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Modern Security Data Caching with Service Separation in Wireless Networks

Gutti Swathi[1], N. V. Naganjali[2], Dr. R. Murugadoss[3]
[1]PG Scholar, Department of MCA, St.Ann's College of Engineering&Technology, Chirala, Andhra Pradesh, India
[2]Assistant Professor, Department of MCA, St.Ann's College of Engineering&Technology, Chirala, Andhra Pradesh, India
[3]Professor, Department of MCA, St.Ann's College of Engineering&Technology, Chirala, Andhra Pradesh, India

ABSTRACT

The present model of networking basically amasses knowledge toward the end has with the network itself offering a basic "best-exertion", "information rationalist" correspondence medium. Be that as it may, this worldview has turned out to be lacking to address the present issues considering the assorted variety of uses and gadgets that are networked. To offer esteem added services to these end clients and applications, more knowledge should be relocated far from the edges and into the network in a controlled and tractable way. In this paper, we show our approach of using semantic information to give content level data to information streams coursing through a network. An arrangement based administration component is used inside the network texture enabling switches to reason over the content and settle on wise choices with respect to the treatment of information parcels. Service differentiation, in-network content adjustment, activity observing and control and so on are a portion of the new services that would now be able to be offered by the network in a bland and adaptable way. By conveying our proposed engineering, a network require never again be seen as a basic information transport medium but instead as an arrangement controlled insightful bundle/stream processor that can offer particular taking care of in view of utilization needs.

Keywords: Wireless Networks, Content Caching

I. INTRODUCTION

Software-Defined Mobile Networks (SDMN) extends the idea of Software-Defined Networking (SDN) and Network Function Virtualization (NFV) into mobile networks [1]. The aim is improving the scalability and adaptability of the mobile network architectures to varying and diverse traffic demands by leveraging existing host and network virtualization technologies besides SDN [4]. NFV decouples software implementations of network functions from the hardware resources [2].We present new concepts for the SDMN architecture leveraging NFV and SDN to solve the challenges of resource, traffic and mobility management faced by the legacy mobile networks new opportunities are sought out and analyzed theoretically and experimentally to meet the user requirements and address the limitations of SDN and NFV technologies for future mobile networks [3]. Expected benefits of the proposed infrastructure is enhanced QoS context-aware mobile networking, reliability and rapid re-establishment of mobile multicast services in case of handover and failure, as well as ubiquitous access to Internet content delivery services by fixed or mobile users enabled with multiple devices and interfaces [5].Proponents of this model argue that with such interactions, bandwidth usage optimization, more efficient routing, better QoS guarantees, better power utilization etc. can be achieved [6]. The deployment of wireless network technologies in public places bears the danger of unauthorized people gaining physical access to the network, secure user authentication and authorization and a reliable access control mechanism is vital particularly for wireless LANs [7].

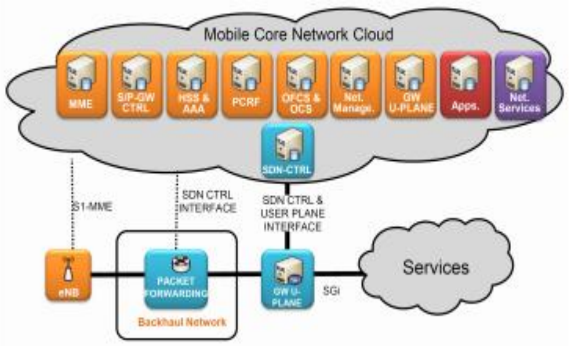

Figure 1. High-Level architecture of SDMN

II. RELATED WORK

There exist proposals that try to solve the challenges faced by current mobile network architectures with the help of codification NFV, and SDN. Software-defined Radio Access [8]. Wireless Multimedia Sensor Networks (WMSNs) not only enhance existing sensor network applications such as tracking, home automation, and environmental monitoring, but they also enable several new applications such as multimedia surveillance sensor networks, automobile traffic management storage of potentially relevant activities, advanced health care delivery, structural health monitoring, and industrial process control[9].The recent context-aware systems are context-aware frameworks that facilitate smart service discovery, delivery and adaptation through rich ontology based context representation [10]. This rich context ontology considers all parameters relevant to an interaction as the context [11]. IPv6 mobility support (MIPv6) proposed to address mobility management for IPv6 at network layer considering heterogeneous mobile network environment, is found to be not efficient for managing frequent mobility [12]. Efforts to improve mobile IPv6 are aimed at minimizing the handover address configuration time and reducing the amount of signaling overhead required to re-route packets to the mobile node's new location [13].

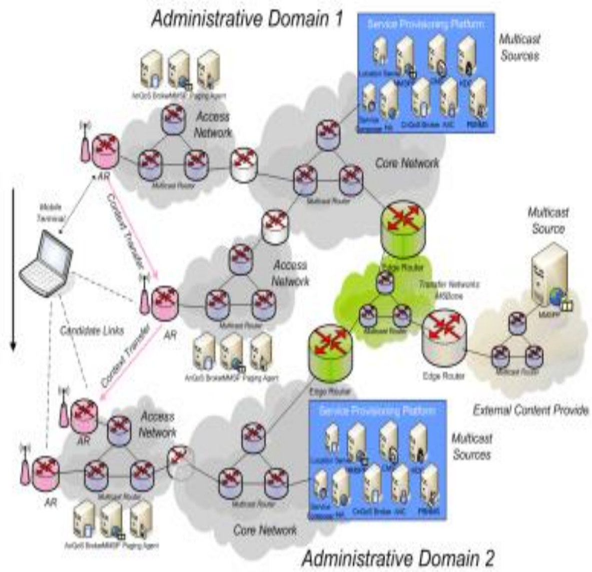

Figure 2. Networking architecture for QoS based multicast transport

III. SYSTEM ARCHITECTURE

The Mobile IPv6 Test bed is constructed along the wireless overlay network concept whereby a number of different wireless technologies are used in combination with the GUIDE infrastructure in order to provide the coverage and network performance required for future network services [14]. This approach was chosen for two reasons. It ensures that mobile users maintain access to network resources wherever and whenever possible, as the most appropriate interconnect can be chosen at any given time. It is likely to better emulate the network topology of future public access wireless networks thus providing us with a more realistic test environment [15].As one of the aims of the Tested is to evaluate what role such access points will have in future networks and what services they will provide, it is extremely important to make access routers as flexible and extensible as possible. We develop our access point using a high performance component based active network platform, namely LARA++ [16].

The access control and router management functions are implemented as LARA++ active services.

IV. PROPOSED APPROACH

This section presents an overview of our proposed framework. We break it down into two components at a node level and at a system level that spans the network the architecture we propose introduces our Node Framework as an additional layer called the CoCoNet layer between the application and the transport layer [17]. This layer is responsible for intercepting socket calls made by applications to the transport layer.The API is enhanced to allow the application to provide semantic level information for messages transmitted over this interface [18]. A Local Policy Decision Point (LPDP) is used to determine what policies to enforce based on the content. In our framework, each Policy Enforcement Point (PEP) is every layer in the networking stack while treats the PEP at a node level [19].

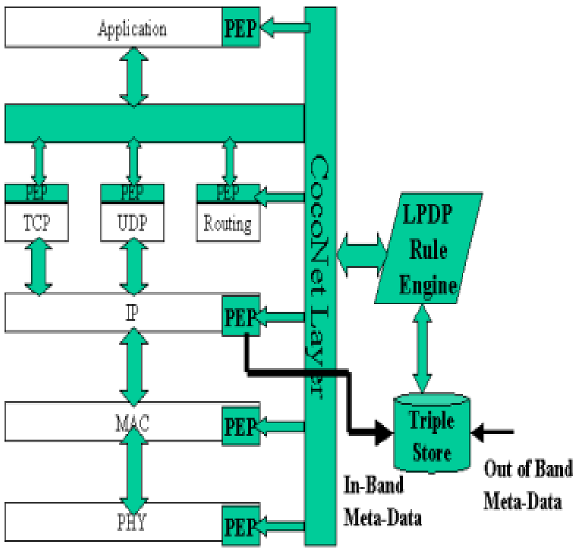

Figure 3. CoCoNet Node Framework

A. Ant Sense Net Algorithm:

Ant Sens Net consists of a protocol based on ACO (Ant Colony Optimization) to discover and maintain routes between CHs and the sink [20]. The route discovery process starts as soon as the cluster process finishes. The data configuration of the ant's structure used in its route discovery process is defined below. It comprises the following fields [21].

1. **Ant. ID:** the ant's ID
2. **Ant. Type:** the type of ant in the route discovery process. This field can be a FANT a BANT a MANT (maintenance ant) or a DANT (data ant).
3. **Ant. notes:** the nodes-visited-stack, contains the IDs of nodes by which the ant passes.
4. **Ant. Hop count:** calculates the number of hops by which the ant passed from its CH source. This field serves as the ant's TTL.
5. **Ant. info:** Each type of ant uses this field to store special information about the route or the nodes, in order to evaluate how appropriate the route

B. Policy Based Multicast QoS Management

The management of QoS provisioning for multicast delivery is based on hierarchically distributed QoS brokers at access, core, and inter-domain level [22]. At the top of this hierarchy the Core QoS Broker is responsible for Inter-Domain and Inter-Access Network Resources provisioning based on Differentiated Service (DS) architecture, while the Access Network (AN) QoS Brokers provide flow based QoS to the mobile terminals using signalling mechanisms for Integrated Service support. Part of the QoS architecture is the Multicast Manager which handles the reservation of multicast resources and performs tree optimizations for mobile nodes with multicast services [23].

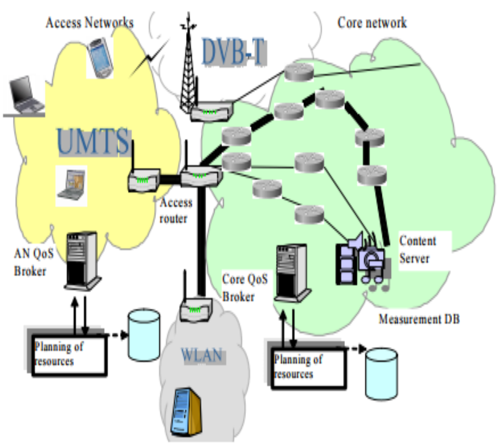

Figure 5. QoS broker architecture for management and planning of resources for enhanced multicast

Policy based QoS management is used to control the multicast distribution from a given server to the multicast users. Policies restrict the multicast transfer for specific services based on resource planning strategies and prediction of mobile user's behavior for content delivery [24].

C. Information Update Phase

This novel clustering algorithm is based on T-ANT and the clustering protocol uses a collection of agents to form clusters in a sensor network. It is completely distributed and completed in constant time [25]. These are the reasons why this algorithm was selected. As in T-ANT clustering operations are split into rounds. Each round comprises a cluster setup phase and a steady phase [26]. In the steady phase of the algorithm, data transmission takes place between sensors and the sink. A number of timers are used to control the process operations during the cluster setup phase [27].

Algorithm. Tasks developed by the other nodes

1. if an ant arrives at node i then
2. if node i is not a CH then
3. if there is a CH in the radius Rcluster then
4. Pick a random CH neighbor
5. Send the ant to it
6. Else
7. Store the ant {This node is a CH}
8. Broadcast a message ADV_CLUSTER to
9. neighbors in range Rcluster
10. end if
11. else if node i is a CH then
12. Decrement the TTL of the ant
13. if TTL > 0
14. Pick a random neighbor according to the
15. probability function probc
16. Send the cluster ant to it
17. Else
18. Destroy the ant
19. end if
20. end if
21. end if

in order to become a CH, the selected node must have received a cluster ant from another CH (or the sink) located at a distance Rcluster from it. Rcluster was previously defined as the minimal distance between two CHs. Hence, at the moment of selecting the following neighbor, the node reads its neighbors' information table and selects.

V. PRELIMINARY RESULTS

To investigate some of the potential benefits that content awareness within the network can bring, we simulated a cross layer approach where the routing layer proactively maintains alternate routes that can be used immediately upon failure of the primary route. The network topology used is the same used in the previous simulations. Only a video sensor in all the network is capturing, encoding and sending a live video sequences to the sink. We use only two paths to send the packets (in TPGF and AntSensNet for ASAR we use only a path). The video sequence is encoded according to H.264/AVC standard with a reference frame list of size five frames for compensated prediction. They do not implement any distortion minimization rate control and they are only specialized in scalar data transmission. Conversely, AntSensNet is content-aware and is able to take actions in order to minimize the video distortion.

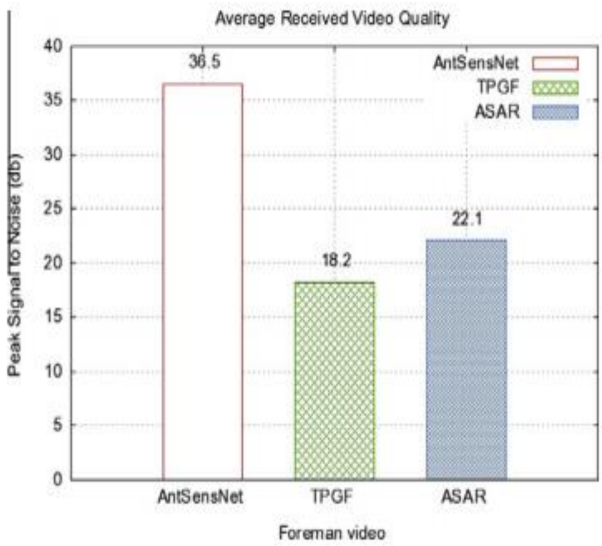

Figure 6. Received video quality of Foreman video

VI. CONCLUSION

We surveyed routing protocols by taking into account several classification criteria, including location information, network layering and in-network processing, data centricity, Mobility-based, Multipath-based Protocols, network heterogeneity, and QoS requirements. This paper is a leap towards SDN and NFV based mobile network architecture to reap the benefits of both technologies in a unified approach. We have proposed SDMN architecture components to overcome the highlighted limitations in current wireless networks and provide a way-ahead for future mobile networks.Controlled cross layer interactions are used to provide more efficient processing while still retaining tractability. The tight integration of the access control system with our Mobile IPv6 stacks allows for a system which adapts quickly to changes in network environment while maintaining location transparency for applications and a high level of security. Further mechanisms for efficient mobile multicast based on advance pro-active resource reservation and QoS policy control are currently the focus of research and development.

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ABOUT AUTHORS:

G.SWATHI is currently pursuing his M.C.A in Information Technology Department, St.Ann's College of Engineering&Technology, Chirala, A.P. She received her Bachelor of Science from ANU.

N. V.Naganjali, MCA is currently working as an Asst.Professor in MCA Department, St.Ann's College of Engineering&Technology, Chirala. Her research includes networking and data mining.

DR.R.Murugadoss, MCA, M.E (CSE),Ph.D (CSE), MCSI, MISTE,is currently working as a Professor in MCA Department, St.Ann's College of Engineering & Technology, Chirala. His research interests inComputer Networks, Big Data and data mining.