SC22 Network Research Exhibition: Demonstration Abstract

Conceptual demonstration of the reconfigurable in-network security sensor network (REINS network)

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Abstract

Conceptual demonstration of the reconfigurable in-network security sensor (REINS) network which connecting Japan site and US sites (constructed in SC22 venue) will be done. In the SC22, experimental "reconfigurable Probe" over the reconfigurable optical add/drop multiplexer (ROADM) network will be constructed. A part of the REINS network concept, i.e., dynamically set up the reconfigurable prove from the network operation and management center (NOC) to the target monitoring point will be demonstrated.

REINS network in SC22

The REINS concept [1] is as follows, "Traffic data collected by in-network sensors distributed over the network are transferred to NOC via 'Reconfigurable Probe', and the analyzed results control the transport network by rerouting and enforcing". Constructed SC22 REINS demonstration network is shown in Fig. 1.

In the SC22, experimental "reconfigurable Probe" over the ROADM network (provided by University of Texas at Dallas (UTD) is attached to the network in the UTD site. The monitoring points will be set in the UTD site in the UTD booth #3824 and mirrored packets are sent to the National Institute of Information and Communications Technology (NICT) site in the NICT booth #3247 via optical paths. In the NICT site, all incoming packet payloads are replaced with "0" data by the Keio privacy control box (shown in Fig. 2) to protect the user privacy. Live traffic is transported via National Research and Educational Networks (NRENs) including JGN to Japan. In Japan side, transported traffic is monitored and analyzed by the Alaxala's traffic analyzer prototype system in the Keio University REINS proof of concept (POC) site. Analyzed results will be sent back to the NICT site and displayed.

The Open ROADM will provide a reconfigurable prove to the target network. A part of the REINS network concept, i.e., dynamically set up the reconfigurable prove from the NOC to the target monitoring point will be demonstrated.

Fig.2: Prototype Keio privacy control box.

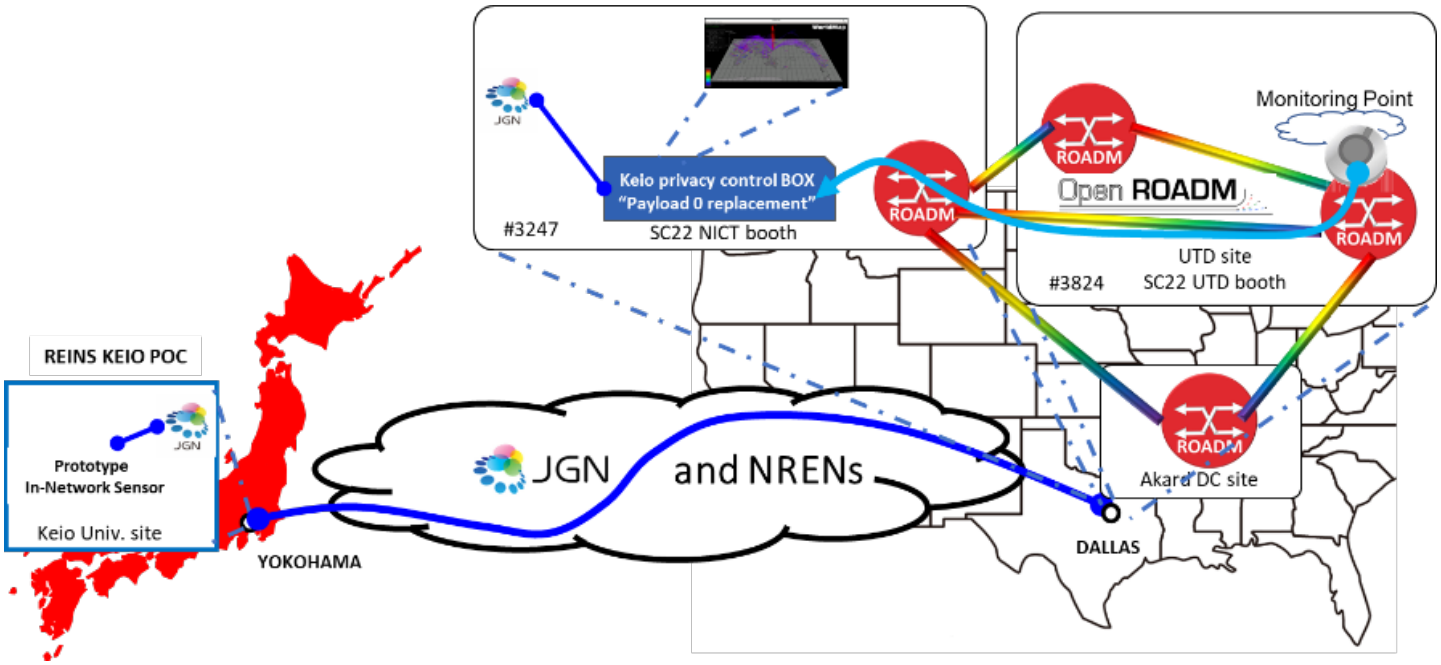

Fig. 1: Constructed SC22 REINS demonstration network.

Goals

1. Connect in-network security sensor in Japan and reconfigurable mirroring traffic sources over NRENs and Open ROADM networks.
2. Construct "Reconfigurable Probe" over the Open ROADM network. In-network security sensors can be attached to the multiple monitoring points by reconfiguration of optical paths.
3. Analyzing can be performed with protecting the user privacy.
4. Analyzed results of the in-network sensors in Japan will be displayed in the SC venue.

Resources

The resources that will be required to make this work fall into two categories: WAN and Dark Fiber (DF) in the SC22 venue.
For the WAN connection from the NICT booth (#3247) to REINS Keio Univ. POC in the Keio University Yamanaka Lab. , we will need minimum three VLANs over NRENs (including JGN of NICT) which have in total 10 Gbps capacity with 3 VLANs.
For the Dark Fiber connection, we will need three pair of DFs between NICT booth and SCinet NOC. These DFs are patched to DFs to UTD booth (#3824) and Akard DC at Scinet NOC. This is to allow us to construct the ring and mesh topologies of the Open ROADM network.

Involved Parties

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References

[1] S. Okamoto, et. al, "Reconfigurable In-network Security Sensor Network with beyond 5G Emerging Technology (REINS network)," to appear in 2022 International Conference on Engineering Technologies for Communications (ICETC 2022), Tokyo, Japan, Nov. 2022.

This work is partly supported by "Reconfigurable in-network security sensor network with beyond 5G emerging technology Project (REINS network)" the commissioned research (02501) of the National Institute of Information and Communications Technology (NICT), JAPAN and JGN TB-A220001.