Network Service Chaining Using Segment Routing in Multi-Layer Networks

ABSTRACT

- Network service chaining, originally conceived in the network function virtualization (NFV) framework for software defined networks (SDN), is becoming an attractive solution for enabling service differentiation enforcement to microflows generated by data centers, 5G fronthaul and Internet of Things (IoT) cloud/fog nodes, and traversing a metro-core network. However, the current IP/MPLS-over optical multi-layer network is practically unable to provide such service chain enforcement. First, MPLS granularity prevents microflows from being conveyed in dedicated paths. Second, service configuration for a huge number of selected flows with different requirements is prone to scalability concerns, even considering the deployment of a SDN network.

CONTINUE

- In this paper, effective service chaining enforcement along traffic engineered (TE) paths is proposed using segment routing and extended traffic steering mechanisms for mapping micro-flows.
- The proposed control architecture is based on an extended SDN controller encompassing a stateful path computation element (PCE) handling microflow computation and placement supporting service chains, whereas segment routing allows automatic service enforcement without the need for continuous configuration of the service node.

EXISTING SYSTEM

- In next-generation metro and core networks, operators will be required to transport different application traffic from/to specific client networks [e.g., data centers, 5G Radio Access Networks (RAN), smart Internet of Things (IoT) cloud/fog nodes processing data from/to massively distributed sensors and blockchain-based platforms, where each application may generate a huge number of low or medium bitrate flows (i.e., MicroFlows) subject to different end-to-end Quality of Service (QoS) requirements.

CONTINUE

- Network service chaining, originally conceived in the network function virtualization (NFV) framework for software defined networks (SDN), is becoming an attractive solution for enabling service differentiation enforcement to microflows generated by data centers, 5G fronthaul and Internet of Things (IoT) cloud/fog nodes, and traversing a metro-core network. However, the current IP/MPLS-over optical multi-layer network is practically unable to provide such service chain enforcement.
- First, MPLS granularity prevents microflows from being conveyed in dedicated paths. Second, service configuration for a huge number of selected flows with different requirements is prone to scalability concerns, even considering the deployment of a SDN network.

PROPOSED SYSTEM

- In this paper, effective service chaining enforcement along traffic engineered (TE) paths is proposed using segment routing and extended traffic steering mechanisms for mapping micro-flows. The proposed control architecture is based on an extended SDN controller encompassing a stateful path computation element (PCE) handling microflow computation and placement supporting service chains, whereas segment routing allows automatic service enforcement without the need for continuous configuration of the service node.

HARDWARE REQUIREMENTS

- Processor - Pentium –III
- Speed - 1.1 Ghz
- RAM - 256 MB(min)
- Hard Disk - 20 GB
- Floppy Drive - 1.44 MB
- Key Board - Standard Windows Keyboard
- Mouse - Two or Three Button Mouse
- Monitor - SVGA

SOFTWARE REQUIREMENTS

- Operating System : Windows 8
- Front End : Java /DOTNET
- Database : Mysql/HEIDISQL

CONCLUSION

- A network service chaining control architecture conceived for MicroFlow computation, placement, and steering in a metro-core multi-layer network exploiting segment routing was proposed and discussed. The architecture allows the deployment of network function middleboxes in the metro-core network and service chain enforcement, and steering for microflows requiring specific QoS or security treatment. The architecture included the proposal of a novel flow computation element and two alternative steering southbound APIs exploiting extended BGP Flowspec and OpenFlow, suitable for legacy MPLS networks and a pure SDN environment, respectively.

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