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MULTICHAIN ROUTING PROTOCOL IN 5G NETWORK

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ABSTRACT:

In this paper, the concept o 2-Layer routing for wireless 5G networks is presented. New fifth generations of the network along with the platform known as the Internet of Things (IoT) are an upcoming trend not only in the commercial market but also in the research area. The 5G networks and IoT will be part of smart homes, smart cities and every aspect of our lives. They are considered as a promising technology that interconnects different types of existing networks into one functional network. In this paper, a brief vision of utilization and areas of deployment of 2-Layered network model consisted of Wireless Sensor Network (WSN) and Mobile Ad-Hoc Network (MANET) is described along with communication technologies and protocols needed for the functionality of2-Layered model. Presented simulations prove that interconnection of MANET network with WSN network provides faster data delivery and higher data rates than traditional WSN network since MANET nodes are able to carry data load from WSN sensors. Therefore, utilization of presented2-Layered model will be useful in disaster scenarios or data harvesting, when urgent data needs to be delivered quickly.

Keywords—Cognitive Radio, MANET,IOT, FlyingAd-Hoc/ Networks, Concept, 2-Layer network.

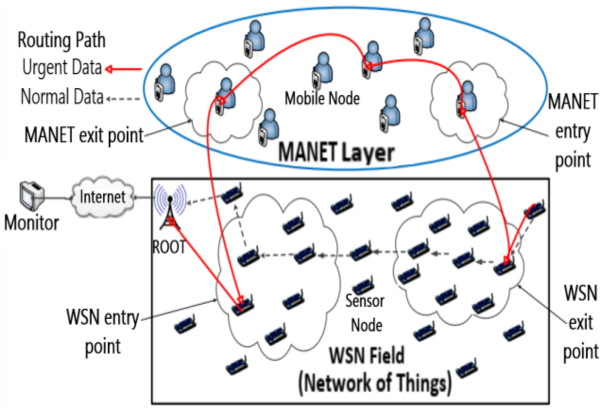
INTRODUCTION:

The world is slowly preparing for an upcoming newgeneration of 5G networks. This also includes a newcommunication platform known as the Internet of Things (IoT). The main aim of IoT is to make the Internet moreand more comprehensive, smart and pervasive. The 5Gand IoT are considered a promising technology that interconnects different types of networks. The wide variety ofhetero geneous devices will operate in this new generation of the networks under different types of applications .Devices like smart phones, PC, sensors, RFID and different network-enabled devices will collaborate in several domains like smart homes, industrial automation, mobile health care, and smart cities. In order to create such acomplex networking system, different types of networks, such as Cellular Networks, Mobile Ad-Hoc Networks(MANET), Wireless Sensor Network (WSN), Vehicular Social Networks (VSN), and Flying Networks (FlyNET)will collaborate in different hierarchies and will createone functional network. This convergence environment with heterogeneous devices enables new Device-to-Device(D2D) communication introduced with 5G that is alsopart of IoT environment. This also helps to overcome the limitation of traditional MANET or WSN networks andhelps to increase data transfer rate, reduce latency and energy efficiency. Another area of new generation networks, where convergence and connection of different types of networks areneeded are disaster scenarios [2]. Various types of disasterscan occur, such as the earthquake, tsunami, volcano, floodsor hurricane. To prevent those scenarios, many effortsare underway to recognize and forecast the occurrence of natural disasters. It is very important to react quickly and therefore, the convergence of WSN, MANET or Fly NET could help to achieve this goal. This multilayered network can be also useful when all existing fixed infrastructure is destroyed. The rescue team can response and operatevery effectively because of easy and fast deploy ment, self-organizing and autonomous properties of mentioned networks. In general, a new generation of networks is an ambitious project that also brings a lot of different problems. All mentioned networks work under different types of technology and network protocols. Therefore, it is very important to specify, how those different networks willcollaborate and how network protocols need to be changedto allow effective and fast communication. Another problemarises in the area of data harvesting. A lot of sensorsand network-enabled devices will operate in environments like smart cities, smart homes, and mobile health care. Amount of collected data will be huge and besides thehigh bandwidth, throughput and other network quality parameters (QoS), it is very important to handle those data effectively. Therefore, in this paper, various ways to interconnect different types of networks into one functional multilayered network that could be deployed in different areas will be presented. The analysis of problems that arise fromsuch interconnection will be also discussed. Simulation and results of the multi-layer network will be leveraged atthe end of the paper.

Mobile and wireless networks have made remarkable development in the last few years. At the present time many mobile phones have also a WLAN adapter. One may expect that near soon many mobile phones will have Wax adapter too, besides their 3G, 2G, WLAN, Bluetooth etc. adapters. We are using IP for generations, 2.5G or 3G Public Land Mobile Networks (PLMN) on one side and WLAN on the other, raised study on their integration. Concerning the 4G, its focus is towards flawless incorporation of cellular networks such as GSM and 3G. Multi mode consumer terminals are seen as must have for 4G, but special security mechanisms and special operating system support in special wireless technologies remain a test. Nevertheless, integration among different wireless networks (e.g. PLMN and WLAN) is implemented in practice even nowadays. Although, different wireless networks from a sole terminal are used absolutely, that is, there is no combining of different wireless access technologies for a same session (e.g., FTP download). The anticipated Open Wireless Architecture (OWA) in is targeted to offer open baseband processing modules with open interface parameters. The OWA is related to MAC/PHY layers of future (4G) mobiles.[3] The5G terminals will have software defined radios and modulation scheme and new error-control schemes can be downloaded from the Internet The enhancement is seentowards the consumer terminals as a focus on the 5G mobile networks. The 5G mobile terminals will have access to different wireless technologies at the same time. The 5G mobile terminal should be capable to merge special flows from different technologies. The network will be dependable for managing user-mobility. The 5G terminal will make the ultimate selection among different mobile access network providers for a specified service. The paper gives the concept of **intelligent Internet [13] phone where the mobile can prefer the finest connections.**

EXISTING SYSTEM :

The latest works show collaboration of different networks in different areas of deployment. The main aim of networks interconnection is to use advantages that those networks offer and overcome their disadvantages. In [3] the authors combine WSN and MANET as an IoT-based scenario. This combination allows great mobility and flexibility for users and reduces the cost of network deployment. WSN network consists of a huge number of low-cost and easy-deployable sensors. The MANET network consists of wireless devices that are carried mainly by humans. WSN creates a smart interactive environment, but most of the nodes are fixed and operates with low energy resources and low data rates. On the other hand, MANET nodes are mobile with higher processing capabilities, higher data rates, and energy reserves. To send urgent data via WSN itself may take a long time due to low data rates. Instead of routing data through WSN, it is possible to use a gateway to the MANET, where urgent data can be transported faster. Other works such as [4], [5] combine WSN, ad-hoc networks with unmanned aerial vehicles (UAVs) in disasterapplication areas. WSN sensors are responsible for monitoring and collecting of data, whereas UAVs can play a role by assuming the load of data delivery fromthe resource-constrained sensors. Some works such as [6], [7] also combine VSN, Ad-Hoc networks, and WSN networks into IoT scenarios. The main aim of these worksis to develop Intelligent Transportation Systems (ITS) that provides car collision avoidance, more secure streets, andthe blockage management.



PROPOSED SYSTEM :

The proposed 2-Layer Routing Concept is the interconnection of MANET and WSN network. The first layer consists of low energy wireless sensors. Those sensors could be deployed in different areas such as smart cities to measure important electrical or non-electrical quantities. Sensors are connected into the WSN network, where they operate in an ad-hoc manner. Since sensor nodes in WSN require low-energy consumption and there are alsoexisting resource constraints, they are using IEEE 802.15.4 based link layer, also known as Zig Bee. Therefore, sensors are able to communicate over distances up to about 10 meters and with maximum transfer data rates of 250 Kbps. Newest embedded devices are able to communicate with lower transfer rates of 20 and 40 Kbit/s, with the 100 Kbit/s rate being added in the current revision [8]. TheIPv6 is selected in the network layer as suitable protocol for the gateway sensor. The second layer consists of MANET nodes. Devices used for this scenario could be smart phones, laptops, PDAs and other similar smart devices. The advantages of MANET nodes over WSN sensor nodes are higher data rates about 72,2 to 150 Mbps, significantly lower resource constraints and also the mobility of nodes.

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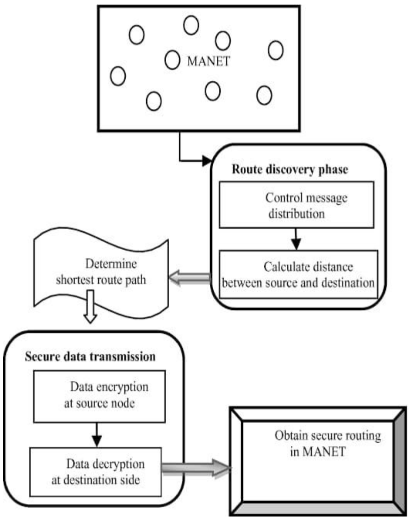
BLOCK DIAGRAM:



CONCLUSION AND FUTURE WORK :

In this paper, the concept of the 2-Layered network is introduced. Proposed concept consists of a WSN network and MANET network, which can be used in different IoT and 5G scenarios, as well as in various disaster scenarios. Simulations of such networks interconnection prove that proposed 2-Layered WSN-MANET network model can decrease delivery of urgent data dramatically and also increase data rates on the source path. The connection of the MANET network with WSN network allows WSN sensors node to re-route data load from WSN network to MANET nodes, which are not strictly resource-constrained as WSN nodes. MANET nodes are able to communicate with higher data rates and operate with longer radio range. Redirection of data load to MANET layer could also save energy of resource-constrained WSN sensors need for data delivery process. This corresponds with the 5G network demands of higher data transfer rate, reduced latency, and energy efficiency. In future research, we will focus on the energy aspect of the model in order to evaluate energy consumption differences. A second important step in the future research will be the implementation of the model in the real world with existing WSN sensors and MANET nodes.

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