Chapter 67
A Satiated Method for Cloud Traffic Classification in Software Defined Network Environment

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ABSTRACT

With the advent of new technologies like software defined networking, cloud computing and Internet of Things, everything needs to be redefined. Software Define Networking (SDN) is the latest approach and an emerging network technology that will bring a major change in the area of networking. Though SDN has been successfully applied to most of the networking area but traffic classification is the area where it is yet to be applied. With the high adoption of cloud services, the traffic on cloud increased rapidly. The technologies need to be clubbed together so that they can survive in the rapidly changing environment. The paper aims at addressing the cloud traffic classification using Differential Services Code Point (DSCP) marking in software defined network environment. This allows us to identify cloud traffic separately from other web services and helps its traffic flows to be provided with special treatment over other internet services. The paper aims to classify cloud traffic along with suggesting some marking schemes to prioritize cloud traffic using DSCP of IP header.

1. INTRODUCTION

Cloud is on the hype. It is expanding day by day, but along with the benefits it carries dangers of traffic. The cloud traffic growth is a consequence of the fast adoption and migration to cloud. Moreover, the migration to cloud is due to the ability of cloud data centers to handle higher traffic loads. These data centers use virtualization and automation. Thus data centers have increased performance, higher capacity and great throughput. According to reports from Cisco Systems, Global cloud (Compound Annual Growth Rate, CAGR) traffic is expected to grow 4.5-fold – a 35% combined annual growth rate. The traffic between the data centers and beyond data centers is increasing rapidly. To manage this cloud traffic and to provide them best quality of services, the traffic should be classified as per requirements. Traffic classification is the identification of various types of traffic of packet flows. The classification is widely used for various purposes like providing Quality of Services (QoS), network management, network security and traffic engineering purposes. Besides other types of traffic Classification, we suggest policy based traffic classification as it possesses various advantages like

1. We can easily configure a user level QoS Policy
2. It allows us to classify packets at the end device to indicate priority of packet in IP header before IP payloads are encrypted.
3. Policy-based QoS are implemented where they can be closest to the source as it many QoS functions work better when they are closer to the source.
4. They can be managed better as they are implemented on a central controller.

The current internet traffic classification is not sufficient for the growing demands of traffic. Since some of the applications deliberately hide their port numbers, the port based classification will not work moreover newer applications does not carry any registered port numbers. We need a system that automates classification of the cloud traffic policies without making changes to per-flow; per-device or per-port basis. The cloud traffic should be easily identifiable and should get provision of getting higher priorities over other internet traffic. The current internet architecture does not differentiate between cloud traffic and other internet traffic. Hence our paper aims at identification of cloud traffic from other web services using type of service field in IP header. With the advent of software defined networks the traffic classification needs to be modified. The paper aims at assigning the traffic classification policy design as a part of SDN. The Software defined networks separates forwarding and control functions. The SDN follows highly programmatic approach and logically centralized control. Thus this approach can be use of policy or high level abstractions to deal with network traffic classification. The centralization of control enables to experiment innovative ideas for the task. In this architecture the policies will be implemented on SDN Controller layer. Additional software will be implemented at this layer. We know that hardware switch classifiers are faster as compared to this approach but the capability of hardware switch is limited due to the constraints of policies on which it is build. Moreover, it is not possible to reconfigure it frequently. In comparison, though software switch is slower but can be easily modified accordingly as per requirements. We suggest the implementation using OpenFlow which is an open specification and implementation of SDN.OpenFlow can be customized to analyze flows and can easily define /modify forwarding rules as per vendor requirements.

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