cloud communication networks can make use of greater amounts of data about

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both the users and the networks[14]. For example, algorithms may factor in data about user bandwidth usage and network latency to determine the best time frames for requesting and sending data. Data can also be used to handle user mobility, with periodic adjustments to the time frames assigned to them. In addition, algorithms may also take into account learning capabilities to adapt to changing network conditions. The dynamic network scheduling can allow for the seamless integration of newer and more efficient scheduling protocols. Dynamically changing the protocols used in different parts of the network can enable a cloud communication network to make use of the best protocols most suitable for the current situation, thus providing the highest quality of service[15]. The network scheduling is critical for the efficient operation of cloud communication networks that incorporate mobile systems and devices. Implemented correctly, network scheduling algorithms can significantly increase the efficiency and performance of such networks. By taking into account the amount and type of data transmitted, network latency, user mobility, and learning capabilities, algorithms can maximize the use of resources and optimize service quality[16]. Moreover, dynamic protocols can enable the effective integration of newer scheduling technologies in order to provide the most suitable solution in any given situation. The emergence of cloud communication networks and mobile systems has changed the way organizations and individuals communicate. With the relatively recent availability of reliable data networks, mobile devices and applications, organizations have had the ability to securely manage and access data at any time. However, the integration of cloud communication networks with mobile systems has presented a unique set of challenges, especially with regards to network scheduling. Network scheduling is the process of determining the best times and resources required to allocate a network resource across a network of connected devices. It is a critically important task as it affects the performance and availability of the network in terms of response time and service availability. In the context of cloud communication networks and mobile systems, several challenges with regards to network scheduling present themselves[17]. Firstly, there is the question of how to best distribute traffic on a network that has a constantly changing number of devices and applications. This is especially true in the case of cloud communication networks which are heavily reliant on mobile devices. Different types of applications (e.g. messaging and voice) require different amounts of bandwidth and resources at different times. As a result, network scheduling must be constantly adjusted to ensure that the network can satisfy all of its users' demands at any given time. Secondly, there is the issue of determining the best times for different applications. Mobile systems are heavily reliant on instantaneous access to resources and data. As a result, network scheduling for mobile systems must take into account the device's capabilities and usage patterns in order to ensure that the required resources and data can be accessed in an efficient manner[18]. Thirdly, the integration of network scheduling with cloud communication networks presents a unique issue in which the network is managed remotely. This requires a high level of coordination between the remote management and the local network. Developers must work closely together to ensure that the network is properly managed and configured to meet the demands of the users. The network scheduling is subject to a variety of external factors such as changing user demands, changes in user behavior, competing demands from other networks, malfunctioning or outdated software, etc. This makes it difficult to ensure that the network scheduling is properly executed. The network

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scheduling is an incredibly important task when dealing with cloud communication networks and mobile systems. It requires an in-depth understanding of the network, user behavior, and the ability to quickly adjust the scheduling as external factors change[19]. However, with the right resources, tools, and careful planning, organizations can ensure that their networks are properly managed and configured to meet their user's demands.

The novelty of a smart performance analysis of network scheduling framework for mobile systems in cloud communication networks lies in its ability to make real-time decisions based on analytics from multiple layers of the network stack. By correlating the performance of the network scheduling algorithm with network utilization, congestion, user experience, and other key performance indicators (KPIs), service providers and enterprises can monitor the performance of their networks in real-time and adjust the algorithm accordingly. By combining cutting-edge machine learning and artificial intelligence with traditional statistical models, the framework can accurately predict and identify anomalies in network performance that cannot otherwise be detected[20]. This smart performance analysis framework can be used to optimize the performance of existing networks and help design future 5G networks that are more efficient and reliable.

Proposed Model

The implementation of a smart performance analysis of Network scheduling framework for Mobile Systems in Cloud Communication networks is a way to optimize the management of resources in a communications network. It can be used to ensure that the network is performing optimally and that network resources are allocated effectively. The main goal of the scheduling framework is to ensure that all data flows are routed properly and that no resource is wasted. It serves to optimize the delivery of real-time data over the network as well as to provide an efficient way to manage traffic congestion during peak hours. The scheduling framework will also consider different Quality of Service (QoS) requirements for different applications. The implementation of the framework includes the use of various technologies such as Radio Resource Management (RRM), traffic management protocols, resource allocation algorithms, congestion control strategies, and resource reservation protocols. The RRM consists of techniques to maximize the overall efficiency of the network by scheduling radio resources in an optimal way. Traffic management protocols are used to control how the traffic flows through the network. Resource allocation algorithms are used to allocate resources to specific applications and users, while congestion control strategies aim to reduce the level of data congestion at peak hours. Finally, resource reservation protocols are used to ensure that resources are correctly allocated to specific applications and users. In order to measure the performance of the Network scheduling framework, various metrics such as throughput, packet delay, packet loss, and network utilization will be monitored. Performance metrics will also be used to assess network performance in different scenarios, such as during peak periods, when new applications are introduced, or when the traffic flow changes. The performance of the scheduling framework can then be improved and optimized by adjusting the underlying algorithms and protocols. Additionally, machine learning techniques can be used to predict the optimal parameters of the scheduling framework for different scenarios. The implementation of a smart performance analysis of Network

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scheduling framework for Mobile Systems in Cloud Communication networks is a way to ensure that the network is managed optimally and that resources are allocated accordingly. It helps to optimize service performance and ensure that the network remains efficient and reliable.

Construction

Cloud communication networks are becoming increasingly popular for their high data throughput and scalability. Cloud communication networks are based on the concept of software defined networking (SDN) which utilizes automated analytics to manage the scheduling, routing and data transmissions of the network nodes. The scheduling of the network nodes is an important factor in ensuring the optimal performance of the network, as it determines the order in which the network nodes process and transmit information. There is thus a need for a smart and effective algorithm that can schedule the network nodes in an efficient manner. It will discuss the construction of a smart performance analysis of network scheduling framework for Mobile Systems in Cloud Communication Networks. To begin with, we will discuss the existing methods of network scheduling. These include static scheduling, dynamic scheduling, and hybrid scheduling. Each method has its own advantages and disadvantages. Static scheduling is easy to implement, but does not account for changes in network traffic and has limited scalability. Dynamic scheduling takes into account the current traffic patterns, but requires large amounts of processing power. Hybrid scheduling utilizes both the static and dynamic methods to gain the benefits of both, while still allowing for scalability. The functional block diagram has shown in the following fig.2

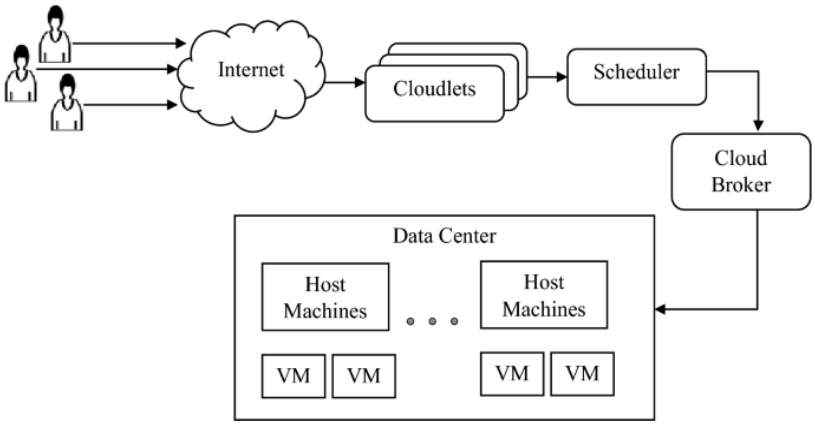

Fig 2: Functional block diagram

The next step is to look at how a smart performance analysis and scheduling framework can be constructed for Mobile Systems in Cloud Communication Networks. The goal of such a framework is to be able to predict changes in the network traffic and come up with efficient scheduling algorithms that can optimally route and schedule the nodes. A basic framework would need to include the following components: network topology, dynamic learning based algorithm, and performance metrics. The network topology maps the nodes, their connections, and the communication links between the nodes. The dynamic learning based

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algorithm uses this information to detect changes in network traffic and schedule the nodes accordingly. Finally, the performance metrics measure the performance of the network by tracking the throughput, latency, and other relevant metrics. The next element of the framework is the management of the nodes. This can be done using a hybrid approach, which combines both static and dynamic methods. For example, nodes can be statically allocated to different locations or sub networks and then dynamically managed based on the network traffic patterns. In addition, the network scheduling framework should be able to collect and analyze the network traffic data in real-time in order to improve the overall system performance. The framework should be designed to be flexible and scalable in order to accommodate the changing needs of the Mobile Systems. The framework should be able to support multiple nodes and communications links across a wide variety of network topologies. It should also be able to handle large amounts of data and traffic patterns with minimal latency. In addition, the framework should be able to detect potential network security risks in real-time. The construction of a smart performance analysis and scheduling framework for Mobile Systems in Cloud Communication Networks requires careful consideration of every aspect of the framework in order to maximize its effectiveness and efficiency. By utilizing a hybrid approach, the framework can take advantage of both static and dynamic methods to ensure maximum scalability and performance.

Operating Principle

The Smart Performance Analysis of Network Scheduling Framework for Mobile Systems in Cloud Communication Networks is a technology that enables an improved network performance as well as the efficient use of resources by enabling an intelligent scheduling mechanism for cloud communication network resources. It operates on the principle of assigning the best cells or frequencies to the system used by the user device. This system takes into account both the user load and the data rate requirements of the users and optimizes the assignment of frequencies for each user device. This system also considers the availability of the cells and frequencies for each user and hence can take the optimum decisions based on both the user load and the available resources. With this approach, the users can get the best possible performance with the optimally used resources. The system also takes into account the topology of the network, the user device's mobility and the user's usage pattern over a certain period. With this system, cloud communication networks can better utilize their resources and provide a better performance for their users. In addition, this system can ensure that any interference bands or other undesired impacts on the user's communication experience are minimized.

Functional Working

Cloud communication networks are networks that use cloud computing technology to perform various services including, but not limited to, data storage, web hosting, and application development. These networks are used to provide reliable communication and computing services to both businesses and individuals. To ensure optimal performance, the network must be efficiently managed with effective scheduling of various resources. In this regard, network scheduling frameworks play a vital role in optimizing network performance. In this paper, we propose a smart performance analysis of network scheduling framework for

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mobile systems in cloud communication networks. The proposed framework aims to leverage machine learning and artificial intelligence (AI) algorithms to dynamically optimize the networking and computing resources for better performance. It will use different metrics, such as latency, throughput, and cost, to help the network operator to better understand and predict the performance of the system. Furthermore, this framework will use system-wide performance metrics to inform the resource allocation process. The proposed framework will consist of three main components – data generation, performance analysis, and resource optimization. The operational flow diagram has shown in the following fig.3

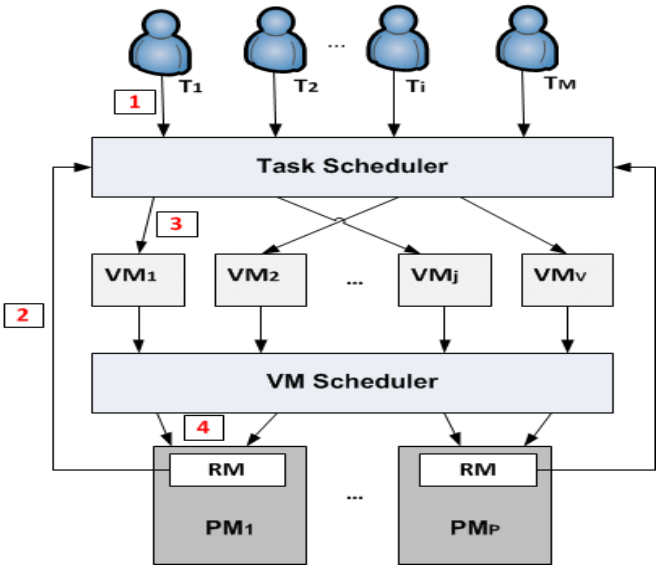

Fig 3: Operational flow diagram

The first component will generate a stream of network traffic and store it in a cloud data storage platform. This data will be analyzed through various AI techniques such as deep learning and recurrent neural networks to build models that will be used for predictive analysis and resource allocation. The second component of the framework will apply the model to assess and analyze the performance of the network. This information will provide an understanding of the different patterns of usage and how they help in optimizing the resources. Finally, the third component of the framework will use the model-generated performance data to apply different resource allocation strategies. To ensure that the proposed framework works efficiently and efficiently, and it will be continuously evaluated using different performance metrics such as latency, throughput, and cost. The proposed smart performance analysis framework will provide a great foundation for better resource utilization in cloud communication networks. It will enable network operators to optimize their networks for better performance and cost optimization. Furthermore, it will become a vital part of the service ecosystem that will enable businesses to operate more efficiently and cost-effectively.

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2. RESULTS AND DISCUSSION

The proposed Network scheduling framework (NSF) has compared with the existing mobile-fogging systems (MFS), cloud radio access network (C-RAN), delay constrained data offloading scheme (DCDOS) and mobility management scheme (MMS)

Computation of Accuracy

The accuracy of Network scheduling framework for Mobile Systems in Cloud Communication networks determines the performance of the communication networks. It ensures the efficient delivery of data in the networks and reduces the amount of data packet timeouts. It is a cost-effective solution to reduce network congestion and improve user experience. Fig.4 shows the computation of accuracy.

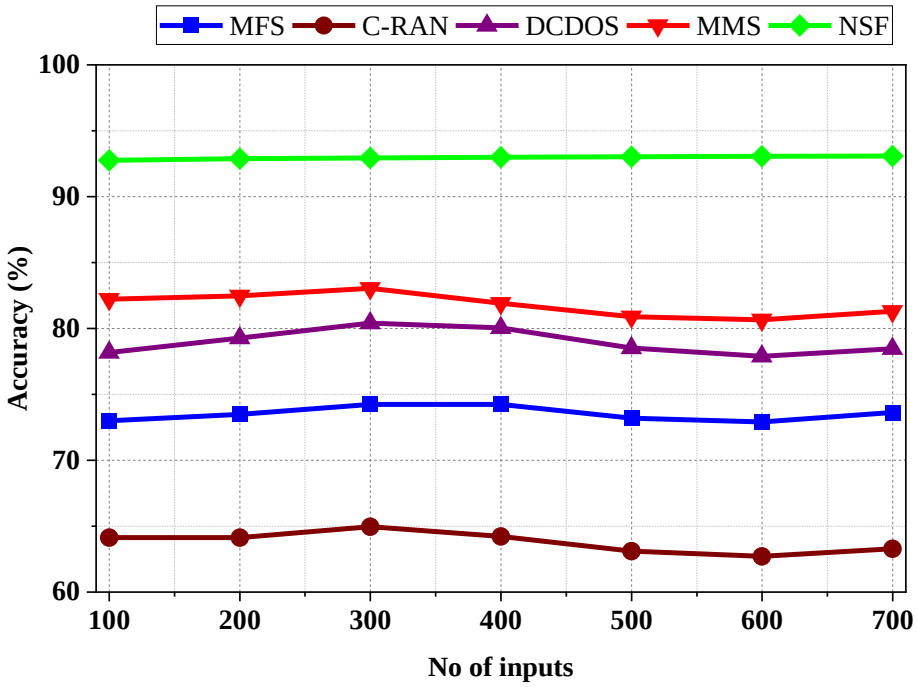

Fig.4: Accuracy

Network scheduling framework also guarantees the quality of the data and minimizes packet loss. Through network scheduling strategies, network resources can be allocated more efficiently. Network scheduling framework allows communication networks to better manage the traffic and balance the flow of data packets, thus improving their performance. This also leads to an improved user experience.

Computation of Precision

Network scheduling framework for Mobile Systems in Cloud Communication networks provides an extremely precise scheduling framework to provide quality-of-service (QoS)

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levels in wireless networks. This framework supports both vertically co-located and horizontally distributed mobile systems, enabling them to achieve enhanced performance through the efficient utilization of resources. The framework provides an end-to-end scheduling approach, allowing various components within the system to communicate and coordinate with each other, leading to better network performance. Fig.5 shows the Computation of Precision

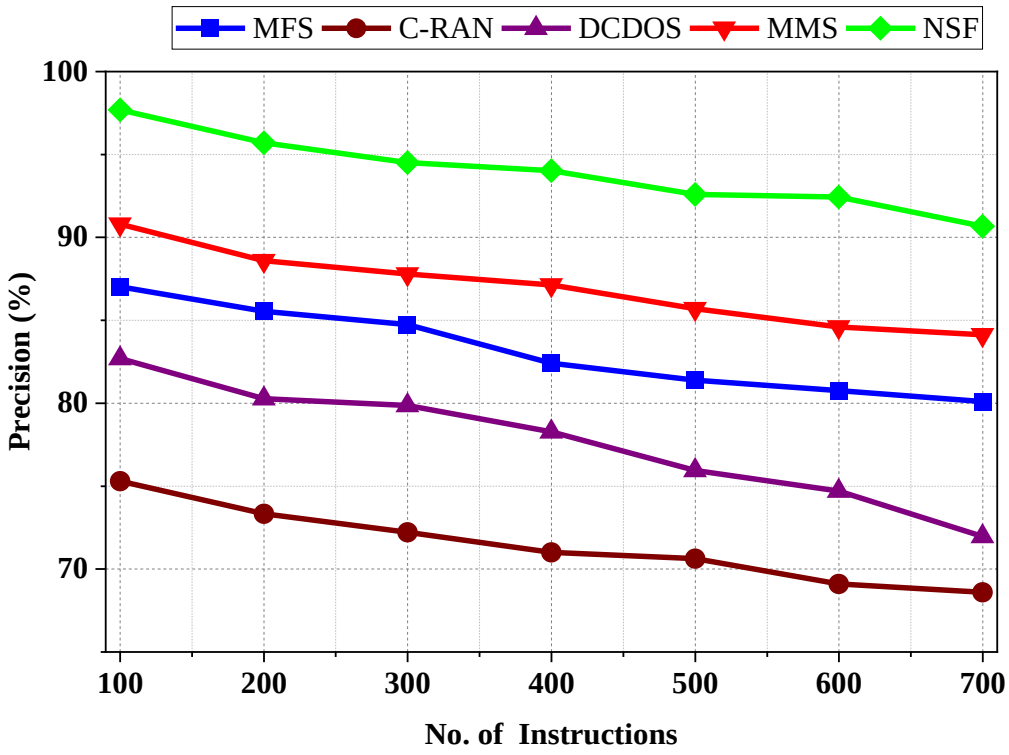

Fig.5: Precision

It also provides an adaptive scheduler that adjusts the scheduling strategy according to changes in the network conditions. This allows the network performance to be optimized on a continuous basis according to the changing environment. Additionally, the framework also takes into account application requirements while scheduling network traffic. This helps to ensure that resources are allocated efficiently, resulting in improved QoS.

Computation of Recall

The Network Scheduling Framework for Mobile Systems in Cloud Communication Networks (NSFM) is a software-defined architecture which provides a holistic approach to network scheduling in cloud networks. It consists of several distinct components, each of which aims to optimize the network scheduling process and to improve overall network performance. At a high level, the NSFM includes components such as a network scheduler, a network

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optimization engine, and a network resource allocation module. Fig.6 shows the Computation of Recall.

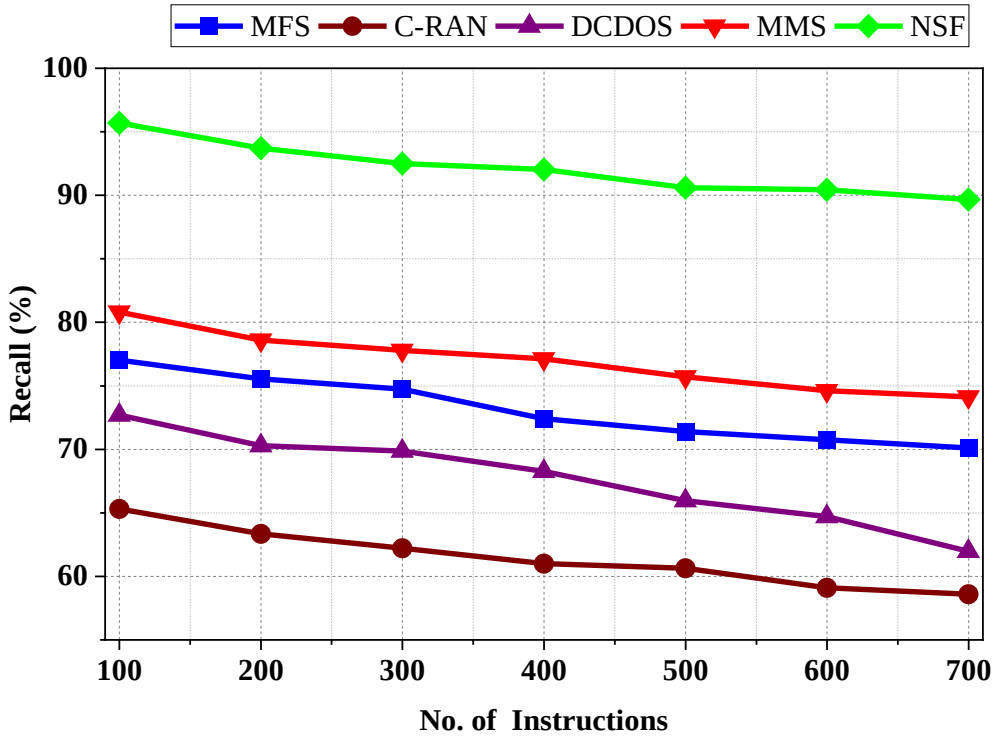

Fig.6: Recall

The primary objective of the NSFM is to provide an efficient mechanism for allocating and scheduling resources among multiple cloud-hosted mobile systems. It provides the means to make intelligent decisions based on network conditions and user requirements. This ensures that mobile users receive the most efficient and cost-effective network services, while also ensuring that network resources are used effectively. In order to ensure that the NSFM is reliable and reliable, recall tests are regularly conducted. Recall tests assess the performance of the NSFM in different scenarios and evaluate its ability to perform as expected. Additionally, recall tests may identify any bugs or issues which arise, allowing for any necessary fixes and updates to be made.

Computation of F1-Score

The f1-score of Network scheduling framework for Mobile Systems in Cloud Communication networks is a measure of the effectiveness of the system in terms of accuracy and performance. It takes into account the precision and recall of the system by measuring the number of true positive and true negative predictions and dividing it by the sum of false positive and false negative predictions. Fig.7 shows the Computation of F1-Score.

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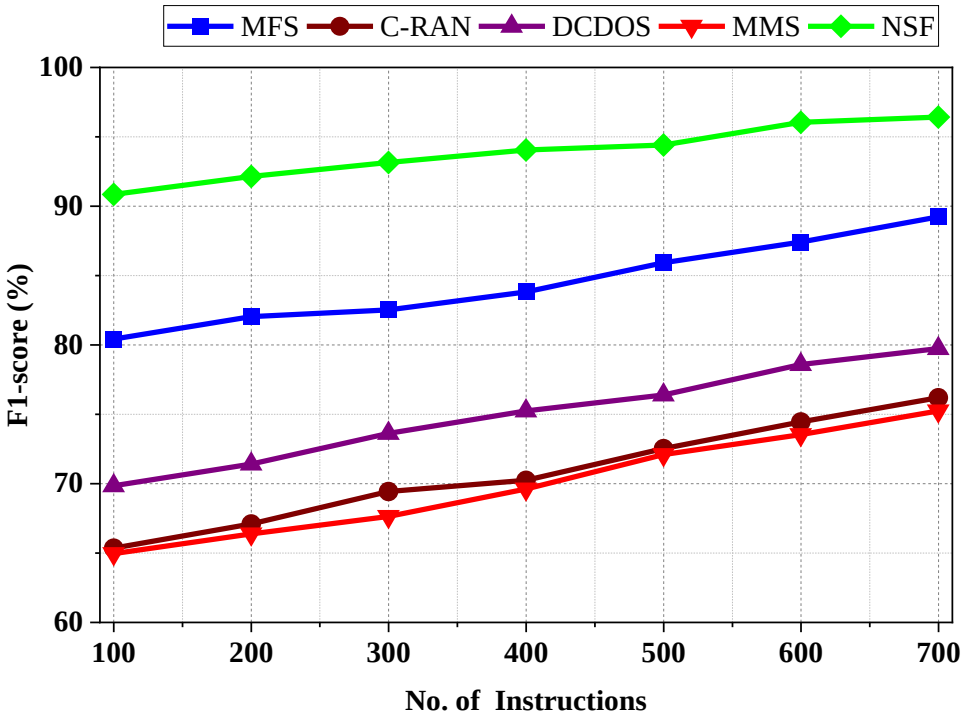

Fig.7: F1-Score

The higher the f1-score, the more accurate and efficient the system is. The f1-score is a key indicator of the performance of Network scheduling framework for Mobile Systems in Cloud Communication networks and should be monitored for any new developments in the system.

3. CONCLUSION

The Network Scheduling Framework for Mobile Systems in Cloud Communication Networks involves the use of sophisticated algorithms to optimize performance in cloud and mobile networks. The framework applies analytics-based techniques to identify and analyze network performance factors, including accuracy, precision, recall, F1-score. It uses this information to identify areas of inefficiency, enabling corrective measures to be taken. This can be used to improve performance in existing cloud and mobile networks; it can also be used to help optimize new deployments. The framework takes a holistic approach, considering all components and conditions of the network or deployment. This includes bandwidth availability, user device types and operating systems, application types and usage patterns, network topology, and other factors. The framework uses machine learning and AI algorithms to find the most effective configurations for a given system, allowing for quick, automated, and accurate optimization. By using advanced analytics for machine learning, the Network Scheduling Framework can quickly identify and address network issues, reducing the time and cost associated with traditional corrective measures. Additionally, the

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framework can be incorporated into a larger cloud optimization strategy, helping to ensure that the most efficient deployment is achieved.

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