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WIRELESS INTELLIGENT NETWORKING

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ABSTRACT *In this paper, we researched about wireless intelligence networking that has further information about the main topic and these are 1)DIMSUM.Net : Latest Ways in Wireless Networking Using Coordinated-Dynamic- Spectrum-Access, 2) New ways, methods and strategies about today's communication devices, 3)Network virtualization: research challenges in detail. Each topic is defined briefly in literature view and more details topic wise.*

1. INTRODUCTION

The new paradigm of dynamic spectrum access (DSA) network wants to facilitate the opportunistic access to large parts of the underutilized bandwidth. The majority of research papers is focused on to distribute it equally for all. Un-coordinate access methods are commonly used in ad-hoc military applications.[41]

In this we discuss two new concepts, (1) coordinated access band (CAB) (2) statistically multiplexed access (SMA) to the spectrum. Here we discuss the implementation in the new Dynamic Intelligence Management of spectrum for ubiquitous mobile-access network (DIMSUMnet), and this architecture consists of four things: 1: per domain spectrum 2: clients 3: base station 4: radio access network manager (RAN-MAN). Broker that handle spectrum access. Here we discuss its design algorithm and various issues.

Static dividing of the frequency bandwidth have significant implications that have been recently brought by wide (extensive) utilization measurement in Europe and America (USA). First the radio spectrum is allocated in large part of the area, but it is barely used in most locations. Different radio band frequency allocated for military, government and use for public security. The cellular and PCs bands are however quite well used. The use of cellular and a PCS bands vary over space and time. Most of the time, the technology thoughts and concepts which are unsuitable for modern society have served as a basis for the amount of spectrum. Different bands of spectrum are historically reserved for different purpose. For example, VHF, UHF bands. These bands are fixed for television broadcast in the United States, the allocation of 6 MHZ per TV channel was based on the old analog NTSC system even think that now a days a better quality video can be broadcast with 50% less spectrum per channel. Given the pervasive penetration of TV cables, this this precious spectrum, though authorized and allowed, kept in use in most locations. On the contrary, without license bands are required no spectrum cost, have fueled technology innovation, it provides the less cost networks and client devices, and growth of network rapidly. The current methods of spectrum management have left little spectrum to assign for facilities and existing facilities. In the other words, now a day's spectrum access usage is limited rather than limitation of throughput. In the business implementation of current spectrum management are that is offers of its creation is to build networks, which required major process of spectrum license, implementation of network infrastructure and providing end user facilities. Some time, high cost and long process for spectrum.[39]

2. Literature view

In wireless network we are going to discuss and research on the environment of networks which steadily increase day by day the way to control the environment of information. Using wireless communication, we can manage the path of data information; we can transmit our data from source to destination or send and receive data via using wireless networks. Nodes defined the transmission range and frequency also assigned. We will provide the best way of communication and enhance the delivery rate. The requirement of memory to store the information will be discussed in our research paper. New experiments are on the data in networks.

In our research paper, we further discuss about the following given points:

1. Assign Algorithms:
   In this method algorithms are assigned to each and every node. Each node makes the decision where the message will be sent. It controls the behaviors of individual nodes.
2. Message Passing Strategies:
   We will make the strategies which will be used to send and receive message successfully without any error.
3. Minimize Transmission Problems:
   Transmission problems will be minimized. A message is sent to a destination using data traffic on the path of wireless communication, problems occur and the message was not sent due to network problem, due to wrong address or due to low battery power. Such things are made causes in communication over globally source to destination communication. We discuss that how can be reduced such kind of problems.
4. Single-destination Strategy:
   Our goal is to establish a single destination strategy. In past, in network environment, if a message was sent from the sender it was sent all the nodes over the network until it will send to the desired location of data. We further define the structure of network communication which consists of the rules and strategies that a request of a message or any kind of data should be sent to its exact location. If a data request is sent which is in minimum form, but when the filtered data sent back it will be contain complete information about that data request.
5. Design Goals of Successful Communication:
   Message passing is the method of transferring data or messages from one location to another. Our major focus is to established strategies of delivering the data on the correct path and assurance of successful delivery of data. If the network is available each and every message will be sent to its exact destination, if it does not message will not

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send and then does not produce the best quality of communications.

Over the past decade Network-Virtualization (NV) has been presented as a long term result of the existing inter-network problems. It would be an important and crucial part of next generation networking models. Network Virtualization provides high speed and reliability as it bonds any type of internet lines for highest speed then existing internet speed. For more it adds high 9s availability to WAN.

The most important thing which is terrific and wonderful achievement of Network Virtualization is that Network Virtualization cut down the bandwidth cost as it is a cost effective network architecture. It saves up to 70% on bandwidth cost with cost effective DSL and Cable Broadband videos MPLS cost, significantly while you groom your traffic with the advanced course.

Network Virtualization is composed of flexible, provides diversity, promises security and promotes increased and efficient manageability.

Yes, however it is possible that many technical issues that are in the process of Network Virtualization's triumphant awareness, but it is truly promised and technically proved that Network Virtualization has a capability to meet and beat the future challenges.

As we can see that over the past decades organizations and top business companies have been selected Network-Virtualization technologies at an efficient rate of demand.

NV is a process of merging hardware/software services and the network's working in a single network. Network Virtualization involves platform virtualization, mostly combined with resource virtualization.[61,64,66,67]

In the recent years concept of NV has been attracting a huge and significant attentions of the next generation, including top businesses and multinational companies all over the world. The reason is that the experts believe that NV can resolve the so called problems of the present-day inter networking by introducing NV as unusual technologies. With NV many of organizations can take advantage of the efficiency of software based computer storage resources and forwarding plans as urge by (SDN), and Network Functions Virtualization (NVS) that NV has become more a focus.[62]

Physical networking devices are responsible for the transmitting of data packets while the NV is provided with an intelligent concept that is easy to deploy, manage devices and under-laying network resources. NV can align the network to better virtualized environment (NVE). NV creates a network within a virtualized. From these perspectives NV can operate different traffic continues to ensure network traffic.[63]

Trend is towards using NV create overlay networks on top of physical hardware for the need of future generations.co-currently using NV reduces cost on physical(underlay)networks by using White Box Switching(WBS).preferring to the use of new and modern, off-the-shelf switches and routers,WBS limits expenditures by not using expensive proprietary switches, NV also contributes to decreased expanses by relying on the intelligence of the overlay to provide necessary advanced network functionality and features. [68]

3. DIMSUM.Net: Latest Ways in Wireless Networking Using Coordinated-Dynamic- Spectrum-Access

In this paper, we discuss the concept of CAB which is abbreviation of coordinated access bands. Multiple part of the radio spectrum can be allocated as CAB. For a geographical region, allocation of many different parts of the CAB spectrum for a single network or its customer can arrange or organized by a broker of the spectrum. The broker of the spectrum who owned the CAB spectrum permanently and just gives the time limits to the senders.[39]

The process condition may specify some extra parameters like non-exclusive or exclusive and maximum power nature of laser. Now just checked and measuring the threats, but it is being flexible due to the use of infrastructure. The CAB frequency band is matched with those licensed band frequencies which have a short time duration of spectrum band. This contrasts, of slow, regulatory legalistic process for licenses. The difference between being (1) now a days if licenses are not permanent they are signifying for long term and sole ownership. (2) Coordinate access band was honored by the automated machine driven protocol. For the usage of the CAB there are two possible models. The network operators only generated the requests for CAB spectrum. Here the end-user mobile node(MN) devices (PCs, laptop,...,etc.) take part in the more difficult leasing procedure and asked to communicate with the peer end user devices or with network parts like a base stations. Some frequency band width is permanently fixed for one CAB channels as spectrum information (SPI) channels. For example, we have two cases which have difference direction from BS to MN. (1) M1 model and (2) is M2 model. M1 is unidirectional however the M2 is bidirectional in between the MN and BS. The spectrum information channels are analogous to common spectrum coordinate channel (CSCC) offered, which aims at developing an unlicensed protocol for the usage of the spectrum. So that's why CAB leases were honored by the automated machine-driven protocol. Advantage of co-locating the band of CAB with existing technology of cellular band is that it can be change the radio components of the client and server network can be implemented using existing technologies as the frequency range covered over which re configurable radio needs to operate is not very large. With the passage of time the large part of wide band radio electronics and CAB network can be converted into a CAB spectrum with the dynamic access of the spectrum.[52]

Spectrum management: It is the process in which it adjusts and control the use the frequency of radio to promote an efficient gain and use of social benefit. The radio spectrum offers the full frequency range from 3 KHz to 300 GHz which are used in communication of wireless network. Spectrum management needed many changes in it so that's why the value of mobile telephones is increasing as compare to wireless. Now a days the value of wireless broadband rise very quickly to a high level due to changes in the network of communication. Like a 3G and 4G mobile services and the extensive use of wireless internet services.[53] Spectrum was

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licensed through the administrative Since 1930s. Limited by technology. The major problem in the use of the spectrum was its single interference. However the limit was set for protecting license signals. This usual practice of the different band license to join of similar facilities was given. In many other countries, "spectrum auction" that is used to speed up the innovation of technology and do better the work of spectrum in use. DIMSUMnet Architecture there are 4 possible components of cellular architecture which are following: (1) new intelligent and end user devices (2) RAN Manager (RANMAN) (3) spectrum information and management broker (SPIM) (4) Radio access management (RAN). There are three major entities are involved in spectrum lease (SPLE) in the information channel (SPIC) guidelines are between in end-user and BS devices.[43,46,47] In the simplest CAB-M1, mode of operation in DIMSUMnet. In the spectrum leasing the end user devices will not involve. Spectrum information snap shorts received from the RANMAN configure the leased spectrum at the base station, which configures its devices to offer the application service for voice and data. It will be advance in M2 mode of operation.

New methods and strategies For Wireless Networks in today's communication

1- Geographical Routing Methods:

Geographical routing means the routing principles which depend on the information from the whole world. The main purpose and idea is that the routing on the geographical locations in which source sends the message to the destination through wireless network instead of using addresses on the network. This type of routing requires that each and every node knows its own destination and also knows the source location of its destination. In this routing method a message can be sent to its destination without having information of topologies on the network.

There are different types of strategies which are used to send and receive data or messages from one location to another, e.g. the single - way, multiple-way etc. different nodes are involved in the routing strategies. The nodes contain sender and receiver information which send the messages on the way which are most suitable for local network. Also recovery methods and routing schemes are defined. If one node is not available, then another node will be available to transfer that data which in in the queue. To find the best node in the routing process geographic routing is used to find the best and successful positions used to send a message with guaranteed delivery.

2- POSITION BASED ROUTING ALGORITHMS

In the networks which are small and shortage of required useful knowledge about the destination, simple strategies are applied to get the desired information. If the message is in minimum length, then it can be delivered using the architecture of routing algorithms [PL, QVL, and SSL]. If the message has large length, then location of the destination can be searched. Destination will be sending back a report to the sender side by using the routing, which contains a short message and its position. Then sender will be able to deliver a full message to the correct and exact position of destination. But in single-way or multiple-way routing schemes having strategies which are sometimes not deliver the message due to some causes such as limited power of battery, communication will be minimized if there are a lot of routing tasks are executed. Methods have the responsibility to manage and maintain routing tables with updated and geographical network knowledge at every node in the network. Small changes in the local topologies are very sensitive if shortest solutions occur. Since local topologies should have better algorithms. And each transmission in different paths counted and message sent to all its locations with a single transmission.

3- Search Based Routing with Guaranteed Delivery

Search based routing have algorithms which are independent to send and receive data/messages. These algorithms do not use the routing tables. Messages are sent to its exact destination by using the search strategy. Source first search the address of its destination and directly send to that place instead of following the rules which send the message to all the nodes in the network. It is necessary to ensure the guaranteed delivery of messages from source to destination. It will be searched that which path is closer from source to destination. Then decide on which routing protocol message will send and remember it is a better path for this message.

4- Routing with Guaranteed Delivery

It is the routing architecture graph in which nodes maintain some information about the local data to perform routine procedure. If routing traffic generated, then mobility will be increased. To ensure guaranteed delivery of messages, algorithm plans and sub-graphs will be constructed and then applies all of these rules along routing protocols between the source and destination. Efficiency of algorithms will be improved in the sense of performance. The situations such as building, bad weather will disrupt the message transmission. Solve all problems occur and provide guaranteed delivery of data.

5- Energy and Price aware Routing

This is used to make the analysis about the battery consumption requirement in a routing process. Nodes manage the power used in a task. If the number of battery consuming devices in the network is increased simultaneously, then the life of batteries is not expected better in future. We need the betterment in power consumption of routing algorithms.

4. Network virtualization: research challenges

Network virtualization (NV)

NV is an arrangement of merging available resources in a network by splitting up the available transmission rate into the channels; each is independent from the others.

1. Business model

Virtualizing Networks Functions (VNS) can help mobile-virtual-network-operators (MVNO) and communication service-providers get to market "faster at lower cost". We can look at a second wave of virtualization in the mobile world and how it is changing business models. If it can be virtualized, then someone else can and probably could host it. It sums up the strategy mobile operators, communication service providers and other businesses

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increasingly are applying for infrastructure such as Radio Access Networks (RAN).

This strategy fundamentally changing the competitive landscape. One example is by enabling businesses like content creators and search advertising companies to enter the market faster than before. Hats more,

They have lower overhead, less risk, then if they had to buy and maintain network infrastructure themselves. Consider Google recent foray into the mobile business becoming a mobile virtual network operator (MVNO) doesn't cost Google a lot, it helps the company; provide a full portfolio of service to control customer's experiences end to end. This could spell trouble for infrastructure providers.

Network virtualization today goes beyond the well-established MVNO model. Now the establish infrastructures are themselves looking for someone else to own and run parts of their network. They see this network virtualization as a way of providing services to OTT players like Google and Facebook.[56-58]

2. Historical Background

LAN

This Network is originally defined as a network of computers within the same area. It was an early system developed. The disadvantage is that, processing of incoming data takes much time by routers compared to bridge or switch. On LAN information contained by broadcast domain is usually dependent on physical devices in the network

VPN

VPN enhance private network. It allows a public network as internet Facebook, Google. VPN provides users with the facility of transmitting data packets across a public network when computers connect to the network. Benefits from VPN are the functionality, management and security policies of the VPN.

3. Types of VPN (Layers)

VPN 1

The VPN 1 router creates a VPN tunnel over the internet and assists in creating and building a Radio over IP Communication networks with easy configuration system. Companies would have to handle the system themselves for their customers and output. They like to use.

VPN 2

Its technology is limited. Layer 2 WAN, MPLS technologies is MPLS based Virtual Private LAN Services (VPLS). Businesses have to control the network system themselves, customer note. Choose VPN 2 network like same layer or ATM having simple architecture that allow customers to take control of their own routing tables.

VPN 3

Layer 3 VPN is a fully meshed architecture that enables multi-cast conferencing involving a dispersed work group. Outsourcing is considered as its weakness that's why companies don't want to prefer it.

VPN 4

VPN that is used along with a quality web browser. Layer 4 VPN never need to install the client software to the end user. It provides clients with entry to web applications and internet connection.

4. Active Programmable Networks

Active programmable network it is a communication algorithm that allows data flowing through the network to actively alter the network operations. Dynamic networking provides the highly tailored and instant "real-time" modifications to the underlying operation of the network. [56,59,60]

5. Over Lay Network

An overlay network is a network that runs independently on top of another one, although supported by its infrastructure.

Examples

Cloud provider networks, P2P, VPN's, (CDNs) Content delivery networks, experimental networks, (VOIP) Voice over services

Such as "Skype".

Introduction of Overlay network (OLN)

Now a day's internet is changing each facet of communication in society with a vast frame of applications in different fields like top businesses, e-commerce, games, music information, and social media.

New web browsing is capable of high definitive, production, safety to be developed efficiently and simultaneously at the **lowest cost.**

However, the internet is a multi-network that create many sets of objects for interaction. The basic purpose of overlay network is in old age ideas of computing virtualization. Overlay network gives full performance of applications that are available at the top.

6. Types of Overlay Networks

1) The Ubiquitous Caching overlay network

It provides data packets of the web if demanded movies, music files to be downloaded and many other software and live streaming. The key benefit is that it is provided with high level services.

P*erformance Benefits of Caching of Overlay*

It is used to cache the static objects like movie files, a music video files and virus intimation. Performance benefit can be defined as performing testing platform" by the users to their desktops all over the world. It provides periodic and instant downloading of websites and also reports best performing results for every download material.

Offload Benefits

It describes the management of data traffic serving by the origin and measuring the ratio of huge volumes of data packets by overlay network. When data traffic is huge just like the popular internet entities the offloads of the origin are from minimum 10 to maximum 100.

Dealing with popular and Unpopular Content

Now a day's social media having end user created content like static objects (pic and movies) which is called unpopular and cold content on the internet is replaced. On the other side the famous and popular content is dealt with making several copies to the users worldwide.

2) Routing Overlay networks

The routing over lay network is composed of a large area telecommunication which is more reliable less in active and having higher throughput than the existing Internet services.

Architecture of routing overlays

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The live streaming content on the internet are dynamically cacheable in the real time, or could be routed in the real time. The reason behind is the caching of live content is not possible, that's why the routing overlay architecture enhance the performance activity by using the best routing overlay path by origin for the user.

3) Architecture of Security Overlays

Internet services are created to defend it, but different attacks of hackers trying to steal the important user information and details from the internet. The best thing about it the security is automatically be provided by the internet platform used by the user. Whether it is very costly to provide security to the users, but maintaining access capacity and security expertise within an internet platform is more cost effective.

7. Overlay Networks Architecture

The overlays are capable to provide all types of user required services by content providers included information social media, e-commerce many types of download structures internet and web portals and e-transactions of many companies with authentication as well. All types of web services are accessible through many devices like cell phones, tablets, desktops and palmtops by the users. Internet services used by the users worldwide are provided by edge servers on the overlay network through which they interact directly throughout the globe. These edge servers are capable to provide low rate of latency less packet loss and higher transmission rate which result in better performance quality.

8. Benefits of Overlays Networks

1) Shared Spare Capacity Control

Overlay network is composed of huge amount of servers having high speed and capacity of operating model which is capable of diverting any type of data traffic to different servers, which results as an increased transmission rate. [65]

2) Benefit of Lower Cost

The security experts of the overlay network are keenly providing highest security for all types of (small and large) internet services due to the shared reasons of the e-services the transmission cost could be affordable and lower than before.

3) New Security abilities

Overlay networks offered to detect and defense the whole spectrum of hackers attack at the network layer. All the overlay network servers are designed for real all types of low level hacker attack. By using an internet web application firewall the overlay network becomes capable to counter the hacker attack and filter the dangerous and dreadful data exchange. [69]

4) Protections of the origin (Servers)

Overlay networks are enough stronger to protect origin server from the hacker attack through as to receive only such data traffic that comes from the overlay server having specified IP addresses. Overlay origin servers are capable of blocking, searching and deleting the harmful information coming from the insecure networks. Authentication of the origin overlay server is also a strong feature for hacker attackers. [1]

5. CONCLUSION

In this paper, we argued a case for coordinated, real-time dynamic spectrum access, uncoordinated methods common in ad-hoc military applications. We introduced the concepts of Coordinated Access Band (CAB) and Statistically Multiplexed Access to spectrum. We described the DIMSUMnet architecture that implements these concepts for cellular networks using a centralized regional spectrum broker. We elaborated on new control plane technologies. We also presented the DIMSUM-Relay Cluster for fixed wireless infrastructure. The methods with best and guaranteed delivery of messages search. Energy and cost problems solved and network schemes are defined to develop and maintain the successful transmission of messages in a wireless network environment.

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STOJMENOVIC AND LIN: LOOP-FREE HYBRID SINGLE-PATH/FLOODING ROUTING ALGORITHMS WITH GUARANTEED DELIVERY FOR... 1031 Fig. 9. Diagram 4: Full message count for 100 nodes.

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