Bridging Talents through SAGE2 Collaboration over SDN/IP
Demo ID: SC18-NRE-012

## Introduction

The key to foster innovation is always about how successful those talents can freely collaborate together on brilliant ideas. SAGE2 has long been one of the best video collaboration tool as the answer to the aforementioned demand. Meanwhile, SDN/IP is a promising technology to integrate the advantages from both the flexibility of software defined network (SDN) and the ubiquity of traditional IP networks. To take advantage of the agility and versatility of SDN/IP to further help scientists and network researchers to fulfill international collaborations, a SDN/IP testbed has been established between multiple sites in Taiwan, Japan and USA, with SAGE2 nodes of each participating institutions communicating over the testbed.

## Architecture

Each participating site has its own ONOS controller, Quagga and OpenFlow switch installed and configured as an independent BGP autonomous domain. Over the VPLS connections between sites, the OpenFlow switches of participating sites have been interconnected as the following figure. The Quagga has been configured to have BGP information exchanged with adjacent sites. Therefore the entire SDN/IP testbed has been functionally equivalent to a routable interconnected layer3 network.

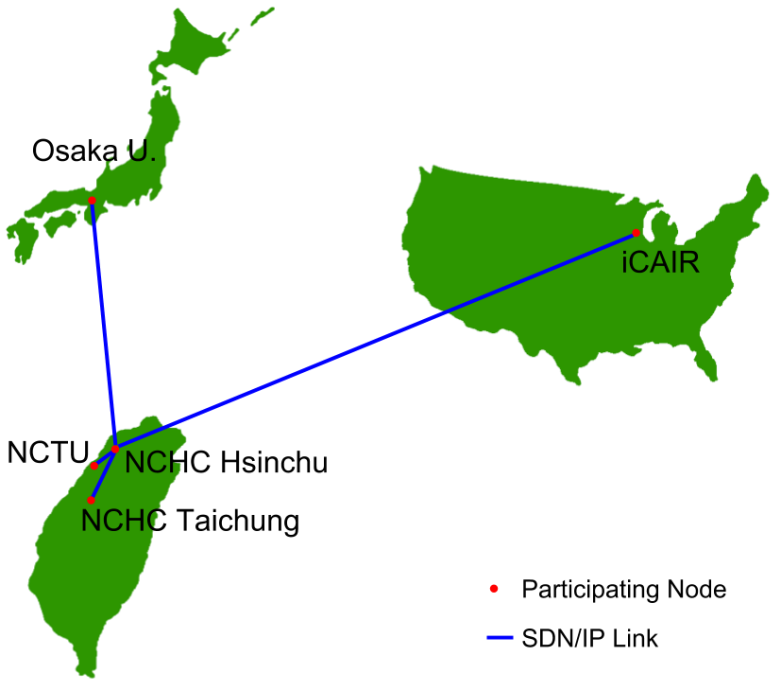


Figure 1 The architecture of the SDN/IP testbed

SAGE2 has been installed in Osaka university (Osaka U.), National Chiao Tung University (NCTU) and two offices of National Center for High-performance Computing (NCHC) in Hsinchu and Taichung,

respectively. The remote_sites setting of the SAGE2 default config json file has been added and mutually pointed to other sites in order to allow inter-site media transfers and synchronization.

## Demonstration Plan

Presentation material including pdfs, photos and movies will be pushed to the SAGE2 display wall locally as well as sent to other remote SAGE2 walls. The traffic between users and SAGE2 servers, and between SAGE2 servers of different participating sites will entirely be on the SDN/IP testbed to showcase the connectivity of the layer3 interconnected independent SDN domains.

## Conclusion

With SDN technology alone, the peering between network autonomous domains is in short of a dynamic mechanism to exchange necessary information thus manual intervention is often unavoidable. In traditional network, BGP provides a mature and well test-of-time mechanism to this problem. By incorporating the BGP into the SDN network, SDN/IP combines the strength of both worlds, enabling the coexistence and intercommunication of SDN network and traditional Internet.

SAGE2 technology is showcased in this demo to further highlight the idea that the SDN/IP can smoothly allow independent SDN domains to share their data and collaborate without consent to a certain peering configuration in prior. Each participating site has its own SDN fabric, network autonomy and independent SAGE2 facility. New sites can easily join by allowing the BGP exchanges with the testbed, just as what they would do with the traditional network. Their scientists can freely collaborate on top of this SDN/IP network while enjoying the power of SDN.

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