## **ASEAN Forum for Software Defined** System on Disaster Mitigation and **Smart Cities**

**Project Status Updates ASEAN IVO Forum 2016** 

25 November 2016, Hanoi, Vietnam





















### **Outline**



- Project Background
- Project Activities for Year 1
- Focus Areas in Year 1
  - Visualization of Distributed Environmental Data
  - SDN-IP Peering for IoTs Data Transmission (Resilient Transnational Network with SDN-IP)
  - SDN/NFV Infrastructure for Disaster Mitigation and Smart Cities



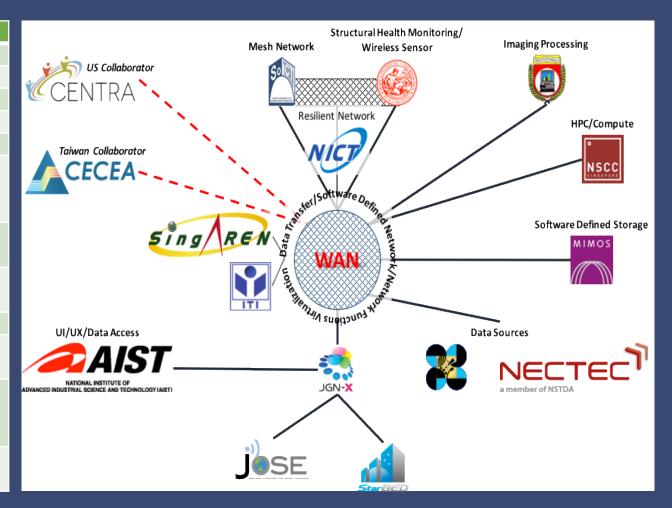
**Goals:** This project addresses the impact of climate change on cities and urbanization, with particular relevance to the priority area of improving environmental resilience and more specifically in disaster mitigation.

#### **Activities:**

- Develop a Software Defined System architecture blueprint for disaster mitigation, crisis communication, and emergency management that can monitor and report disaster events in near-real-time.
- Investigate programmability aspects of IoTs technologies, networking, and edge/cloud computing platforms.
- Conduct field testing of potential use cases using NICT's existing testbeds such as JGN-X, Starbed, and JOSE.
- Organize workshops with ASEAN members to disseminate R&D results.
- Dialogue with PRAGMA (NSF, US), CENTRA (NSF, US), and CECEA (Taiwan) on similar R&D challenges to accelerate project activities.



	Member	Affiliate Institution	Country
1	Jason HAGA	AIST	Japan
2	Eiji Kawai	NICT	Japan
3	Hiroshi Kumagai	NICT	Japan
4	Hong H. ONG	MIMOS	Malaysia*
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7	Alejandro H. Ballado Jr.	Mapua Institute of Technology	Philippines
8	Jelina Tanya H. Tetangco	ASTI	Philippines
9	Bu Sung LEE	SINGAREN	Singapore
10	Kanokvate Tungpimolrut	NECTEC	Thailand
11	Hong Son NGO	Hanoi University of Science and Technology	Vietnam
12	Van Dzung DINH	Vietnam National University (Hanoi)	Vietnam



## **Project Activities for Year 1**



January-March 2016

- ASEAN IVO Forum @ Philippine in January
- Proposal submitted in February.
- Proposal approval received at end of March

End of April 2016

 Project Kick-off Meeting (via teleconference) May-August 2016

 Members interaction on work areas and their project in progress Septembe r 2016

Project team
 1<sup>st</sup> Meeting
 @ PRAGMA 31, Thailand

November 2016

• ASEAN IVO Forum @ Hanoi

Today

December 2016

Project team
 2<sup>nd</sup> Meeting
 @ SEAIP
 2016, Taiwan

February 2017

Work areas
 PoC demo
 planned at
 month end

## 1<sup>st</sup> Project Meeting @ PRAGMA 31, Bangkok (September 2016)



- 3 Keynotes
  - Dr. Chen Academia Sinica
  - Prof. Jose CENTRA
  - Dr. Lin CECEA
- 1 Workshop
  - AirBox hands-on





- 3 work areas defined
  - WP1: Visualization of Distributed Environmental Data
  - WP2: SDN-IP Peering for IoTs Data Transmission (Resilient Transnational Network with SDN-IP)
  - WP3: SDN/NFV Infrastructure for Disaster Mitigation and Smart Cities





	WP1: Visualization of Distributed Environmental Data	WP2: SDN-IP Peering for IoTs Data Transmission	WP3: SDN/NFV Infrastructure
Objectives	<ul> <li>To create reliable software defined distributed storage platform for seamless access and visualization</li> </ul>	To federate IP networks with SDN-IP for resilient and effective infrastructure	<ul> <li>To build a ASEAN SDN/NFV Testbed (Philippines, Vietnam, Myanmar, Japan, Taiwan)</li> </ul>
Problems to be solved	<ul> <li>To ensure consistent access to environmental data</li> <li>To ensure data resiliency</li> <li>To facilitate data discovery</li> <li>To address data security</li> <li>To enable ease and standard visualization</li> </ul>	<ul> <li>Interconnection through legacy internet by IP tunneling</li> <li>Migration to native SDN connection (work with POC for SDN/IP (performance, feasibility)</li> <li>Integration with access network such as Free space optics</li> <li>Automatic configuration of test environment on PRAGMA-ENT</li> </ul>	<ul> <li>Reliable/resilient network</li> <li>loTs enabled transport system (environmental sensors and gateways/MQTT broker)</li> <li>Case study 1: Early Warning Systems (e.g. flood, typhoon, earthquake monitoring)</li> <li>Case study 2: Smart Environment</li> </ul>
Team members	<ul> <li>ASTI (Data resource, Data Management)</li> <li>MIMOS (Distributed Object Storage)</li> <li>AIST (Data Visualization)</li> <li>NECTEC (Data resource)</li> <li>NICT (Testbed, SDN, NFV)</li> </ul>	<ul><li>HUST</li><li>NICT</li><li>ASTI</li><li>NECTEC</li><li>SINGAREN</li></ul>	<ul><li>VNU</li><li>HUST</li><li>MAPUA</li><li>UCSY</li><li>NICT</li></ul>
Additional collaborators	<ul><li>NCHC (Additional use cases)</li><li>NAIST (SDN, NFV, PRAGMA-ENT)</li></ul>	<ul><li>NCHC</li><li>Osaka U</li></ul>	<ul><li>NCHC</li><li>Osaka U</li></ul>



# ualization Storage

#### Phase 1:

#### Phase 2:

#### Phase 3:

- Setup and configure the distributed object storage on the NICT Testbed (JOSE)
- Optimization and tuning
- Data harvesting (Data migration and validation, e.g. environmental data, NOAH data, Dam data)
- Data management and access methods,
   e.g., VO concept, "Dropbox" like.
- Data visualization (SAGE2)

 Software Defined Storage Infrastructure (leveraging SDN-IP and SDN/NFV)

# **WP2: SDN-IP**

- Connect JAPAN (NICT) –
   Taiwan (NCHC) with SDN-IP
- Introduce JOSE and IOT testbed to SDN-IP
- Connect Vietnam (HUST) and Philippines (ASTI) with IP tunneling and migrate
- Building software based environment for SDN (Te-Lung)
- IP tunneling base OpenFlow environment

IoT testbed inclusion

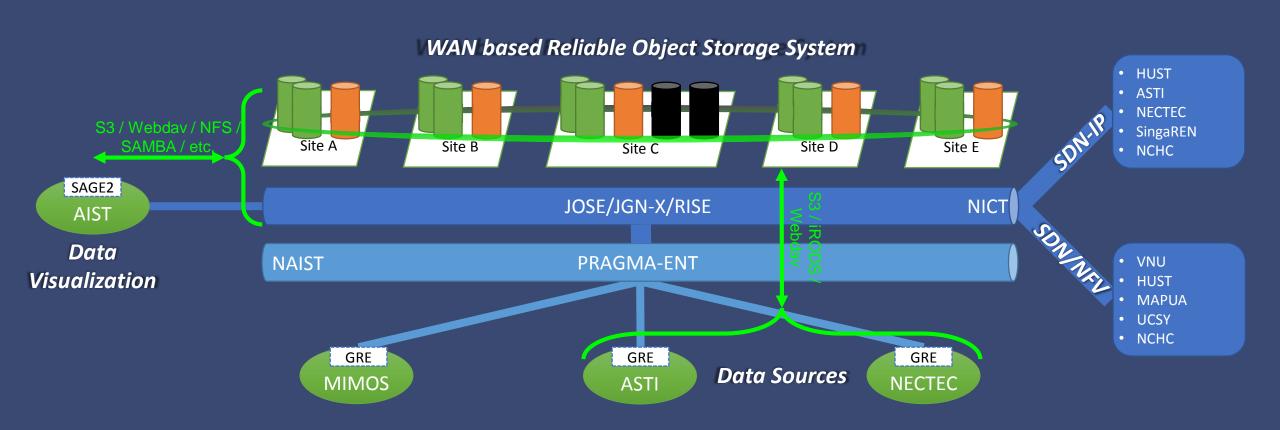
Inclusion of application

WP3: SDN/NFV ofrastructure

- Establish a local SDN/NFV testbeds
- Establish the international connections between the testbed and with the NICT JOSE, RISE and PRAGMA-CENTRA, CECEA
- Set-up trials/tests of proposed reference solutions(resilient/loTs)

### Reference Architecture







# Thank you