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# SOFTWARE DEFINED NETWORK ARCHITECTURE FOR TRAFFIC MANAGEMENT AND VEHICLE TRACKING USING IOT

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## ABSTRACT

Rapid increase in number and diversity of Internet-connected devices raises many challenges for the traditional network architecture, which is not designed to support a high level of scalability, real-time data delivery and mobility. To address these issues, in this paper we present a new model of Internet of Things architecture which combines benefits of two emerging technologies: software-defined networking. Software- defined networking implies a logically centralized network control plane, which allows implementation of sophisticated mechanisms for traffic control and vehicle Tracking. On the other hand, IOT computing enables some data to be analyzed and managed at the network edge, thus providing support for applications that require very low and predictable latency. In the project, we give detailed insight into the system structure and functionality of its main components. We also discuss the benefits of the proposed architecture and its potential services.

## 1. INTRODUCION

` The OpenFlow protocol indirectly helps administrators to move network control out of proprietary network switches. Applications interact with the controller with the help of northbound APIs. In the same way, all the instructions from controller to network devices are routed through the southbound APIs.

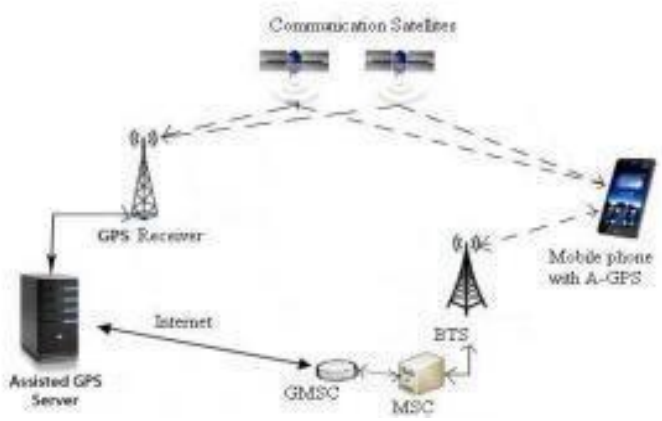


**Fig.1.Traffic Detection System**

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Furthermore, southbound APIs provide a layer of abstraction, making network device type‟s indifferent for the controller and applications. A novel vision on tasks and resources in IoT environments, and how to bridge the gap between abstract high level tasks and specific low level network/device resources, is illustrated. The Network Calculus model is modified to accurately evaluate the end-to-end flow performance in IoT Multinetworks, which is further serving as essentials of a novel multi-constraints flow scheduling algorithm under heterogeneous traffic pattern and network links. The semantic modeling approach performs resource matching and the GA-based algorithm schedules flows. Those techniques can be viewed as plugins and can be adjusted or replaced in different IoT scenarios. Vehicular traffic management is a major area of concern for town planners. The efforts by traffic managers and town planners to overcome traffic congestion are not achieving result as more and more vehicles are added to the road network day by day which exceeds the intended physical capacity of the road space. To tide over the traffic congestion and to ensure better traffic management, timely availability of dynamic traffic information with traffic managers are essential to regulate the traffic and divert the traffic to alternate routes.

The usage of the Internet and Computers are increasing alarmingly in recent times. This has obviously led to the increase in numbers of network devices and subsequently has increased the capacity, cost, software/hardware requirements and various other requirements. Today's traditional Network infrastructure and protocols face a huge burden of handling the alarming increase in the number of network elements. The current technology involves deployment of a network administrator who has supervisory rights over the network to manage them. This technique has various drawbacks like Complexity, Inconsistent policies, Inability to scale and Vendor dependence. These drawbacks could be overcome using a new technology called Software Defined Networking. This technique involves deployment of all the above mentioned traditional techniques into software that manages everything in a network. SDN is a step in the evolution towards programmable and active networking. SDN allows network administrators to have programmable central control of network traffic via a controller without requiring physical access to the network switches. A set of open commands for forwarding was defined in the form of a protocol known as OpenFlow.

## 2. PROPOSED SYSTEM

Thousands of automobiles are lost each year in the state and thousands of automobiles are also recovered by the Police from when they catch the culprits or even when the culprits leave the vehicles they have stolen after they have used them. The usual problem with the recovered vehicles reaching the actual owners is that the vehicle need not be found in the same jurisdiction as one in which the complaint was launched. So, when a vehicle is recovered, usually the Police try to trace out the actual owner of the vehicle from the RTO based on the license and chassis number. But this is a lengthy and time consuming process for the RTO to trace out the actual owners from the records and inform back to the Police stations. Because of these delays, vehicles that are recovered all long time to actually reach their owners. Despite the various technologies that have been introduced in recent years. This project we are implementing to understand the traffic density and to identify vehicle through wireless tracking, will have IR sensor to count the number of vehicle passing through the highway, every time a vehicle come across sensor the count will be incremented and this count will be available on the cloud interfaced through IOT. Also using this project will track the vehicle, each vehicle attached with RF card when it pass through control unit will read the card and identifies the particular vehicle and data send to cloud in IOT architecture. There are several sources providing traffic information to

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commuters through FM stations, GPS assisted systems. However these are not covering the entire segment of population as these systems have not become mass based. Several other devices and systems such as traffic sensors, inductive loop, magnetometer, infrared devices, acoustic, ultrasonic, visual camera, radar and laser systems. As these sensors are highly sensitive to environment such as weather changes like rain, fog etc, they are less effective and error prone, costly and needs regular maintenance. None of the methods mentioned above has proved its effectiveness on a long termbasis.

## 3. RELATED WORK

Software-defined networking (SDN) is a new emerging technology for networking in which control is Decoupled a hardware and given to software part called a controller[1]. When a packet arrives at a switch in a foreseeable network rule built into the switch patented firmware tell the switch where to forward the packet. The switch sends every packet going to the same destination along the same path and treats all the packets the exact same way. In the campus network, smart switches designed with application-specific integrated circuits (ASICs) are Refined enough to recognize different types of packets and treat them differently, but such switches can be quite expensive. The aim of SDN is to allow network administrators respond quickly to changing to the requirements. In a software- defined network, a network administrator can shape traffic from a centralized control software without having to touch individual switch. The administrator can change any network switch rules when necessary ordering, de-ordering or even blocking specific types of packets with a very level gritty of control. This is especially helpful in a cloud computing multi-tenant architecture because it allows the administrator to manage traffic loads in a flexible and more efficient manner. Essentially, this allows the administrator to use less expensive, commodity switches and have more control over network traffic flow than ever before. Currently, the most popular specification for creating a software- defined network is an open standard called Open Flow. Open Flow lets network administrators remotely control routing tables. We exploit the fact that most modern Ethernet switches and routers contain flow-tables that run at line-rate to implement firewalls, NAT, QoS, and to collect statistics. [5] While each vendor's flow-table is different, we've identified an interesting common set of functions that run in many switches and routers. OpenFlow exploits this common set of functions. OpenFlow provides an open protocol to program the flow table in different switches and routers. A network administrator can partition traffic into production and research fellows. Researchers can control their own flows by choosing the routes their packets follow and the processing they receive. In this way, researchers can try new routing protocols, security models, addressing schemes, and even alternatives to IP. On the same network, the production traffic is isolated and processed in the same way as today. The data path of an OpenFlow Switch consists of a Flow Table, and an action associated with each flow entry. The set of actions supported by an OpenFlow Switch is extensible, but below we describe a minimum requirement for all switches. For high-performance and low- cost the data-path must have a carefully prescribed degree of flexibility. This means forgoing the ability to specify arbitrary handling of each packet and seeking a more limited, but still useful, a range of actions. coverage in a larger area. Hence, they are used for vehicle tracking particularly for vehicle counts and speed measurements. The disadvantage of this method is that to cover a longer road segment, large no. of cameras are required and hence suitable for junction monitoring. In this method [6] signal transmitted from the MS to the BTS is measured at the BTS.

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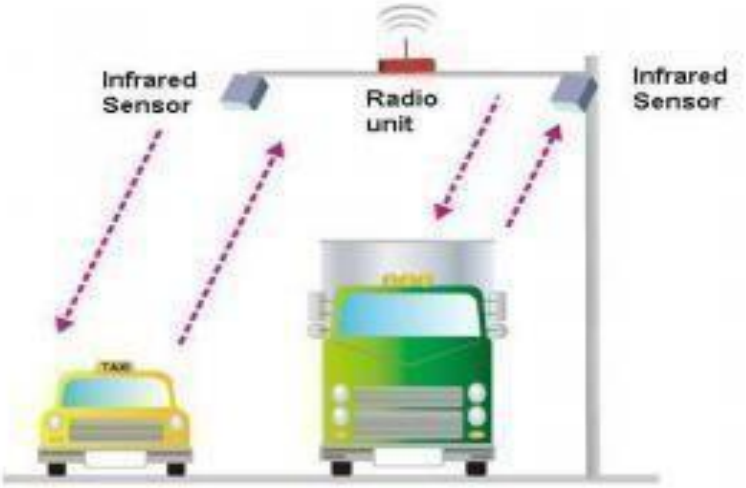


**Fig.2. Vehicle detection**

Alternatively, the signal can be initiated by the BS and the round-trip time is measured at the BTS. The distance of the MS from a BTS is related to half the round-trip time and the location of the MS is found by the intersection of three circles of appropriate radius.

## 4. NETWORK PROBLEMS

The factual not just during periods of economic downturn, but has become the norm as service level agreement are applied to both enterprise and SP networks. Network management system technology provides the network operator with some increasingly useful capabilities.

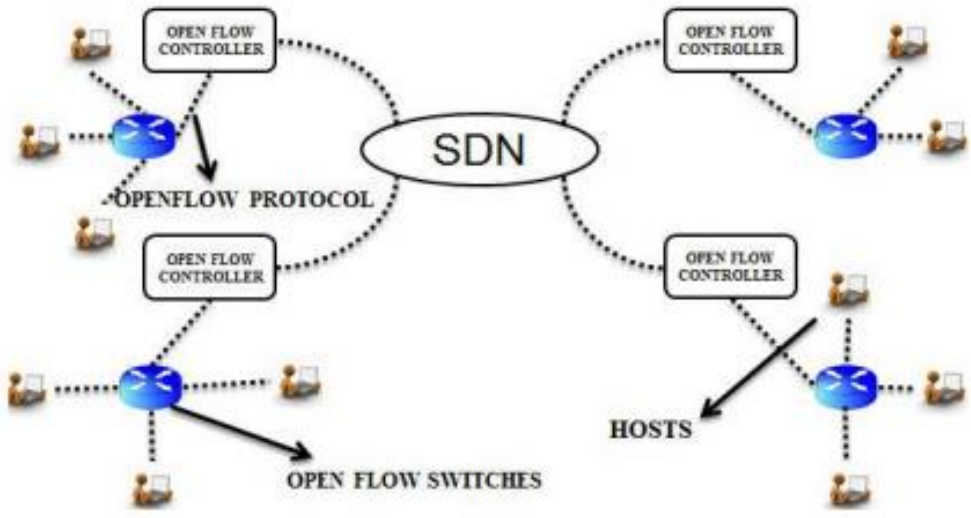


**Fig.3. SDN Design architecture**

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Unique way from error-prone, tedious, physically intensive operations to software assisted automated end to end operations.The network operators needed to execute automated end to end management operations taking place their networks. An sample of this is Virtual local area ne management in which an NMS GUI provides a visual picture such as a cloud of MAC addresses, VLAN members ports, VLAN IDs. The network management system can also provide the ability to easily delete, modify and add virtual local area network members as well as indicate any faults as and when they happen. An additional example is enterprise WAN management in which ATM or FR virtual circuits are used to carry the traffic from branch offices into central sites. In this situation the enterprise network manager wants to be able to easily create, delete, modify, and view any faults on the virtual circuit to the remote places. Supplementary examples include storage including SANs management and video/audio conferencing equipment management.

## 5. RESULT ANALYSIS

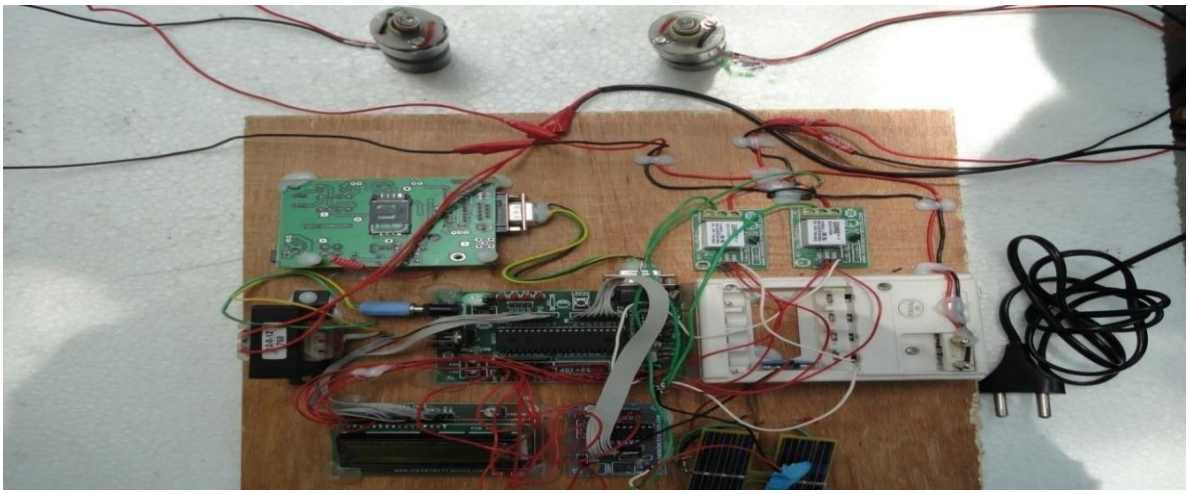

**Fig.3.Hardware Kit**

Any mobile station can freely use this service with a GPS receiver which calculates its position by precisely timing the signals sent by GPS. The position can be calculated if the position of each satellite and the distance from the satellite (pseudo range) is known. For accurate results four or more satellites must be visible among the 24 satellites in 4 orbital planes as shown in figure 1. Genetic Algorithm (GA) is stimulated by the theory of natural evolution and its principles. It is one of the directed random search techniques, employed to find a near optimal solution for many larger problems in complex multi-dimensional search spaces. The advantage of this type of end to end competence is a large discount in the cost of managing enterprise networks by SLA fulfillment less need for arcane NE know how smooth enterprise business processes and happy end users. Exposed purveyor independent NMS are needed for this and later we look at ways in which software layering helps in designing and building such systems. Humble ideas such as always using default MIB values pragmatic database design and technology sensitive menus also play an important part in providing NMS vendor independence.

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The problems presenting menu options appropriate to a given selected NE provides abstraction for example if the user wants to add a given NE interface to an IEEE 802.1Q VLAN then that device must support this frame tagging technology. The Network management system should be able to figure this out and present the option only if the underlying hardware supports it. Through awarding only appropriate options the NMS reduces the amount of data the user must sift through to actually execute network management actions.

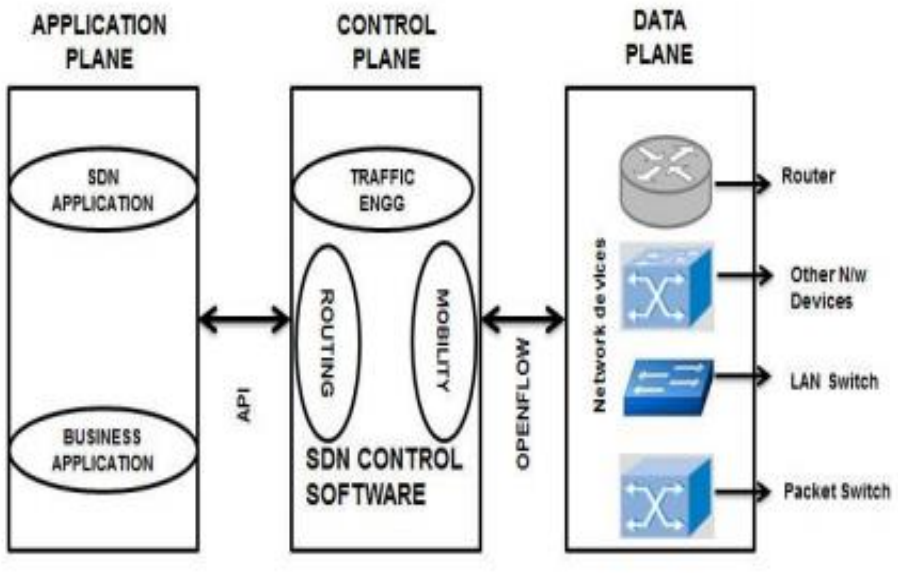


**Fig.4. Output Structure**

Software-defined networking (SDN) is a new emerging technology for networking in which control is Decoupled a hardware and given to software part called a controller[1]. When a packet arrives at a switch in a foreseeable network rule built into the switch patented firmware tell the switch where to forward the packet. The switch sends every packet going to the same destination along the same path and treats all the packets the exact same way. In the campus network, smart switches designed with application-specific integrated circuits (ASICs) are Refined enough to recognize different types of packets and treat them differently, but such switches can be quite expensive. The aim of SDN is to allow network administrators respond quickly to changing to the requirements. In a software- defined network, a network administrator can shape traffic from a centralized control software without having to touch individual switch. The administrator can change any network switch rules when necessary ordering, de-ordering or even blocking specific types of packets with a very level gritty of control. This is especially helpful in a cloud computing multi-tenant architecture because it allows the administrator to manage traffic loads in a flexible and more efficient manner. Essentially, this allows the administrator to use less expensive, commodity switches and have more control over network traffic flow than ever before. Currently, the most popular specification for creating a software- defined network is an open standard called Open Flow. Open Flow lets network administrators remotely control routing tables.

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There is a centralized SDN block which is a software governed protocol that manages the entire network. It is connected to the OpenFlow Controller which in turn are connected to other OpenFlow switches, routers and other networking components. It uses a unique protocol known as "Open Flow Protocol" that controls and manipulates the entire network. The open flow controller controls the open flow switches. These switches monitor the networks performance and sends periodical reports to the Network Administrator as per his preference. In case of any network failures or node failures in the network this Open Flow Controller will trigger an alert message to the network administrator. It also has the self healing process but if the issue goes beyond the scope of the Open Flow Control protocol then an alert message is triggered to the administrator. This whole process can be manipulated by the Network administrator according to the environment of the network or according to the outcome required. This structure is applicable from a small home network to a complex commercial network.

## CONCLUSION

We have proposed the architecture for IOT, which relies on two emerging technologies: SDN and Fog computing. The proposed architecture is designed in the way to support a high level of scalability, real- time data delivery and mobility. Fog computing platform is considered as the appropriate platform for IOT due to its capability to resolve problems related to latency for services that require fast analysis and decision – making.On the other hand, SDN introduces logically centralized control plane, which allows the implementation of sophisticated mechanisms for traffic control and resource management.

## FUTURE DEVELOPMENT

That is hard to achieve with distributed control panel in traditional network architectures, since a global view of the network state is lacking. Another challenge is low latency handling of time-critical task such as analysis and decision-making.

## REFERENCES

1. Bonomi, F., Milito, R., Natarajan, P., & Zhu, J. (2014). Fog computing: A platformfor Internet of things and analytics. Big data and internet of things: A roadmap for smart environments. Springer International Publishing, 546, 169–186.
2. Yi, S., Li, C., & Li, Q. (2015). A survey of fog computing: Concepts, applications and issues. In Workshop on Mobile Big Data (pp. 37–42). Software-Defined Fog Network Architecture for IoT 123
3. Open Networking Foundation. Software defined networking: the new norm for networks. Web white Paper. Accessed 15 Feb 2016. https://www.opennetworking.org/images/stories/downloads/sdnresources/white-papers/wp- sdn- newnorm.pdf
4. Stojmenovic, I., & Sheng, W. (2014). The fog computing paradigm: Scenarios and security issues. In Federated Conference on Computer Science and Information Systems (FedCSIS) (pp.1–8).
5. Cisco. The Internet of Things: How the next evolution of the internet is changingeverything. Web white paper. Accessed 25 Feb 2016. https://www.cisco.com/c/dam/en_us/about/ac79/docs/innov/IoT_IBSG_0411FINAL.pdf
6. Controlling an SDN Via Disturbed Controller, by Europen Commission Number PIRG06-GA-2009-256326, Volkan yazici, Ozyegin University.

INTERNATIONAL RESEARCH JOURNAL IN ADVANCED ENGINEERING AND TECHNOLOGY (IRJAET) E - ISSN: 2454-4752 P - ISSN : 2454-4744
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7. Improving Network Management With Software Defined Networking, by Hyojoon Kim and nick feamster, 0163- 6804/13/ IEEE Communication magazine 2013.
8. Software Defined Networking Overview And Implementation, by Manal Algarni, Vinayak Nair, David Martin. George Mason University IFS 2013.
9. OpenFlow enabling innovation in campus networks, by Tom Anderso University of Washington, hari Balakrishnan MIT, Larry Peterson Princeton university,march 2008 Openflow switch.org.