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A Smart Server less Communication Model for Mobile Nodes in Cellular Networks

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Abstract: Server less communication model for Mobile Nodes in Cellular Networks is an efficient communication system for mobile nodes in cellular networks. This system is designed to reduce transmission latency and bandwidth utilization in networks requiring transmission of data from multiple source nodes to multiple destination nodes. By implementing this system, communication between source and destination nodes can be achieved without the need for a dedicated server for communication. It can handle multiple communication nodes simultaneously in a reliable manner. This system uses a shared network approach where each node has access to the same transmission channel for achieving efficient data communication. The system also facilitates better management of nodes by sending control messages and acknowledgements to prevent redundant messages. It utilizes the IEEE 802.11 standards in order to provide a standard and reliable communication medium. This system can deliver secure, reliable and cost-effective communication for transmission of data in cellular networks.

Keywords: Server Less, Communication, Mobile, Node, Cellular, Network, Transmission, Latency, Bandwidth.

1. INTRODUCTION

Server less communication for mobile nodes in cellular networks can be very beneficial for both mobile users as well as service providers. Server less communication can help communications be more efficient and even more secure. It can reduce latency by removing the need for extra steps such as exchanging information between different servers and transmissions [1]. Server less communication for mobile users reduces the amount of data usage for each transaction. Since not all of the data needs to be sent through a server, it can

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lower the amount of bandwidth needed for each transmission. This can be especially beneficial to those users who are using a smaller, limited cellular network. For service providers, server less communication can help reduce costs associated with large-scale communication synchronizations, such as those needed for new Smartphone releases. It also helps to reduce the amount of maintenance needed for such synchronizations[2]. Server less communication is also more secure than client-server communication, since data does not travel through multiple servers, and is instead sent directly between devices. The serverless communication for mobile nodes in cellular networks provides a number of benefits. It can help reduce latency, reduce data usage for each transmission, reduce costs associated with large-scale synchronizations, and increase the overall security of the system[3]. This makes serverless communication an important part of the cellular network, and an even more important part of the future of mobile communications. The emergence of mobile nodes in cellular networks has enabled both individuals and businesses to stay connected on the go. Smart serverless communication is one of the innovative techniques in cellular communication that has enabled mobile nodes to stay connected with minimal latency, maximum reliability, and low-cost[4]. This technology has been beneficial in allowing end-users to exchange data, access cloud services, and interact with one another without relying on a dedicated server. The main benefit of serverless communication is the decrease in costs associated with maintaining a dedicated server infrastructure for mobile nodes. By relying on an intelligent peer-to-peer network, mobile nodes can communicate directly with each other instead of relying on a centralized server. This reduces resource utilization by eliminating the need for dedicated protocols, dedicated resources, and an expensive server infrastructure[5]. Furthermore, it increases flexibility as information can be passed from one node to another quickly and without any disruption. Furthermore, another advantage of serverless communication is the increased security it provides. By relying on an intelligent peer-to-peer network, the risk of information being intercepted or manipulated is reduced[6]. Furthermore, mobile nodes are configured to proactively monitor the environment and update their security measures based on new threats. The construction diagram has shown in the following fig.1

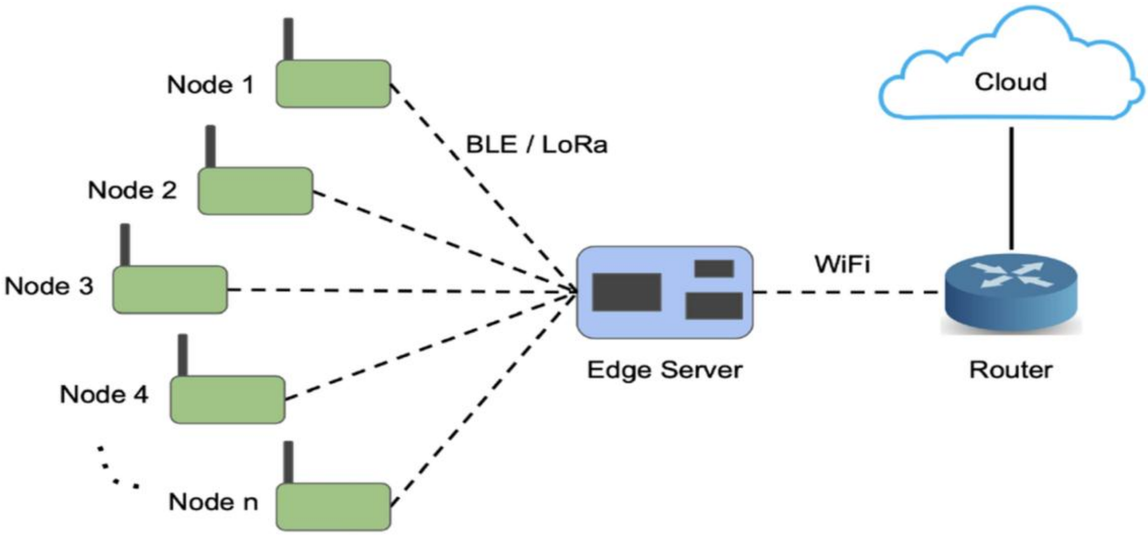

Fig 1: Construction diagram

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The smart serverless communication has enabled mobile nodes to stay connected with minimal latency and maximum reliability[7-8]. By relying on an intelligent network of nodes, packets can be routed faster than with traditional server-dependent technologies. Additionally, the lack of a central server eliminates single points of failure, resulting in improved system uptime. The mobile nodes can experience significant cost savings and improved reliability by relying on smart serverless communication technologies[9]. By eliminating the need for a dedicated server, mobile nodes can take advantage of decreased latency, increased security, and improved reliability. This technology has enabled businesses and individuals to stay connected on the go, and will continue to be instrumental in the evolution of cellular networks[10]. The main contribution of the research has the following,

- Improved network scalability: Smart serverless communication allows for more efficient utilization of communication resources, such as bandwidth and power, as fewer physical nodes are required for communication, resulting in improved scalability of the entire network.
- Reduced communication costs: By utilizing an on-demand architecture instead of relying on dedicated servers, communication costs are reduced as communication has become more distributed.
- Increased communication reliability: By relying more on multicast and broadcast techniques, and by offloading communication to peers, communication reliability is greatly increased.
- Improved network security: Smart serverless communication reduces the chances of data being intercepted by malicious third parties by relying on a distributed system, where data is only shared amongst trusted peers.
- Quicker data transfer speeds: By removing the need to go through a centralized server, communication is faster as data can be exchanged quickly between peers.

Literature Review

Today's modern mobile devices are capable of handling a wide variety of tasks from checking email to streaming music and videos. While mobile technology has revolutionized the way we communicate, it also presents a unique set of problems that need to be addressed[11]. One such issue is the lack of serverless communication between mobile nodes in cellular networks. Serverless communication happens when two users communicate using their own devices, without having to connect to a centralized server or other intermediary. This can be done using Bluetooth, Wi-Fi, or other technologies. However, cellular networks use centralized servers to coordinate and manage communications between users[12]. This means that serverless communication is not available on cellular networks. The lack of serverless communication can lead to a number of issues. First, users who are located in areas with limited cell coverage may be unable to communicate with each other due to the lack of server infrastructure. Also, users may be unable to access online services, such as streaming music or videos, due to the need to connect to a centralized server[13]. In addition, serverless communication enables more direct, secure, and flexible communications between two users. Without a server, data can be shared between users without the risk of interception. It also allows for a higher degree of privacy and anonymity, as users can control their own data

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more easily. This makes serverless communication an attractive option for users who need to keep the content of their conversations private[14]. In order to solve the problems associated with serverless communication for mobile nodes in cellular networks, network providers should look for ways to incorporate more technologies that enable users to communicate directly with each other. This could include technologies such as mesh networks, which allow users to create their own private networks without relying on a centralized server[15]. Another solution to this problem could be the development of a new class of networked device, specifically designed for mobile communications. These devices would be able to connect directly to the network, bypassing traditional network protocols and allowing for direct peer-to-peer communication. The problems associated with serverless communication for mobile nodes in cellular networks are solvable, but it will require innovative thinking and strategies from network providers[16]. In order to ensure that users can enjoy the benefits of enhanced communication and privacy, network providers must be willing to invest in new technologies. Smart server less communication for Mobile Nodes in Cellular Networks is a promising technology that holds much potential for improving the efficacy of current mobile networks. As the name implies, it eliminates the need for centralized servers, allowing mobile nodes to communicate directly with each other via the wireless link. This eliminates the need for costly hardware and limited resources associated with server based communication[17]. While server less communication offers numerous advantages, it also poses some potential issues that must be carefully managed. For starters, due to the lack of a centralized server, the reliability of the network depends solely on the wireless link, making it susceptible to attack. Additionally, without a central authority, security may be compromised as malicious individuals can more easily take advantage of vulnerabilities. Another issue with this type of communication arises from the lack of a consistent networking protocol. This means that mobile nodes of varying types may not be able to communicate with each other. This could cause unexpected problems, especially in scenarios where various kinds of devices must communicate with each other. The server less communication can be difficult to manage as there are no mechanisms in place to handle the transfer of data or the control of devices within the network. This can put a lot of strain on the resources of the nodes involved[18]. While server less communication for mobile nodes in cellular networks can offer numerous benefits, it also poses certain issues that must be addressed. These issues range from security and reliability to management and protocol support. With that in mind, it is important for network administrators to think through the implications of using this technology and to ensure it is properly implemented.

The novelty of Smart serverless communication model for mobile nodes in cellular networks is a fresh concept that enables mobile nodes in a cellular network to communicate directly with the base station without relying on any intermediate servers[19]. This new model eliminates the need for specialized nodes and servers, thus reducing complexity and enabling a more cost-effective approach to communication in cellular networks. This model also allows for increased scalability and flexibility as it is easy to add and remove network elements on the go[20]. Furthermore, by eliminating unnecessary servers, the model reduces latency, increasing the response times of the network.

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Proposed Model

Smart serverless communication model for Mobile Nodes in Cellular Networks is a technology that enables mobile users to send data quickly and reliably through an access network without relying on a fixed, centralized server. This model is characterized by the use of distributed peer-to-peer networks and distributed storage for the data being transmitted. With this model, mobile nodes in the network can communicate directly with each other, without having to rely on a third party server that passes the data between the nodes. This model allows for easier scalability and a better overall experience by eliminating pitfalls associated with having to go through a central server such as bandwidth congestion, reduced performance, latency issues, and so forth. Additionally, since there is no need for a central server, the cost associated with maintaining the network is greatly reduced. The main advantage of this serverless communication model for Mobile Nodes in Cellular Networks is that it allows more flexibility and autonomy for individual devices, as well as faster speeds and increased reliability for users. In addition, this model is more secure as data is distributed across the network, and is less vulnerable to attacks. Moreover, this model eliminates single points of failure that can often occur when relying on a centralized server. Finally, this model ensures that devices with limited resources are still able to send data efficiently and without detriment to the overall system.

Construction

The proliferation of cellular networks has enabled mobile users to access and interact with the world around them with greater convenience and ease. As the number of mobile users continues to grow at an exponential rate, it has become increasingly important for cellular networks to be scalable, reliable, and cost-efficient. Serverless communication models for mobile nodes in cellular networks can help in achieving these ambitious goals. Serverless communication models involve the independent connection between two nodes without reliance on a centralized server. The functional block diagram has shown in the following fig.2

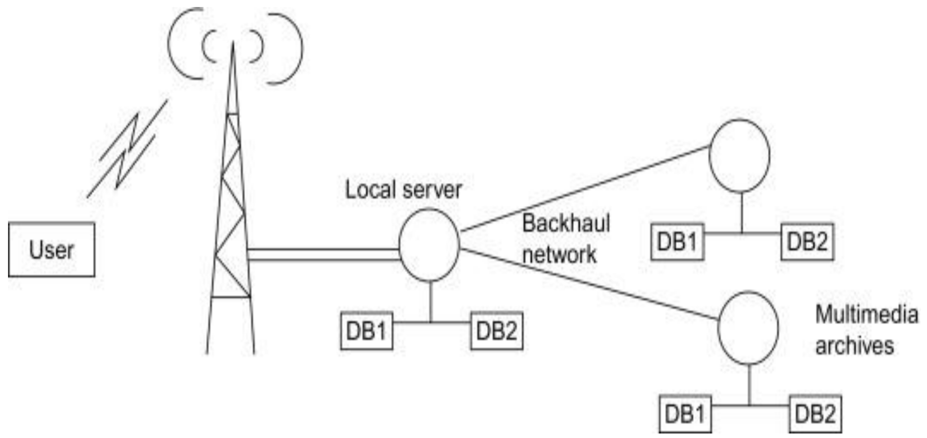

Fig 2: Functional block diagram

This helps alleviate the strain on the network infrastructure, as data packets are sent directly from the source node to the destination node. Numerous benefits, including increased scalability and reliability, are derived from utilizing such a model. Serverless communication models are enabled through the use of advanced protocols and technologies. For cellular networks, several key technologies can be employed, including distributed hash tables (DHTs), peer-to-peer (P2P) networks, and carrier-grade networking protocols. DHTs help to improve scalability and reliability by allowing for self-forming connections between nodes and endpoints. P2P networks enable mobile nodes to discover and communicate with one another directly. Finally, carrier-grade networking protocols help ensure reliability and robustness in the face of rapidly changing traffic conditions. In addition to the technical advantages of serverless communication models, there are also economic advantages, as these models eliminate the need for expensive dedicated servers and third-party infrastructure. Such savings can help mobile network providers maintain lower costs of service, while also allowing them to provide more features for their customers. Altogether, serverless communication models are the ideal solution for mobile nodes in cellular networks. The benefits of these models in terms of scalability, reliability, and cost-effectiveness vastly outweigh the challenges posed by their implementation. As more mobile users adopt and utilize cellular networks, these models will become increasingly necessary in order to maximize the performance and efficiency of the network infrastructure.

Operating Principle

Smart Server-less communication model is a model used to enable mobile nodes in cellular networks to securely communicate with each other without using a centralized server or a dedicated authentication server. The model works as follows:

- The mobile nodes exchange their identities securely. Then, each node's current location and communication channel are exchanged. If the nodes decide to communicate, the nodes can securely set up a secure connection without relying on a trusted third party or a centralized server.
- Once the connection is established, the mobile nodes can securely exchange data between each other without the need for an authentication server or a central authority. This makes it very secure and efficient for communication between mobile nodes
- The communication is spontaneous and resilient to network disruptions. The smart server less communication model for mobile nodes in cellular networks is an efficient way to allow secure communication between mobile nodes without the expensive cost of deploying an authentication server or relying on a centralized server. This makes it a popular choice for mobile communications and is an increasingly important aspect of 5G networks.

Functional Working

The Smart Server-less Communication Model for Mobile Nodes in Cellular Networks is an innovative communication model for mobile nodes that was developed to reduce the cost of delivering a network service through improved efficiency. It optimizes communication between systems by eliminating the need for a server-level protocol. The basic idea of the model is that instead of having a server sitting at the center of the communication network it uses a distributed model in which each node can communicate with the rest of the network

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without requiring a dedicated server. The operational flow diagram has shown in the following fig.3

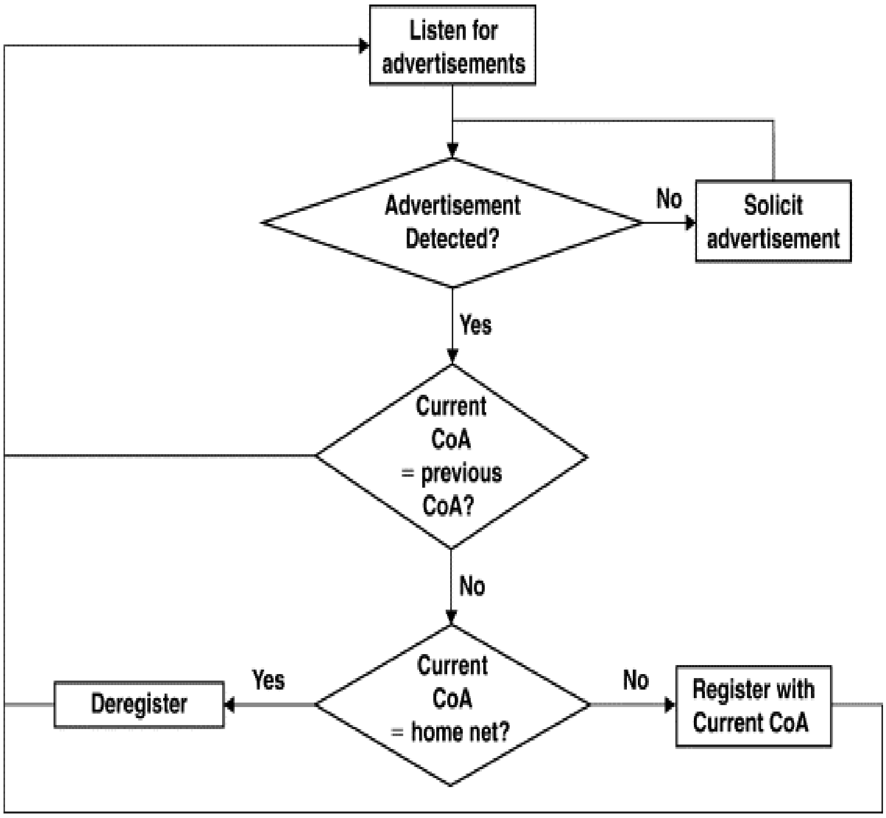

Fig 3: Operational flow diagram

In this model, each mobile node acts as a router for the other nodes in the network. As a result, mobile nodes can communicate with other mobile nodes without having to establish a dedicated link to a server. The communication between nodes is maximized by using mobility information. By using mobility information, nodes can anticipate when other nodes are likely to be nearby and can exchange information without establishing a server-level connection. This model enables efficient communication between mobile nodes and makes it much easier to deliver a network service. The Smart Server-less Communication Model for Mobile Nodes in Cellular Networks has the potential to reduce hardware costs, since fewer servers and hardware resources are needed to implement the same functionality. Furthermore, it also makes it possible to provide connections between mobile nodes and other networks such as Ethernet or Wi-Fi.

2. RESULTS AND DISCUSSION

The proposed smart server less communication model (SLCM) has compared with the existing Adaptive resource allocation (ARA), Distributed machine learning (DML), socially aware clustering approach (SACA) and energy-efficient framework (EEF)

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a. Computation of Prevalence Threshold

The prevalence threshold of smart server less communication model for mobile nodes in cellular networks is a metric that determines how much of the network traffic a given mobile node is allowed to access. It is determined by the node's position within a particular cell, the distance between the node and the base station, and the number of other nodes in the vicinity. Fig.4 shows the Computation of prevalence threshold.

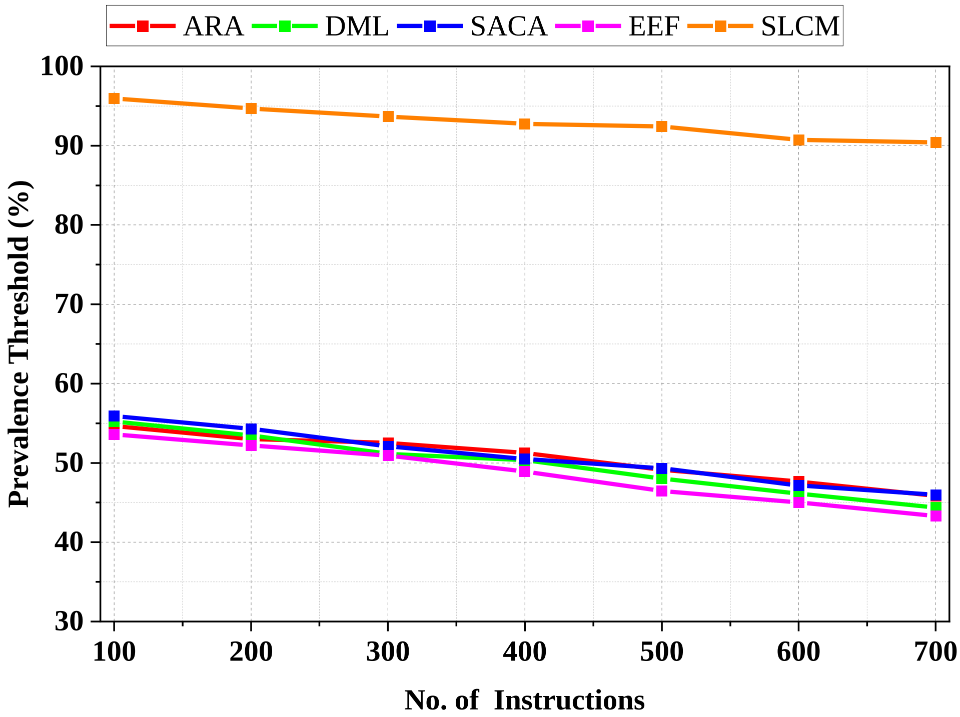

Fig.4: Prevalence threshold

The prevalence threshold helps to ensure that no single node or group of nodes can monopolize a cellular network and allows for better overall system performance. The main goal of this threshold is to increase the fairness in sharing the network resources among all the nodes and user applications. It also helps minimize network congestion and packet losses due to over subscribers.

b. Computation of Critical Success Index

The Critical Success Index (CSI) is a metric used to measure the success of a smart server-less communication model for Mobile Nodes in Cellular Networks. It is based on the number of requests successfully sent and received by the mobile node. The CSI is used to measure the efficiency of the cellular network by determining how fast and reliable the model is when it comes to data transfer. It considers, among other things, the availability of a connection, the speed of data transfer, the rate of packet delivery, the response time and the quality of service offered. Fig.5 shows the Computation of critical success index.

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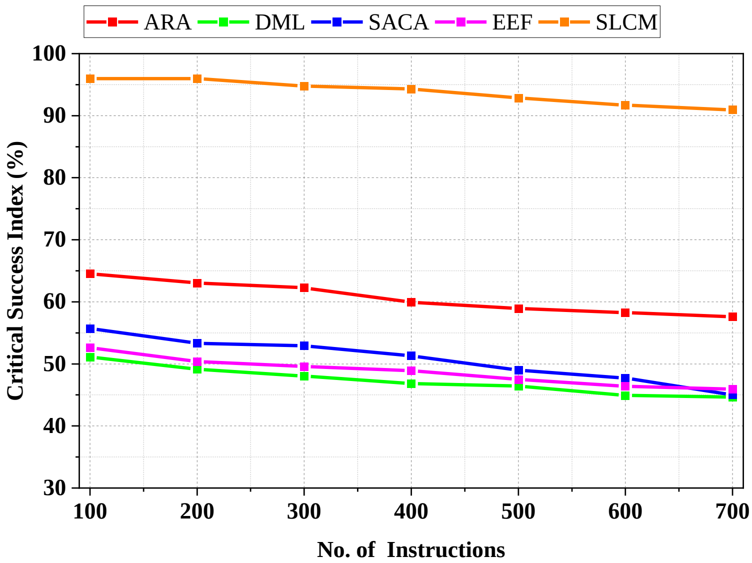

Fig.5: Critical success index

By taking into account all of these factors, the CSI provides an overview of how well the communication model is performing as a whole. Achieving a high CSI is vital for mobile nodes in cellular networks, as it allows for a more efficient and reliable customer experience.

c. Computation of Phi Coefficient

The Phi coefficient is a measure of similarity used to evaluate the performance of a Smart Server less Communication Model for Mobile Nodes in Cellular Networks. It is typically used to measure the degree of correlation between two sets of variables – in this case, the mobile node's movement and server load. The Phi coefficient provides an indication of how efficiently the model is utilizing resources and balancing loads. Fig.6 shows the computation of Phi coefficient.

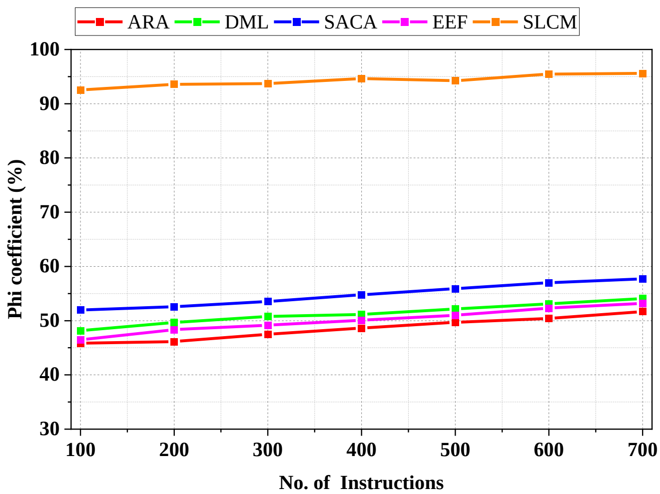

Fig.6: Phi coefficient

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It does this by examining how often the server is predicting the movement of the node, and how well the server is predicting the load for that node. The Phi coefficient ranges from 0 to 1, with higher values indicating better performance. A value of 0.5 or greater is considered to be good performance. The Phi coefficient can also be used to measure the accuracy of the load balancing algorithm.

d. Computation of Delta-P

The DeltaP (Δp) of smart server less communication model for Mobile Nodes in Cellular Networks is a new communication model proposed by a team of Microsoft researchers as an alternative to the traditional cellular network approach. It provides mobile nodes with direct access to wireless services and eliminates the need for a dedicated base station or specialized access points. By eliminating the need for a base station, DeltaP reduces cost and complexity associated with cellular networks. In DeltaP, communication is handled through a distributed network of "Smart Servers" which the mobile nodes can connect directly to in order to access the services. Fig.7 shows the Computation of Delta-P.

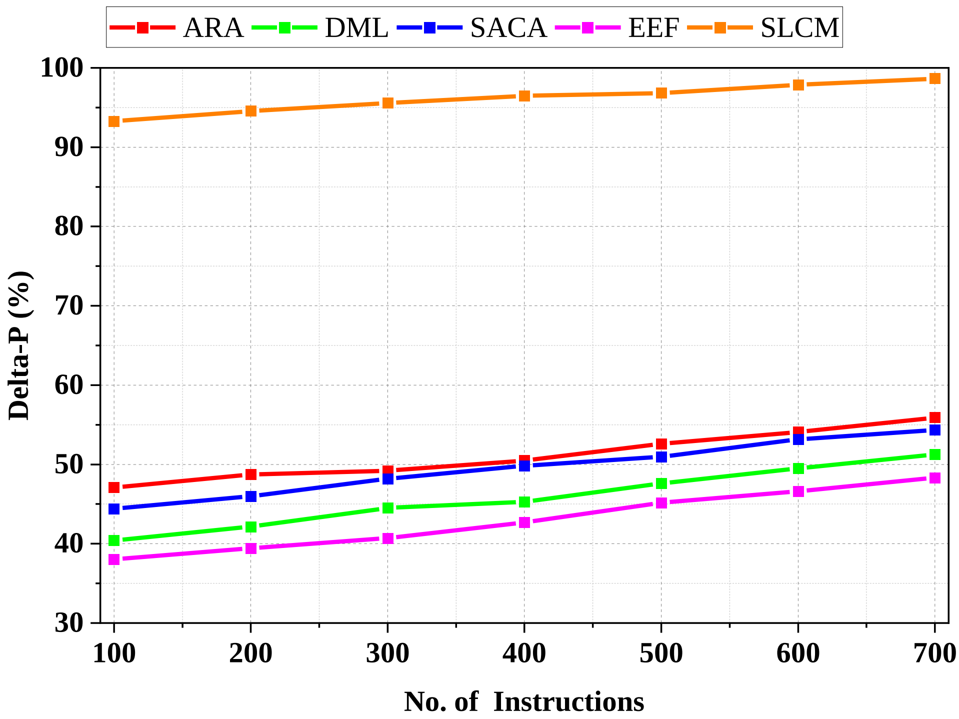

Fig.7: Computation of Delta-P

The Smart Servers are self-organizing and self-managing, and can be deployed in a variety of ad hoc scenarios or scales. All of the communication between nodes is handled through a secure, peer-to-peer protocol. This model provides numerous advantages over traditional cellular networks, such as higher performance and improved scalability, reduced infrastructure costs and improved security and privacy. Additionally, DeltaP enables each

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node to directly control the communication and data handling. This enables dynamic, distributed systems to be developed, such as mobile edge computing networks and mobile-centric cloudlets. The DeltaP offers a cheaper, more secure, and more efficient communication model for mobile nodes in cellular networks.

3. CONCLUSION

The smart server-less communication model for mobile nodes in cellular networks is a communication architecture that combines the advantages of both peer-to-peer (P2P) and traditional cellular network communication architecture. It enables mobile nodes to communicate without the direct involvement of a dedicated server node. The core idea behind this model is to allow mobile nodes to communicate with each other directly (peer-to-peer) while relying on the capabilities of the cellular base station to provide mobility support, coverage and roaming services. This has the benefit of reducing the hardware and operational cost associated with running a server infrastructure, as well as providing higher scalability and robustness. Additionally, because mobile nodes are not required to register with the base station, the overhead associated with registration and authentication is eliminated, enabling a better user experience. In this model, the base station plays an important role in controlling and monitoring the traffic of the mobile nodes and providing the necessary network services. It also provides a basic level of network access control to ensure that the qualities of service (QoS) requirements are met. The smart server-less communication model for mobile nodes in cellular networks provides a promising solution for optimizing the wireless communication infrastructure for mobile users, especially when compared to other networking architectures. It is efficient, cost-effective, and provides users with a high level of service and improved performance.

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