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A Newly Proposed Prospective and Robust Computer Networking Model Architecture Based on the Infrastructure of Cloud Computing Contrivance

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Abstract: ***Computer Networking Play's a major role for data communication or data sharing and data transmissions from one location to another, which are geographically differ, but in today's scenario where the main and primary major concerns are not to data transfer but also utilize all resources with greater efficiency and also preserves the confidentiality and integrity of the messages with respect to speed and time with lower Bandwidth and also consume a very low computational costs with low power supply and redirect to optimality. Cloud Computing also play's a significant role to access data at geographically different locations. So In this paper we create a fusion of Computer Networking Architecture and Cloud Computing Architecture and released a very much superior fundamentally strong Cloud computing based Computer Networking model, which works on the concepts of 'Virtualization'. Because when the number of hardware components (Servers) drastically increases all factors which are responsible to make possible networking among nodes are also consume each resources at extreme level, and networking becomes complex and slow, that's why we used the concept of Virtual Machine. In this paper we proposed a Computer Networking model using the concepts of Cloud Computing. This model also suitable for data transmission but also take concern the most significant feature of Computer Networking, which is Data Security. This model also used some Proxy servers/ firewalls to take concern some security mechanisms. In this paper we also proposed Communication Oriented model among the Inter-cluster domains that how one node which belongs to another CLOUD cluster make possible communication among other Inter-CLOUD clusters with respect to data security measures. In this paper we proposed three models related to this networking model, which is CLOUD Networking Infrastructure, Connection Oriented model, Communication Oriented model. The detailed description of all three models are in the upcoming sections of this paper.***

Keywords: Cloud computing based computer networking model, A virtual model for computer networking, Computer Networking model based on virtualization, Virtualization based computer networking model.

I. INTRODUCTION

Computer Networking [1] play's a major role for transmitting data from one geographic location to another, but transmitting data from one geographic location to another are not only the major primary concern of Networking, but data transmitting securely and preserves all information security trade [2,3] such as Data Confidentiality [2,3], Data Integrity [2,3] and Data Availability [2,3] with consumption of low computational costs and proper utilization of all networking resources such as bandwidth and power supply are also the primary major concern. A successfully established computer networking [1] contains much of resources with high consumption of computation costs due to continuous data processing by the number of servers and these servers are drastically increases when the number of nodes or LANs (Local Area Network) [4,5] have to increases abnormally, but it's very typical and very expensive to setup proper networking connections of different geographic locations to make data communications possible. So the term optimality may missing in these physical existence networking infrastructure, and various setups are required to make possible data communication possible at different geographical locations, so as In this today's era of information age data converge into a huge TBs, PBs and YBs so processing of data at different locations with the requirements of computer networking [1] may also drastically increases. Here In this paper we proposed a newly computer networking model, which are not physically existed, but look like their physical existence and this tasks have to be done through the concept of Cloud Computing [6] mechanisms, here we use the main features of Cloud Computing [6,15] which is 'Virtualization [7,8]'.

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331

Each server virtually distributed at different LANs which is the virtual machine of original Cloud. We generally known that at any Local Area Network (LAN) [4,5] we arrange in a systems with any topological manner, here inside any LAN [4,5] we use the hybrid topology (the combination of two), here generally used the Star and Ring Topology, So no need of hub are required to transmit data among nodes here we use the concept of virtualization [7,8], we generally used the software application approach to take decisions to transmit data among nodes and these hub or generally called the server for that Star Topology or LAN are the virtualization [7,8] of the original CLOUD. In this paper the next upcoming sections describe the mechanisms of these networking in depth. So there are many advantages of Virtualization [7,8] or using the concepts of cloud computing, because cloud computing provides us utility that we access data at any geographically differ places and using the concepts of virtualization [7,8] we easily create some adhoc networks at different geographical locations without setup the proper physical machine. In this networking model each server are the virtualization of the original cloud so each servers are connected to each other and also provides the utility of distributed computing [9,10]. But In the concepts of cloud computing security [11,12] are the major concern, because each clouds are linked with each other, so malfunctioning or malicious data at one cloud may harm all the cloud which are linked together, so here in this concept, we use the concept of proxy server firewall concepts to make it's a robust computer networking model, because data transmission from one cloud to another dependent on the decision of firewall. Firewall grant the permissions to forwarding data packet from one cloud to another and that's the main concept of this cloud computing infrastructure [13,14] based computer networking model. In this paper we divided this model into three phases, now the first phase are the Connection Oriented model and the second phase are the Component Oriented model and the last one phase are called the Communication Oriented model, so these all three models are responsible to make data communication possible among nodes. Using the concepts of cloud computing infrastructure [13,14] no physical existence of servers, so the costs which are required to setup servers at different locations also would be decreases with lower computational costs and efficient bandwidth utilization and also redirect to optimality. Speed up is the main factor of computer networking architecture, so bandwidth utilization are the main features of this model so speed factor also be drastically increase, so add on some parameters a strong potential robust networking model have to be released which based on the mechanisms of cloud computing infrastructure [13,14].

II. A NEW PROPOSED COMPUTER NETWORKING MODEL USING THE INFRASTRUCTURE OF CLOUD COMPUTING

A. Connection Oriented model among CLOUDs

This model works on the concept of CLOUD Computing technique, Generally CLOUD play's a very bigger and significant role for Distributed Computing Networking Environment and networks those distributed geographically in different locations, so the concepts to use physical machines installed at different locations, we can use the concept of CLOUD Computing technique, which is Virtual Machine or Virtualization. The diagrammatic representation of this model are as follows:

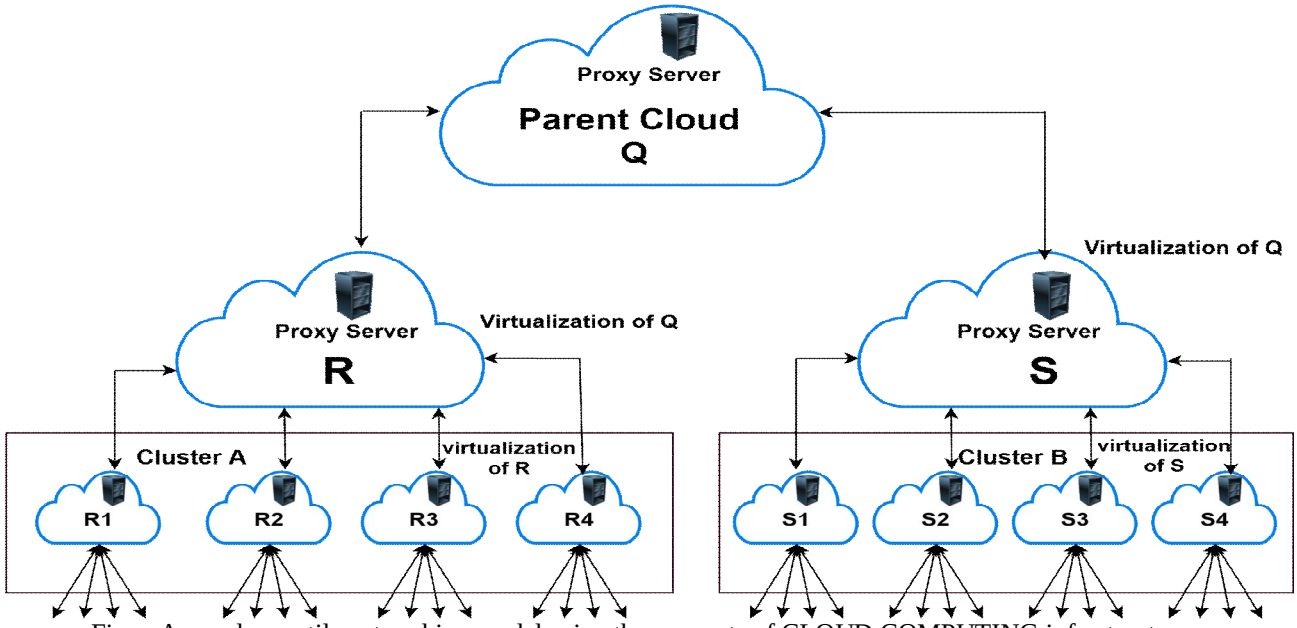

Fig a: A novel versatile networking model using the concepts of CLOUD COMPUTING infrastructure.

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332

In this diagrammatic representation a parent cloud name says 'Q', each CLOUD cluster contains a proxy server or proxy firewall due to some security concerns measures or prevent this networking model from some unauthorized access or some potential networking attacks and secure this networking model framework against potential damage, so these model also provides with security mechanisms.

In this networking model we adopt the tree like structure, a parent cloud name says 'Q' virtually distributed into two another sub CLOUDs name says 'R' and 'S' Respectively.

These Virtual partitioned of 'Q' into two sub CLOUDs are called the virtualization of 'Q'. Because the Virtualization are the main concepts of Cloud Computing Environment and the main features of cloud computing is that it's a portable and easy to access at anywhere and anytime. To append the security mechanisms with this model makes it's a strong Networking architecture than some others traditional networking models.

Now sub CLOUD 'R' and sub CLOUD 'S' also contains proxy servers, the communication model between the nodes which exist within sub CLOUD 'R' or 'R' Cluster or which exist Inter Cluster such as sub CLOUD 'S' are modelled in fig b.

Now CLOUD 'R' further subdivided into 4 different virtual CLOUDs which are 'R1', 'R2', 'R3', 'R4' these all sub CLOUDS belongs to the virtualization of CLOUD 'R' and we can give a generalized name which represent to this all sub CLOUDs as the cluster 'A'. Each virtual sub CLOUDs also contains proxy servers to take concern security mechanisms. And CLOUD 'S' further subdivided into 4 different virtual CLOUDs which are 'S1', 'S2', 'S3', 'S4' etc. These all sub clouds are the virtualization of CLOUD 'S'.

We can give a generalized name to all this sub CLOUDs as the cluster 'B'. These all virtual sub CLOUDs also contains proxy servers to take concern some security measures. Now again this chain grow up again and again based on the architecture of this networking model framework.

So this model depends on the concepts of CLOUDs virtualization.

B. Connection Oriented model among nodes with in CLOUDs

The next phrase describe that how the connection establishment makes possible among nodes with in clouds. The diagrammatic representation of this concepts are modelled in the fig b:

In this networking model a one CLOUD contains the connections for various LANs (Local Area Networks) or generally In other words various LAN's (Local Area Networks) have to be connected with one CLOUD, as the diagrammatic representation shows. In this networking architecture model we generally adopt the hybrid topological order to connect various nodes with each other, here we used Star Topology and Ring Topology to makes connection establishment possible with each other and the server which are responsible to connect these nodes into Star Topological manner are generally the virtualization of 'S1', represent as LAN A1 in the diagram.

As similar to this various LANs have to contains these similar type of structure to connect nodes with each other and these all LANs as diagram follows (LAN 'A1', LAN 'A2', LAN 'A3', LAN 'A4') are further connected to CLOUD 'S1' in Star Topological manner and makes a fully connected structure for this networking architecture model framework.

In this diagrammatic representation LAN 'A1', LAN 'A2', LAN 'A3' and LAN 'A4' are connected to CLOUD 'S1' in a Star Topological manner.

These CLOUD 'S1' are the virtualization of CLOUD 'S'. So no physical existence of servers but provides all utilities that looks like that there some physical existence of servers that's the main benefits of CLOUD computing infrastructure, which is utilized in this Networking Model Framework.

Again In this similar way LAN 'B1', LAN 'B2', LAN 'B3', LAN 'B4' have to connected with CLOUD 'S2'. These all LANs (Local Area Networks) also adopts the some hybrid topological strategies to connect nodes and makes connection possible with each other. Here as same as previously LANs, we generally adopt the Star and Ring Topology to makes connections possible among the nodes, and the server which are responsible to arrange these all nodes in a Star Topological manner are the virtualization of CLOUD 'S2'.

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333

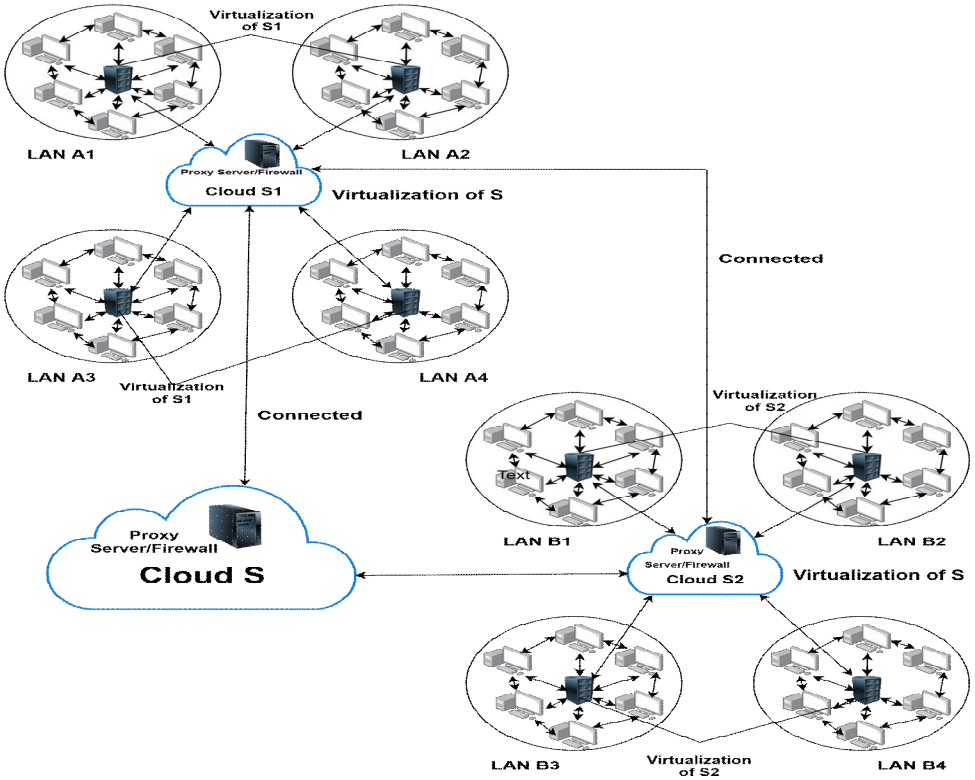

Fig b: Connection Oriented networking model among nodes.

Now each CLOUD contains proxy servers to take concerns some security mechanisms and security measures. The main tendency to use security mechanisms in this networking model is that the security are the main concerns of cloud computing environment because the damage within one CLOUDs effects all other sub CLOUDs and the networking model will be destroyed because all sub CLOUDs works on the mechanisms of Virtualization and connected to each other, so prevent all security related misconceptions and security measures before any attacks or it's potential effects harm the Networking Resources. So any data packets which travelled inside or outside this network goes through this firewalls and excepts all the challenges of security and meet all the criteria of security concerns then successfully data transmission have to be done among nodes in this networking model framework.

The Communication Oriented diagrammatic representation of this model are as follows:

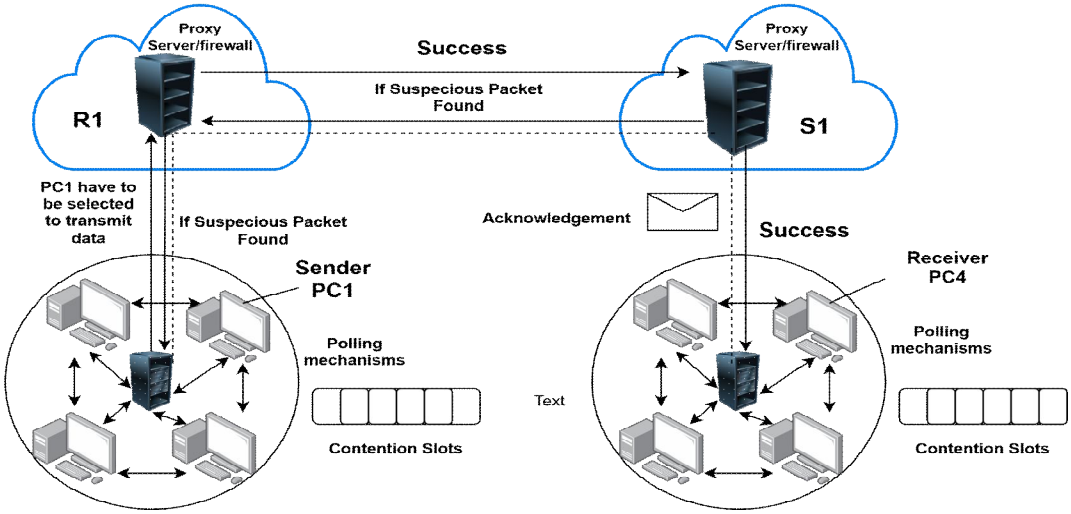

Fig c: Communication Oriented Cloud based Networking model.

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334

In this Communication Oriented Networking model how two nodes have to be communicate which belongs to different Sub CLOUDS or different clusters makes possible with also preserves some security measures and data security concerns. In this networking model suppose a LAN 1 node PC1 wants to communicate with LAN 2 node PC4, here PC1 and PC4 plays a role of sender and receiver respectively sends a data packet to their server which is the virtualization of CLOUD 'R1' and now CLOUD 'R1' further transmit that data packet to CLOUD 'R1', and CLOUD 'R1' also contains proxy server, which acts as a firewall examine the status and the behaviours of the packet, if any suspicious or malicious data have to find then CLOUD 'R1' doesn't transmit or forward that data packet to CLOUD 'S1', if no malicious data found then it's successfully forward data packet to CLOUD 'S1', Now again CLOUD 'S1' check the status and the behaviour of data packet which arrives from CLOUD 'R1' before forwarding this to desired Receiver node PC4, then if any suspicious data found then it's back this packet to CLOUD 'R1', otherwise it's forward data packet to desired Receiver node PC4. After received the data packet from PC1 (Sender) Receive node (PC4) successfully transmit acknowledgement to PC1. So this is the overall mechanisms of Communication model of this Cloud based networking model. A one main important concepts are that when multiple requests have to be generated for transmitting data to another sub CLOUDs nodes, then how it's handle, generally it will handle by the Polling mechanisms, here a window generally called the contention slot window, each contention slot is reserve for each node request, If nodes have something to send then it's put their status on the contention slot after all nodes fill their status for data transmitting in Contention slots then using the mechanisms of polling to decide that which nodes transit data to some another sub CLOUDs at an instance. Because Communication play's an important role in the concept of any networking strategies. Here we also modelled communication pattern of Sender to Receiver or Receiver to Sender, but also preserves the security measures that the whole network not to harm by some malicious or some cyber-crime activities, because here proxy server, which acts as a firewall play's a major role to preserves the three trade of information security, which is (Confidentiality, Integrity, Availability). So this model also very reliable for data communication at any place with very low computational cost and a very low power consumption, but the role of security and proxy server firewall makes it a very robust cloud based networking model.

III.FUTURISTIC APPLICATIONS

In the present scenario of today's information age where the size of data would be drastically increases from day to day transaction, so the requirement of a potential and robust computer networking model are the first need of today's information age, so there are a lot of overhead to established computer networking at a divergent level because more networking resources are required to established connections among nodes with very high consumption of power and a lot of bandwidth would be wasted with very expensive computational costs. So the primary concern to established a robust computer networking model is that we will use a very small number of resources and enhanced the productivity of that model to similar as where the number of resources are used in a very maximized number and also proper utilization of bandwidth and a very low power conception with a very lower computational costs. In this newly developed computer networking model which based on the concepts of cloud computing are also gives an optimal results with proper utilization of all networking resources with very low consumption of power. Here we used the concept of virtualization, so no need of physical machine to install at various different geographical locations. But the productivity of this virtualization based computer networking model are similar to those model where the concept of virtualization are not to be used. This model also preserves the data security principal, for securing data transmission. There are various futuristic scope in this model to enhance it at broad level, such as: 4D network, Expressive Internet Architecture, Quantum computing, Time Cloaking etc. Because In the present scenario we required that we will use minimum number of physical or hardware resources and achieve higher productivity with greater efficiency with very lower computational costs and direct to optimality. In this model we use the concept of virtualization, we also known that cloud computing using the mechanisms of cloud computing we access data from any nook and corner with very high speed at 24*7 basis. So using the mechanisms of this virtualization technique we will modelled a superior network which based on the concept of virtualization. In this cloud based Computer Networking model nodes which placed anywhere in the word would connect and make LAN (Local Area Network) using the utility of Cloud computing, so it's have capability to create an adhoc networks, so the costs required to physically installed wires or some networking resources for make data communication possible among nodes are totally avoid in this cloud computing based computer networking model. Resource Utilization are properly done with this Cloud Computing based computer networking model, because virtualization provides us a software utility that they gives exact the same productivity as compare to hardware so this features make this model a very low expensive computational costs and also redirect to optimality, and speed up is the main factor of computer networking that the data packet which travelled from sender to receiver selects the shortest path and reach to the destination or receive with very small

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amount of time with enormous speed, but here no physical device or generally called server have to existed so no overhead to processing data at server or encountered some delay, So In the reference of speed up factor, this model also works with fastest data transmission speed. Another main advantages of this model is that this computer network can be create at any place and anytime, because it's not adopt predefined structural model for establishing networking, it's contains adhoc structure, depends on the number of nodes which communicates among other nodes. So In the near future there are many advancements have to be done with this model, this networking model also suitable for performing big data and data mining techniques at different geographical areas. Security is the main concerns of any computer networking model, so here we generally use some firewalls such as proxy server, which are responsible to take decision to forwarding packet from source to destination, so some network threaten parameters such as malicious code and some malfunctioning elements and some viruses and cyber attacks are totally prevent by using this model, so it's a very robust and contains a very strong and potential mechanisms to conduct computer networking using the concepts of cloud computing.

IV. CONCLUSION

Computer Networking play's a major role in today's information age, In this today's information era computer networking are not only relate with to transmit data from one geographic location to another but preserves some security concerns and also find the optimal solution to achieve greater efficient with proper utilization of all networking resources with enormous speed, but cost factor also a major challenges in networking era. Cost may drastically increases where the number of hops or nodes have to append in the networking model, so how we achieve these all parameters in a very reliable manner, so this Cloud Computing infrastructure based computer networking model play's a major role, because this model contains and works with the concept of Virtualization and this features becomes this model versatile among all other previously and traditional approach based computer networking models. So In this model no physical established server have to require to make data communication possible, here we use the concept of virtualization to setup any server at different location and these virtualization are nothing but the virtual machine of the original CLOUD as the section 2 represents in this paper. Data reachability and Data fetching are easily done because in this networking model infrastructure all CLOUDs are linked with each other and makes data fetching possible. To take concerns some security mechanisms each CLOUDs contains some firewalls, in this reference we used the proxy servers, which acts as a firewall and take decisions to which data packet forward from one cloud to another. So In this networking model infrastructure the three trade of Information Security, which is (confidentiality, Integrity and Availability) also preserves. Cloud computing provides the fundamental concepts of virtualization and that's the main features of CLOUD that no physical machine have to required, a virtual machine which acts or look like as a physical machine and also consume a very low bandwidth with lower computational costs and power supply.

So Proper utilization of all networking resources are the primary major concerns of Cloud Computing Infrastructure. So in this reference all sub CLOUDs are the virtualization of original CLOUDs so effective bandwidth of the channel have to be shared among the different sub CLOUDs clusters, so channel utilization are efficiently done in this model. As we known that some recent years IT trends grows abnormally and would be drastically increases so the need of computer networking at different geographic locations have to be drastically increases, so it's a very expensive to established a proper setup at different locations, so here using the concepts of cloud any nook and corner data availability and data reachability on the basis of 24*7 and the concepts of virtualization also decreases costs of this networking model. Using the mechanisms of Cloud Computing infrastructure it will be easy to create ado computer networks at different geographic locations. So In this paper three model infrastructure have to responsible to make data communication possible among different nodes. First model which represents the Connections architecture among different CLOUDs generally called the Connection Oriented model and the second model represents that how components are related to each other and their topological arrangements, generally called the Component Oriented model and the last one which are responsible to make communication possible that how two inter cub CLOUDs communicate with each other, generally called the Communication Oriented model. So these all three models are responsible to make data communication possible among nodes. So it's a bidirectional in nature and a robust computer networking model for data transmission. Malicious data and some malfunctioning code or some cyber-attacks cannot be entered inside this networking model, because a strong robust Cyber Security mechanisms such as the proxy server play's an important role to take decisions that which packets entered inside the networks and data packets those contains some malicious code and some malfunctioning features and contains some suspicious data doesn't entered in this networking model. So using the concepts of Cloud Computing concepts a strong and robust computer networking model with respect to some security concerns.

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336

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VII. CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

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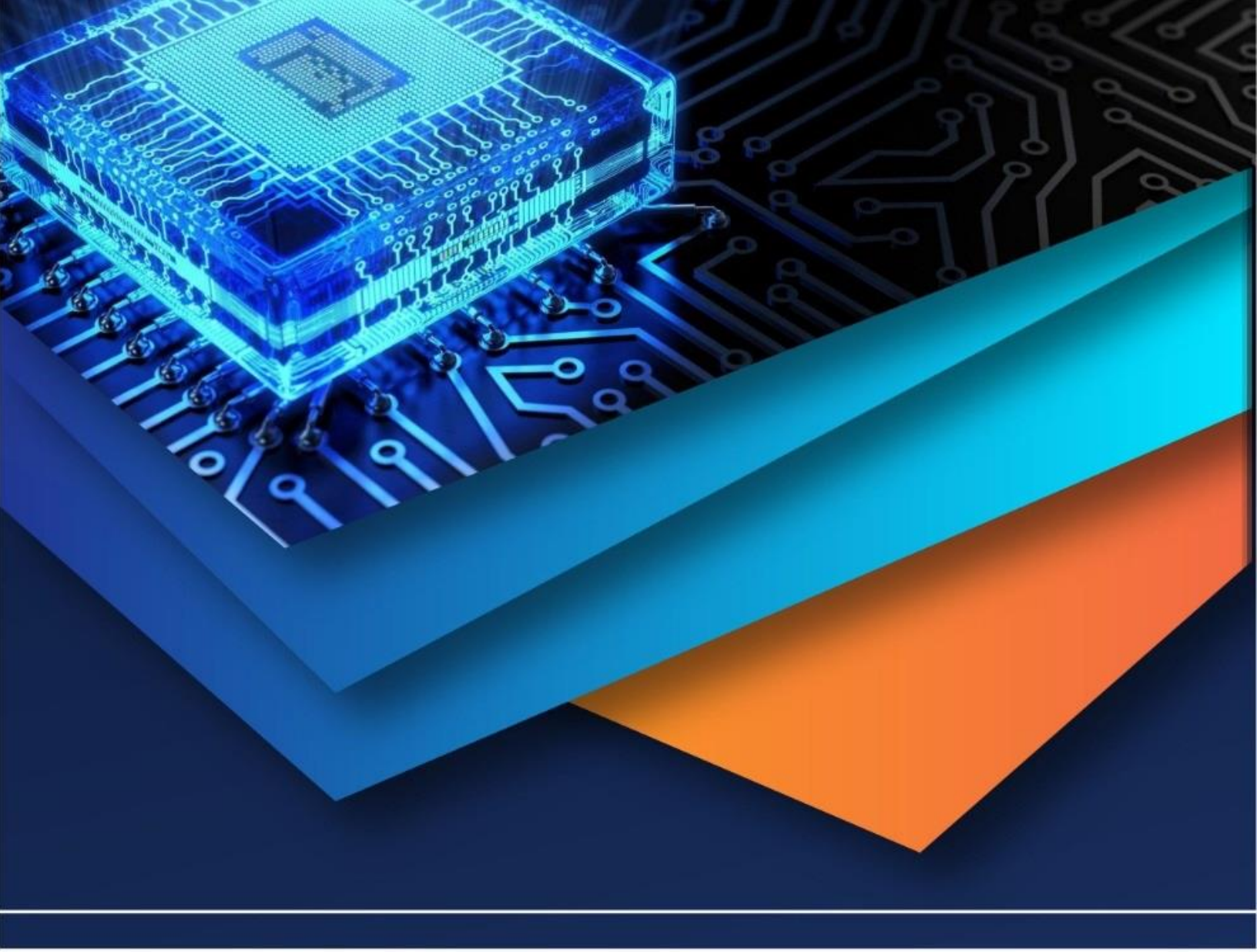
337



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