



WIRELESS NETWORK MANAGED THROUGH SDN

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Abstract- *This paper presents in the area of software defined networking how software-defined networks could reduce cost, and improve competence to provide significant business value to wireless network. The software defined networking (SDN) exemplar undertakings to simplify network configuration and reserve management theatrically. Such topographies are extremely valuable to network operators and therefore, the industrial and the academic research and development communities are paying increasing attention to SDN. Even though manufactures of wireless equipment are increasing their involvement in SDN interconnected deeds to date there is not a clear and comprehensive understanding of what are the opportunities offered by SDN in most common networking scenarios involving infrastructure less wireless communications and how SDN concepts should be adapted to suit the characteristics of these networking environments. In statistic it aims at scrutinizing how SDN can be of assistance in structure less wireless networking environments, and how it should be lengthened to take the physical characteristics of such networking environments into account. Also, a complete SDN solution for wireless personal area networks named Software Defined Wireless Network is presented and some design courses of action are delivered in this paper.*

Keywords: *software defined networking; open flow switch; open flow protocol; NAT; NOS*

I INTRODUCTION

SDN is intended as a way to reduce the complexity of network configuration and management while making the introduction of innovation in networks simpler [12]. 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. The OpenFlow protocol enables globally-aware software controllers. It is a prototype where a central software program called a controller, prescribes the overall network behavior. In software defined networking network devices become simple packet accelerating devices (data plane) but the “common sense ” or control logic is implemented in the controller (control plane). This exemplar shift brings several benefits compared to legacy methods. First it is much easier to introduce new ideas in the network through a software program, as it is easier to change and manipulate than using a fixed set of commands in patented network devices. Second, SDN introduces the benefits of a centralized approach to network configuration, opposed to distributed management: operators do not have to configure all network devices individually to make changes in network behavior, but instead make network wide traffic forwarding decisions in a logically single location, the controller, with global knowledge of the network state. In this the network operators envision the possibility to:

- It acquaint with resolvability in their networks, which in their perspective means to be able to differentiate their offer when compared to other operators, and
- It improve network efficiency given that new, more well organized technical solutions can be easily deployed in their infrastructure using equipment that is already in place.

Therefore SDN design and experimentation is the subject of the increasing attention of the industrial and academic research communities deployment of large SDN test beds such as the one realized by the OFELIA consortium and the institution of large industry driven organizations focused on SDN such as the Open Networking Foundation witness such increasing interest. The SDN has interested the wireless networking community. In fact an increasing number of enterprises working in the field of wireless and mobile communications have joined SDN related initiatives. On behalf of example, Nokia Siemens Networks, Ericsson, and Net gear are current members of ONF. However regardless of such increasing interest, to the best of our knowledge there is not a clear and Compressive understanding of what are the advantages of SDN in relevant set-up less wireless networking scenarios and in what way the SDN concept should be expanded to suit the characteristics of wireless and mobile communications. This paper represents an attempt to achieve such understanding in case on based low rate wireless personal area networks [16]. In fact, major contributions of this work are the subsequent:

- We analyze the advantages of the SDN approach in LR-WPANs
- We identify the major differences between the system requirements that should be taken into account in traditional wired networks and LR-WPANs
- We present the solution we are developing to support the SDN approach in LR-WPANs. Our Solution is called Software Defined Wireless Network and is being prototyped.

II PROSPECTS OF WNMSDN

Lease any false hope (which might have been turned on in the fantasy of wireless networking scientists approaching SDN for the first time) be immediately removed from the table by saying that here is nothing you can do with SDN which cannot be done without to be sure it has been extensively discussed and stressed that SDN is not about performance improvements. On the contrary, it might even be that overall efficiency in the use of network resource decreases given that higher levels of abstraction are introduced. Rather, SDN is about simplification and resolvability. Novel network

control and management solutions can be easily deployed on existing equipment ideally as simply as it is to install new programs on a computer. Accordingly,

- **The** condition new and more well-organized control and management solutions become available, these can simply be installed to replace the old ones;
- **The** condition the framework in which the network operates changes and consequently the requirements change, then other control and management solutions can be deployed that are more effective for the new conditions.

By way of significance higher efficiency of network equipment can be achieved on the long term. However, again, the same efficiency could be achieved by replacing the old network equipment with new one implementing the desired new functionalities or, if supported by the equipment, by deploying the new solutions in each relevant piece of the network that above claims are valid for any networking environment and therefore for wireless infrastructure less networks, such as the wireless personal area networks (WPANs), as well. However, in wireless infrastructure-less networking environments the separation of the network control and management functionality from the forwarding operations (as envisioned in SDNs) offers further possibilities. In fact, while there is almost total consensus about the technical solutions that should be used at the first two layers of the protocol stack at higher layers and in the management plan several candidates are available and ad hoc networks deployed for different scenarios are likely to use different alternatives.

Popular SDN network management operations are centralized {at least in the earliest implementations {and physically separated from the forwarding operations. SDN there are network nodes SDN switches that are responsible for classifying packets in different rows and performing the corresponding actions. Row could be composed by all packets belonging to a certain TCP connection or by all packets characterized by a particular VLAN tag and/or a certain MAC source address and/or a given IP destination address [8]. As a result packet classification is performed on the basis of certain rules. SDN switches can be distinguished from other nodes (the Controllers) that are responsible for setting the rules and corresponding actions. A network node that has no information available to classify an incoming packet, [9], requests the assistance from one of the Controllers which should provide an appropriate rule/action pair. Annotation that the policies applied by the Controller to set the rule/action pair which in the end defines the entire network behavior) can be easily and rapidly modified by installing new Controller software. As it is evident from the above discussion, further advantage of SDN is that it "enforces" a central approach to network control. The raises crucial problems about which network element should run network control operations but makes network optimization easier {as all relevant information is made available to the Controller which has a complete vision of network state. In lieu of all the above reasons we believe that the extension of the SDN paradigm to wireless infrastructure less networks, which we call WNMSDN, can have significant advantages in such networking environments.

III REQUIREMENTS OF WNMSDN

Executions of SDN solutions for traditional wired networks have usually considered velocity as the main performance measure. To be sure it is necessary to guarantee that SDN nodes can execute switching operations at the line rate. Fulfillment of such need has been paid in terms of low edibility in the definition of the rules specifying the owes so that rules are implemented through control of specific packets fields. For example rubrics only consider the typical TCP (or UDP)/IP header. In LR-WPAN networking, constraints on the [8], velocity can be relaxed. Now fact communications in LR-WPANs occur at low rate by definition. On the contrary it is extremely important to guarantee low energy consumption. By looking at the scientific literature it becomes clear that reduction of energy consumption can be achieved in several ways [2]. In the middle of them WNMSDN uses duty cycles [13] in network data aggregation [10] and cross-layer optimization [4], over and done with edible definition of rules and actions. Accordingly, the new requirements {with respect to the wired counterpart {which have been considered in the design of WNMSDN is given below:

WNMSDN necessity provision sense of duty cycles {the most obvious way to reduce the energy consumption is turning the Radio when it is not utilized, that is, using duty cycles. The radio interface of generic nodes is turned periodically would result in [7], topology modifications which should be considered by the modules that are responsible for network control. Obviously control of the duty cycle requires appropriate primitives. Toward this purpose SDWN Defines appropriate actions. **WNMSDN** must support in-network data aggregation {Energy consumption can be reduced by removing the redundancy from the data circulating in the network, that is, by using data aggregation techniques. In fact, it is well known that in many relevant scenarios data circulating in the network is highly correlated both in time and space. For example, in wireless sensor network scenarios the data measured by neighbor nodes is not expected to significantly. Same observation applies to the data measured by the same sensor in different time instances. [11], Maintenance of data aggregation functionalities is achieved by **WNMSDN** through an appropriate module in the protocol architecture and the definition of an appropriate.

WNMSDN necessity support comestible definition of the rules { Existing SDN implementations support rules which consider the traditional TCP (or UDP)/IP header fields only permits a definition of switching and routing strategies which are much more flexible when compared to the traditional ones. However, analysis of the literature in the field of wireless sensor and actor networks suggests that higher flexibility is required in such scenarios. In **WNMSDN** higher flexibility is achieved along two orthogonal dimensions. [15], On the one hand **WNMSDN** allows to define rules which consider any byte in the packet for matching purposes. These would allow to route packets based on the specific value contained in the payload they carry On the other hand, SDWN allows to define rules in which matching can be conditioned also by other relational operators other than equality.

IV WNMSDN ARCHITECTURE

We show the protocol architecture in theoretical way, we are developing for a sensor and actor network based on the use of communication nodes. Also the transceiver a micro control unit is deployed in such nodes with limited computing and energy capabilities. In the network there is also one sink which is also the node where the network Controller is executed transceiver of the sink is connected to an embedded system running a Linux operating system. Computing and communication capabilities of such embedded system are significantly highly when compared to the other nodes in the network. The network Controller functionality will be performed by such embedded system.

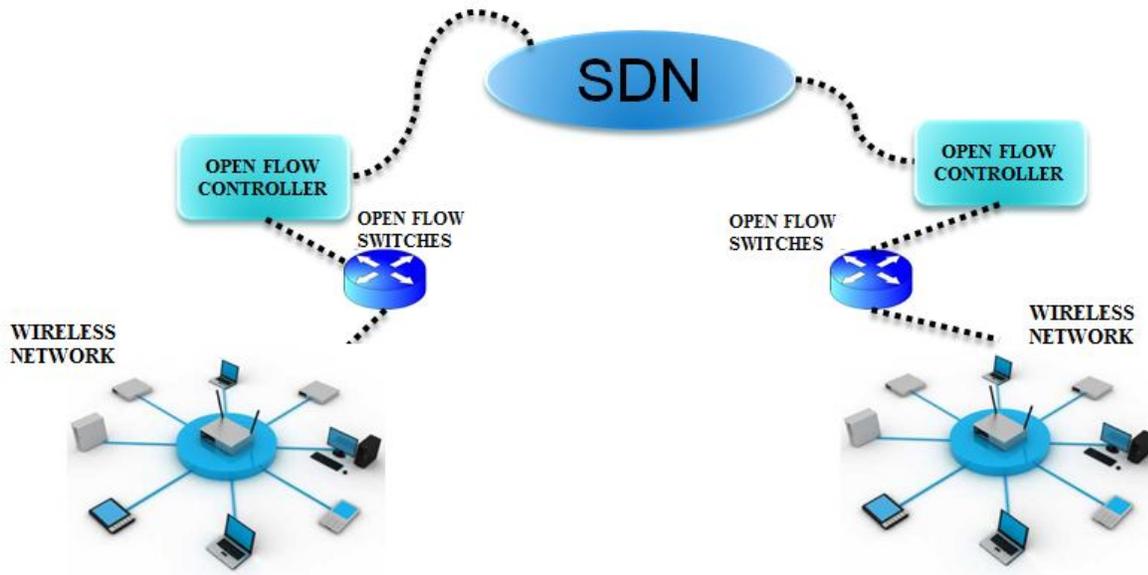


FIG.1 DESIGN ARCHITECTURE

A) IMPLEMENTATION DETAILS

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 is 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. [20] This whole process can be manipulated by the Network administrator according to the environment of the network or according to the outcome required.

One of the main goals of the network operating system layer is to collect the topology information which is necessary by each node to communicate with the sink node and by the sink node to provide a representation of the current topology to the Virtualizer and the Controller. This structure is applicable from a small home network to a complex commercial network. In this section we report some WNMSDN implementation details of our solution. We present the protocol executed by the NOS to collect topology information. we present the format of relevant SDWN packets.

V FURTHER WORK

As a further work, We will discuss & we will implement WNMSDN using Ns3 simulator and too. We will make performance analysis using the deployment. Here will make a policy for the follow of data in the network and how the data need to in the WNMSDN network and control function are implement in the centralized SDN.

VI CONCLUSIONS

In this paper we are implementing WNSDN using centralized software controller. This paper must be measured as a first step towards for giving a implementing design of WNSDN. This paper deals with the identification of implementation of SDN technology to enhance the performance of network management in WNSDN. SDN benefits the Networks in many ways. It mainly simplifies the job of a Network Engineer and it also renders ubiquitous support of the network related issues. We can also set preferences like controlling the bandwidth, restricting access according to time, probing for security issues, reporting a bug, healing the problems automatically and many more complex functions thereby reducing the work of a human lab our. In this paper we have given the in depth idea about SDN and we have also shown the design architecture of WNSDN.

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