Final Project Report
(Executive Summary)
Form

I. Title of Proposed Project:

ASEAN forum for Software Defined System on Disaster Mitigation and Smart Cities

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IV. Total Amount (US$):
USD116,000

V. Duration (6-36 Months):
April 2016, 36 months

VI. Executive Summary

This project addresses the impact of climate change on cities and urbanization, with particular relevance to the priority area of improving environmental resilience and more specifically in disaster mitigation. This collaboration proposes a flexible and robust distributed framework for disaster mitigation, crisis communication and emergency management that can monitor disaster events in near-realtime, based on computational platforms, ranging from automated weather sensors, water gauges, smartphones and laptops, to remote computing and data storage platforms. – the platform would be based on dual-use infrastructure using the latest Software Defined System technologies. The proposed forum will find critical technologies, use cases and develop and deploy collaborative platform in ASEAN region. Use of NICT's existing testbeds such as JGN-X, Starbed and JOSE will have great leverage of research and development. Collaborating with already funded activities in each institution as well as outside projects such as PRAGMA (NSF, US), CENTRA (NSF, US) and CECEA (Taiwan), we can accelerate our activities.

The project is divided into 3 sub-projects looking into i) Visualization of Distributed Environmental Data; ii) SDN-IP Peering for IoT Data Transmission and iii) SDN/NFV Infrastructure. In summary, the initial studies made indicate that Software Defined Systems can provide potential solutions to setup a resilient infrastructure to support activities in smart cities and disaster management allowing reliable data sharing and redundancy as well as collaborative environment for among cities in ASEAN. More importantly, applications need to be researched and developed to fully explore such resilient infrastructure.

Thus, a blueprint for such activities is proposed as shown below:
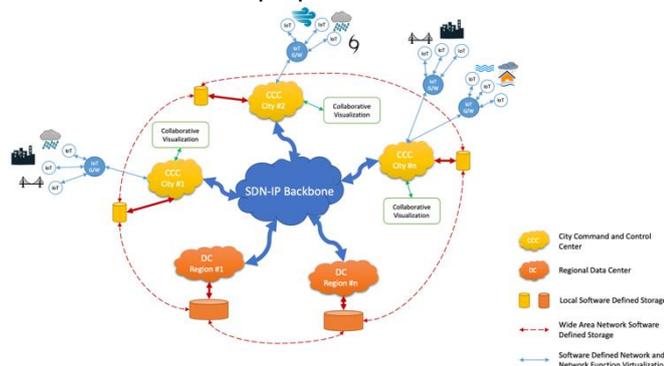
In general, by using the programmable capabilities of the underlying network infrastructure, i.e., SDN/NFV and Distributed Object Storage technologies, we can foresee that during an outage due certain disaster, different centers from different cities can share the load as the data can still be collected and shared with redundancy from the wide area software defined storage and that monitoring/planning/decision making/etc. can be made using the collaborative visualization.

Moving forward, the following areas of development can be considered i) Intelligent dynamic routing in SDN-IP backbone; ii) IoT security; iii) Network Function Virtualization for IoT; iv) Intelligent secure edge computing deployment for IoT; v) Applications for emergency management and disaster management; vi) Edge computing and edge analytics. More important, partners and cities with interests can be identified to actually implement a proof-of-concept using the proposed blueprint.

Last but not least the project has allowed 15 publications in the related fields; 7 presentations as well as 2 demonstrations conducted in various conferences.