

# VIRTUAL NETWORK RECOGNITION AND OPTIMIZATION IN SDN-ENABLED CLOUD ENVIRONMENT

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**Abstract** - In the past decade, mobile devices and applications have experienced an explosive growth, and users are expecting higher data rates and better quality services every year. In this paper, we propose several ideas to increase the functionality and capacity of wireless networks using software-defined networking(SDN) and cloud computing technologies. Connections between users and services in mobile networks typically have to pass through a required set of middle boxes. The complex outing is one of the major impetus for the SDN paradigm ,which enables flexible policy-aware routing in the next generation mobile networks. In addition, the high costs of middleboxes and limited capabilities of mobile devices call for revolutionary virtualization technologies enabled by cloud computing. Based on these, we consider an online routing problem for mobile networks with SDN and cloud computing. In this problem, connection requests are given one at a time (as in a real mobile system),and the objective is to steer traffic flows to maximize the total amount of traffic accepted over time, subject to capacity, budget,policy, and quality of service constraints. A fast log -competitive approximation algorithm is developed based on time-dependentduals.

**Key Words:** CLOUD COMPUTING, ENCRYPTED DOCUMENTS,CONJUNCTIVE KEYWORDS

## 1. INTRODUCTION

MOBILE data is continuing to grow exponentially, and is taking up a larger portion of total Internet traffic in recent years. As various portable mobile devices like smartphones, tablets, and netbooks become more prevalent, people are using mobile Internet more frequently and have shifted a large portion of their online activities, including web surfing, online banking, video streaming, social networking, and online gaming, from

traditional cable Internet services to their mobile counterparts.

Such an exponential growth of mobile data, as well as the vast variety of online activities, imposes a heavy burden on mobile network service providers. Not only do these carriers need to upgrade their network capacities frequently, but they also need to provide differentiated services and meet the varied QoS requirements imposed by different mobile Internet applications.

At present most NE are statically deployed in the network, and routing paths among these nodes are often pre-determined. According to 3GPP specifications, mobile data traffic in current 4G LTE networks is routed in a hop-by-hop manner, either according to fixed routing tables or with limited load balancing capabilities. More specifically, a UE selects an eNodeB according to channel measurements, the eNodeB selects a Mobility Management Entity (MME) according to tracking area identification (TAI), and the MME selects a PGW according to access point name (APN) and an SGW according to TAI. The PGW is solely responsible for QoS. It maps traffic flows into different QoS classes, which are then translated into DiffServ priorities enforced in a per-hop manner. This strategy cannot fully utilize the networks to meet customers' needs due to its poor flexibilitywhen facing asymmetric traffic fluctuations, and lacks finegrained optimization of network resources and end-to-end traffic steering.

## 2. RELATED WORK

Network deployments handle changing application, workload, and policy requirements via the deployment of specialized network appliances or "middleboxes". Today, however, middlebox platforms are expensive and closed systems, with little or no hooks for

extensibility. Furthermore, they are acquired from independent vendors and deployed as standalone devices with little cohesiveness in how the ensemble of middleboxes is managed. As network requirements continue to grow in both scale and variety, this bottom-up approach puts middlebox deployments on a trajectory of growing device sprawl with corresponding escalation in capital and management costs.

The concept of Future Networks is based on the premise that current infrastructures require enhanced control, service customization, self-organization and self-management capabilities to meet the new needs in a connected society, especially of mobile users. In order to provide a high-performance mobile system, three main fields must be improved: radio, network, and operation and management. In particular, operation and management capabilities are intended to enable business agility and operational sustainability, where the addition of new services does not imply an excessive increase in capital or operational expenditures. In this context, a set of key-enabled technologies have emerged in order to aid in this field. Concepts such as Software Defined Network (SDN), Network Function Virtualization (NFV) and Self-Organized Networks (SON) are pushing traditional systems towards the next 5G network generation. This paper presents an overview of the current status of these promising technologies and ongoing works to fulfill the operational and management requirements of mobile infrastructures. This work also details the use cases and the challenges, taking into account not only SDN, NFV, cloud computing and SON but also other paradigms

**Background.** To ensure the required quality of experience and optimal use of network operator's resources in the current conditions telecommunication operator can deploy services using the concept of Network Functions Virtualization (NFV), that has fundamental differences from traditional dedicated hardware. To achieve the expected benefits of NFV, physical resources must be used effectively. This requires effective algorithms to determine onto which physical resources network functions are allocated. **Objective.** The aim of the paper is to improve the efficiency of mobile network through optimal resource allocation in hybrid data center environment. **Methods.** Analysis of all known publications devoted to virtualization of network functions of mobile network has shown the modeling approach to resource allocation and also has shown the absence of decisions on important issues of this process (performance of functional blocks, heterogeneous environment). **Results.** An analytical approach to model and investigate the resource allocation of network functions on a telecommunication operator's network is proposed. **Conclusions.** To model the resource allocation for virtualized network functions a technique of virtual network embedding can be used, while changing the

constraints in which you can get the results for a variety of deployment scenarios. In such way, adding a number of constraints to the classical formulation of the problem, we can take into account the performance of the network functions and heterogeneity (hybridity) of the deployment environment.

### 3. OVERVIEW OF PROPOSED SYSTEM

In proposed system, proposed algorithms only work for the single constraint scenario, while only a few can be extended to support multiple constraints as well. For example, in addition to meeting end-to-end latency requirements, sometimes we may want to ensure that the selected hosts are close enough to the users as well, so as to improve the user experience during cellular handover or computation handoff. Primal-dual algorithm, and then informs the home network of the competitor charge and the actual network latency. Per-hop shortest-path routing. This is the baseline algorithm in which all links are given a uniform unit length, and the scheduler iteratively finds the closest (in terms of the number of links) next-hop NE in a hop-by-hop manner and connects these segments up to construct an end-to-end path. Both network latencies and path length are considered, and our objective is to minimize the end-to-end path length under network latency constraints.

### LIST OF MODULES

- Authentication
- Network Creation
- File Sender
- SDN Controller
- Server

#### a) Authentication

In computer security, logging in (or logging on or signing in or signing on) is the process by which an individual gains access to a computer system by identifying and authenticating themselves. The user credentials are typically some form of "username" and a matching "password", and these credentials themselves are sometimes referred to as a login, (or a logon or a sign-in or a sign-on). In practice, modern secure systems also often require a second factor for extra security.

### b) Network Creation

The Network creation process will be created by the cloud service provider. In Data communication, a physical network node may either be a data terminal equipment (DTE) such as a router, a Gateway, Datacenter, Firewall or a server. Another important one is to these network want to connect with the SDN controller. Each SDN controller has the separate specification like RAM, ROM, OS, etc.

### c) File Sender

If any user wants to store their files in the cloud for that we want to pass our data through the network. So first we want to select our file which one we want to upload. User sends this data to the server to store their file, in between the file will be first received by the router. The router will be received their files and all the details and then it will be resend to the SDN controller.

### d) SDN Controller

The SDN-Controller will receive the files from the router. SDN controller work is to split the files into packets according to their file size. The splitted packets only will be send to the router because the file files will be easily transferred to the server. At the same time network congestion and traffic will be reduce.

### e) Server

Server receives the splitted packets by the router. After receiving the server the files will be merge all the packets and store into a single file only. If the user want to view the files, the server will be send the file. The server received the request from the user then only they can send their files to the router. After that the SDN controller receive the file from the router then only they split their files again send to the router and then only file will be received by the user.

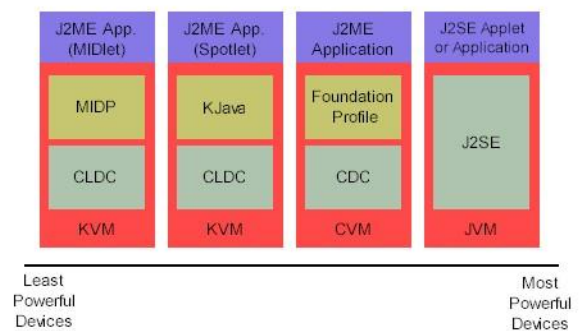
## 4. SOFTWARE SPECIFICATION

### J2ME

Sun Microsystems defines J2ME as "a highly optimized Java run-time environment targeting a wide range of consumer products, including pagers, cellular phones, screen-phones, digital set-top boxes and car navigation systems." Announced in June 1999 at the Java One

Developer Conference, J2ME brings the cross-platform functionality of the Java language to smaller devices, allowing mobile wireless devices to share applications. With J2ME, Sun has adapted the Java platform for consumer products that incorporate or are based on small computing devices.

### General J2ME architecture



J2ME uses configurations and profiles to customize the Java Runtime Environment (JRE). As a complete JRE, J2ME is comprised of a configuration, which determines the JVM used, and a profile, which defines the application by adding domain-specific classes. The configuration defines the basic run-time environment as a set of core classes and a specific JVM that run on specific types of devices. We'll discuss configurations in detail in the profile defines the application; specifically, it adds domain-specific classes to the J2ME configuration to define certain uses for devices. We'll cover profiles in depth in the following graphic depicts the relationship between the different virtual machines, configurations, and profiles. It also draws a parallel with the J2SE API and its Java virtual machine. While the J2SE virtual machine is generally referred to as a JVM, the J2ME virtual machines, KVM and CVM, are subsets of JVM. Both KVM and CVM can be thought of as a kind of Java virtual machine -- it's just that they are shrunken versions of the J2SE JVM and are specific to J2ME.

## 5. CONCLUSION

The infrastructure inefficiencies and routing inflexibilities in current mobile networks, and propose an SDN-based architecture with cloud computing to address the potential bottlenecks and challenges of next generation mobile networking. In order to enable policy-aware routing and provide QoS guarantee, we formulate a multi-commodity flow problem with side constraints, and follow the primal-dual approach to obtain a log-competitive solution using a fast online approximation algorithm. Extensive simulations have been performed to investigate the impact of various parameters on the network performances. These results also show that our algorithm

significantly outperforms prevalent heuristics due to end-to-end optimization, congestion/budget awareness, and primal-dual approximation.

Despite years of work on SDN, the technology is still in its infancy. In this section, we highlight several active areas of investigation, including creating better SDN infrastructure, applying SDN in new settings, and expanding the scope of SDN beyond network switches.

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