Application Aware Traffic Engineering Functionality for an SDN Transit Network

Juan Sebastian Aguirre[1], Kohei Ichikawa[2], Yoshiyuki Kido[1], Susumu Date[1], Shinji Shimojo[1]
[1]Osaka University
[2]Nara Institute of Technology

大阪大学 OSAKA UNIVERSITY

OBJECTIVE

Enhance the BGP reachability functionality in an IP Transit Network by controlling the inter-domain network traffic with an SDN Northbound application.

Research Introduction

- IP Transit networks carry traffic between different Autonomous Systems doing the best effort that the BGP protocol offers, and as a result it routes equally the traffic of all applications.
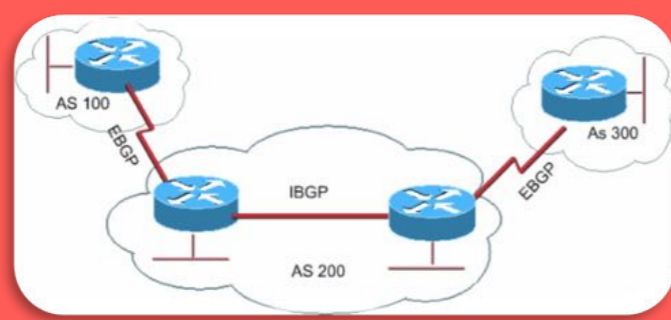
- To implement the Software Defined Networking technology for Traffic Engineering of specific applications and services over a Wide Area Network.

- An SDN Controller in an IP Transit Network provides the mechanisms for manipulating the network inbound traffic with the OpenFlow protocol by installing flows on the data plane.

Research Questions

- How can the desired traffic flow from specific applications and services be analyzed and discriminated?

- What is the impact of the SDN Controller and northbound application compute power over the service level of traffic delivery between networks in terms of latency, packet loss and jitter?

Experimental Setup

- The testbed data plane consist of a wide area network with four Autonomous Systems implemented over the PRAGMA-ENT.

- Autonomous Systems whose traffic will traverse the SDN IP transit network are implemented as Virtual Machines in different sites peering in the PRAGMA-ENT data plane:
    - UC San Diego
    - Indiana University
    - NARA Institute of Science and Technology
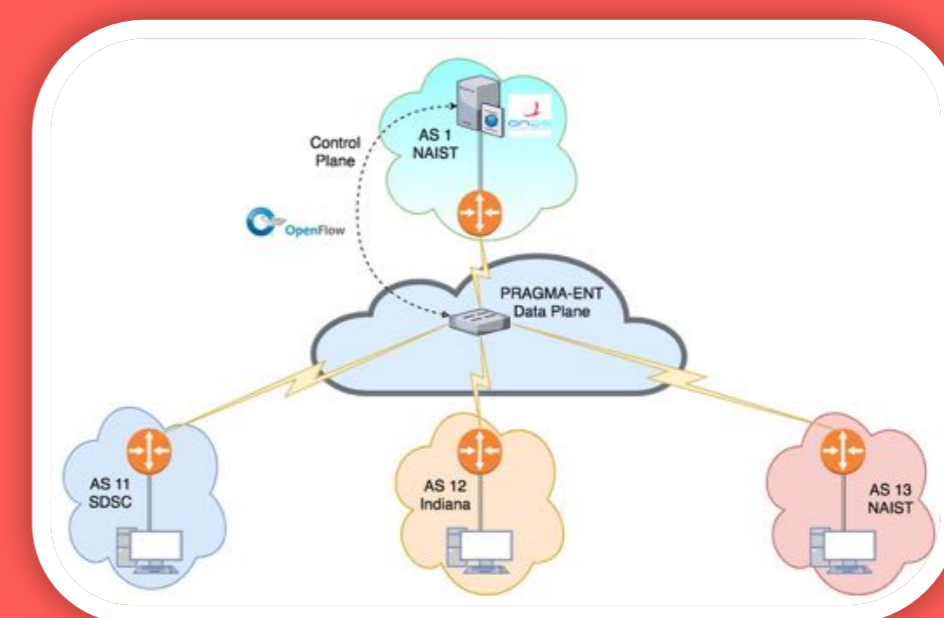
- ONOS and the SDN-IP application provide peering between external networks and the Transit Network through BGP and the ONOS Intent framework.
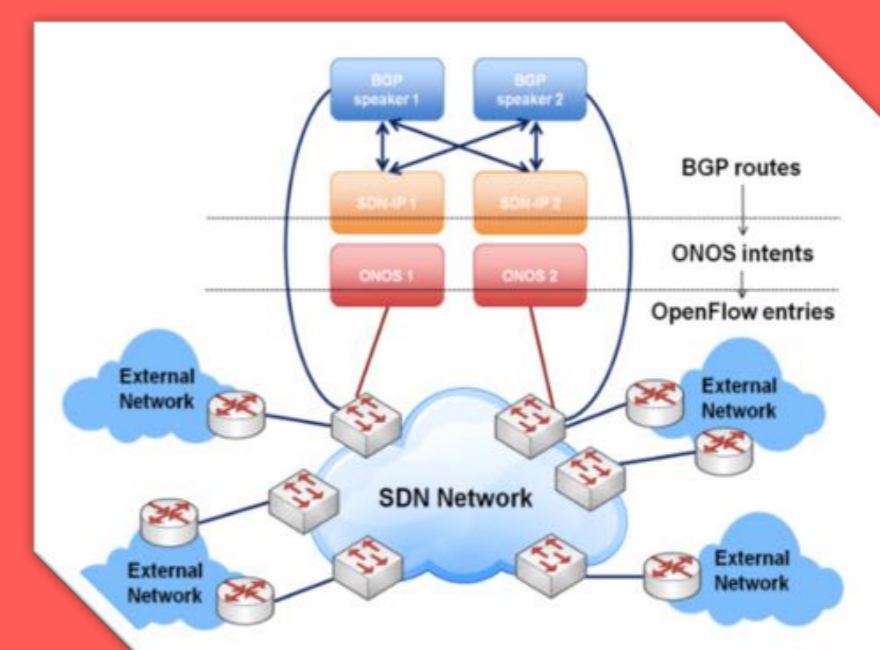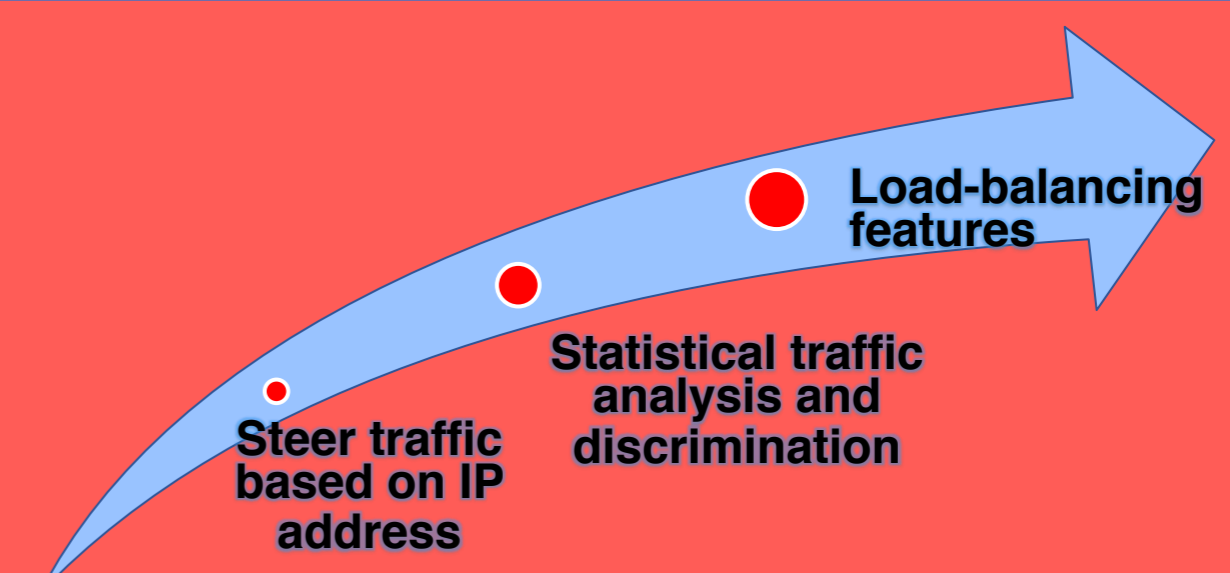

Work in Progress

- Virtual Machine commissioning over the PRAGMA-ENT data plane

- ONOS Northbound interface application development for traffic identification through TCP/UDP port number.

Future Works

Load-balancing features

Statistical traffic analysis and discrimination

Steer traffic based on IP address

Acknowledgements

Student Email: j.sebastian@ais.cmc.osaka-u.ac.jp