



Opportunities for APAN and PRAGMA Collaborations

APAN 41

PRAGMA 30

Manila, Philippines

2016.01.28



Asia-Pacific Advanced Network





Thank You

- Markus Buchhorn, General Manager, APAN
- Denis F. Villorente, Director, ASTI
- Jelina Tanya H. Tentango, ASTI





Overview: Where are we going?

- PRAGMA Collaborative Framework and Activities
- US CENTRA – CECEA – ASEAN IVO
- Opportunities for Collaboration with APAN

PRAGMA's Birth and Evolution

2001 – Present

Establish a Community; Sustain Collaborations

Future – To Be Created

?

PRAGMA New Directions, People, Activities

Change Directions

Focus

First Steps

Teething

Birth

Gestation

Pre-conception

Idea Planted

Direction Set;
Built on
Framework

PRAGMA
Launched;
Idea to Action

Built the PRAGMA Grid
Tried to Make it Useful

Virtualization;
Grid is Dead

Virtual Infrastructure
Data, ENT Testbed
Sustained Expeditions

PRAGMA Students

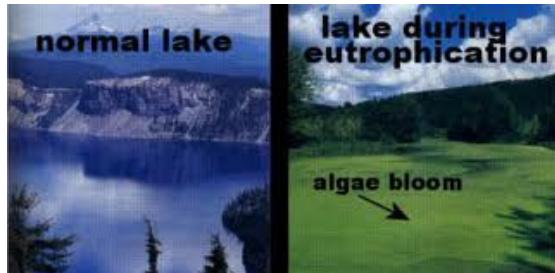
PRIME: 2004 - 2015

GLEON's Birth and Growth

1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
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SEAIP: 2005 ...
PRAGMA Institute 2006

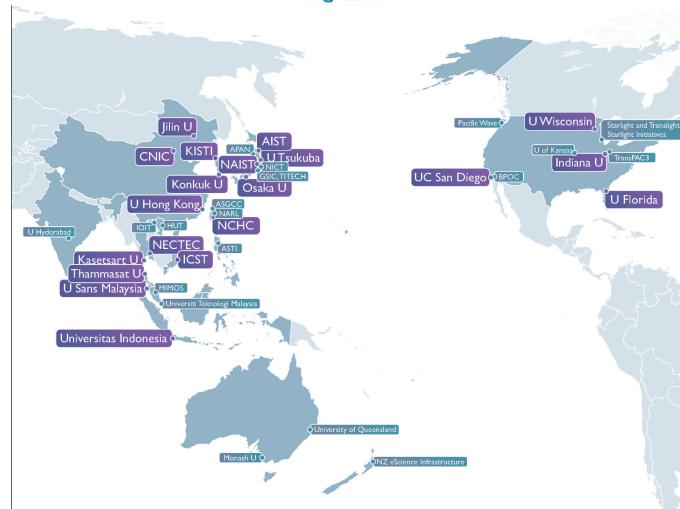
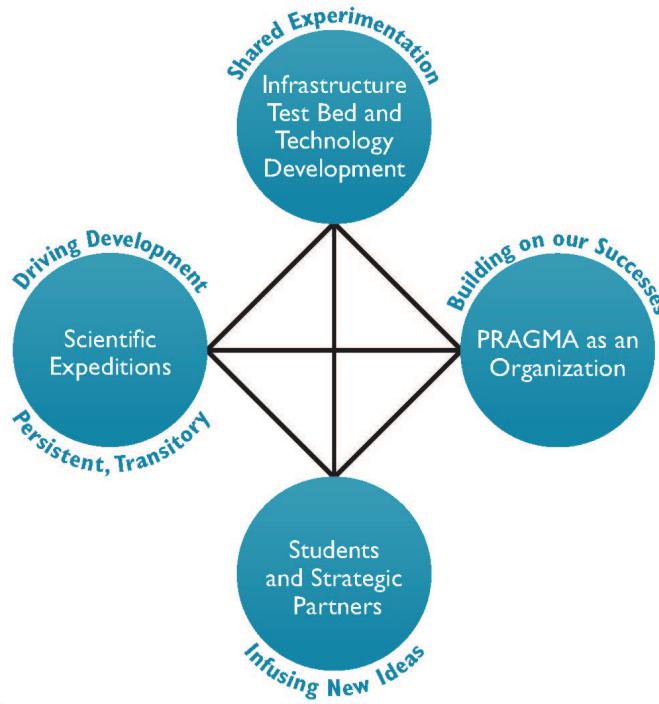
Enabling the Long Tail of Team Science



Virtual Scientific Expeditions



PRAGMA Students



PRAGMA Member Sites

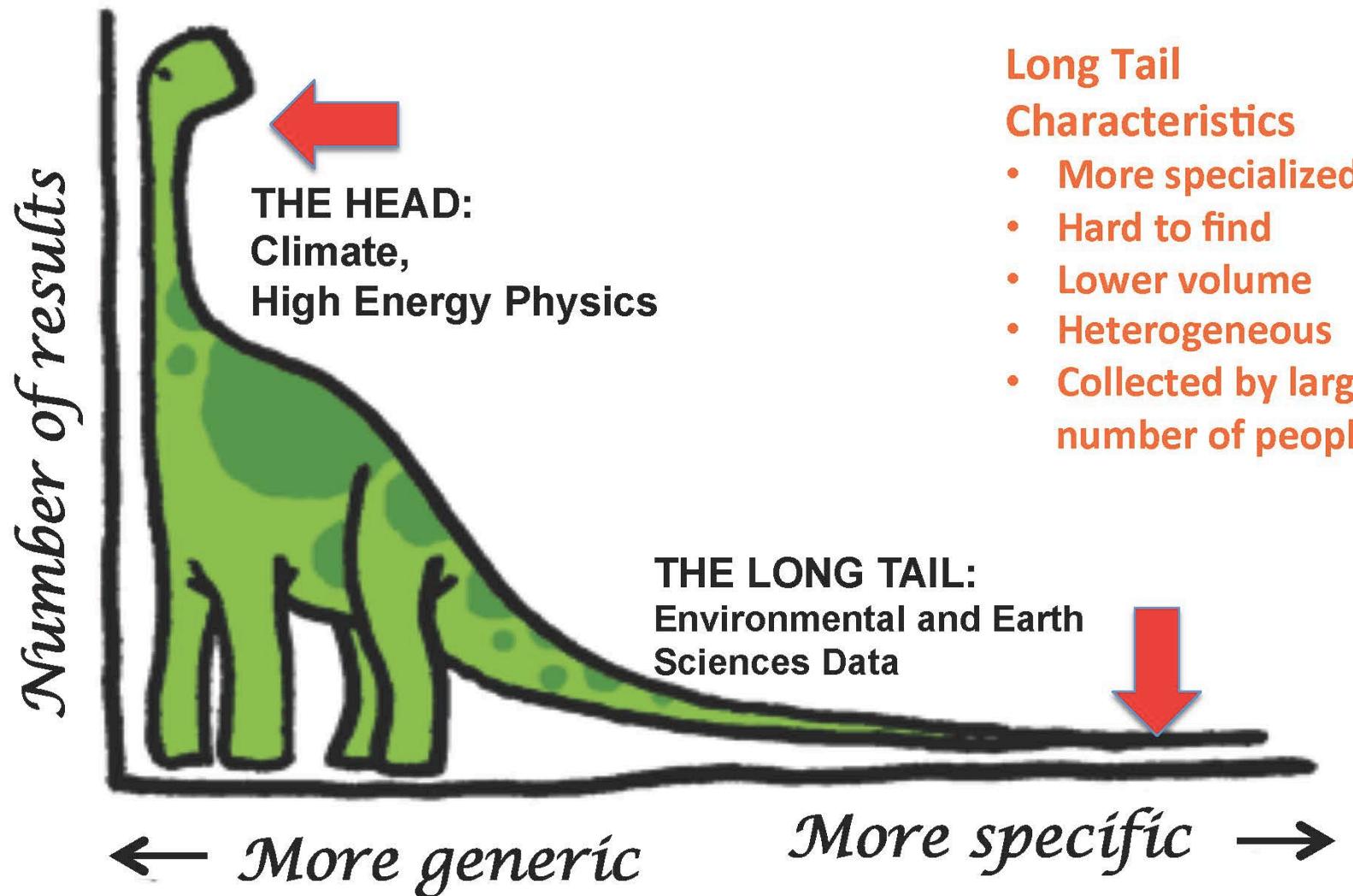


Trust Envelop



PRAGMA Community

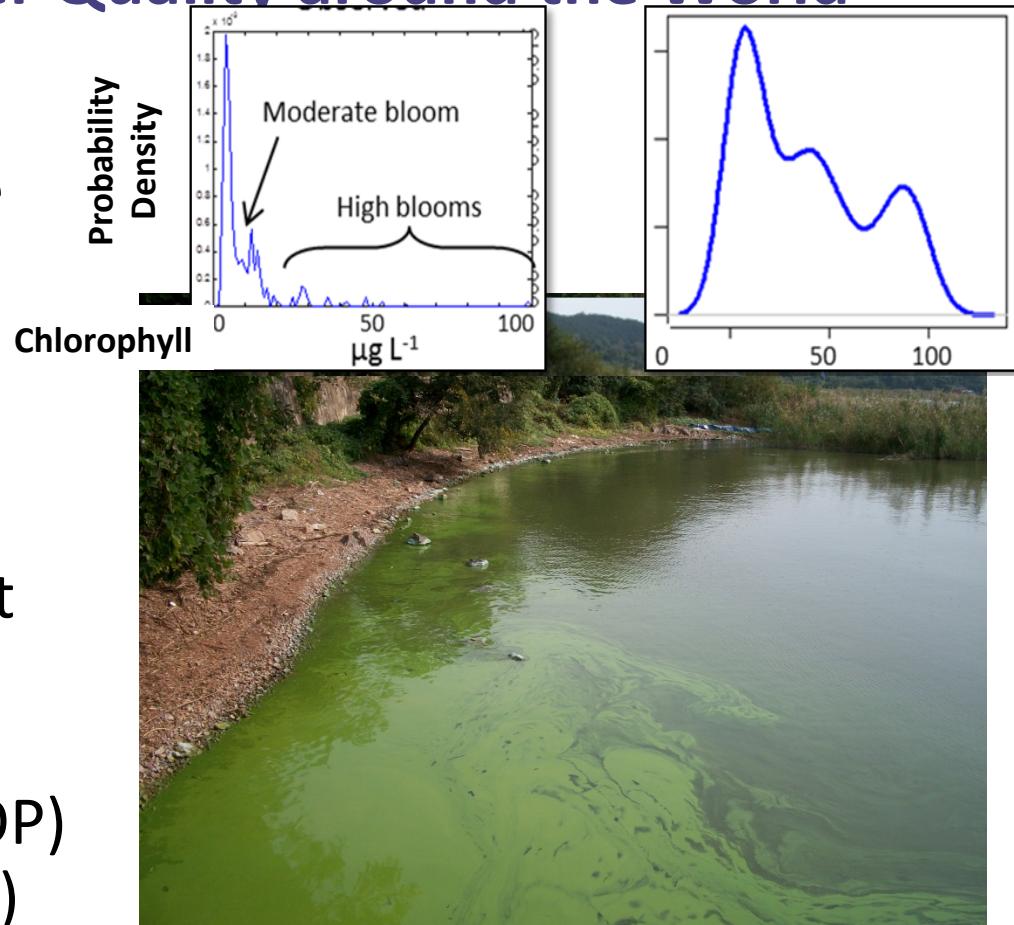
Environmental and Earth Sciences Data have Characteristics of a Long Tail



PRAGMA-GLEON Expedition

Understanding and Predicting Degradation of Lake and Reservoir Water Quality around the World

- What factors influence algal blooms, to enable prediction?
- Multiple factors (parameters) that are inputs to models
- To develop models that reflect data requires scaling computation, easily (IP-over-P2P (IPOP) virtual network project)



Source: Cayelan Carey

Contributors: Renato Figueiredo, Kensworth Subratie (U FL);
Paul Hanson, Craig Snortheim (U W); Cayelan Carey , Jon Doubek (Virginia Tech)

PRAGMA+GLEON = GRAPLE Lake Expedition

Lake ecology science questions

Identify and iterate problems, requirements

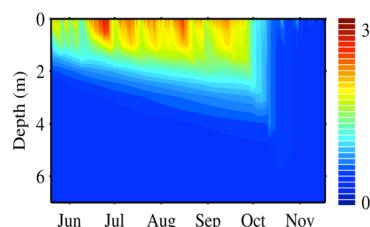
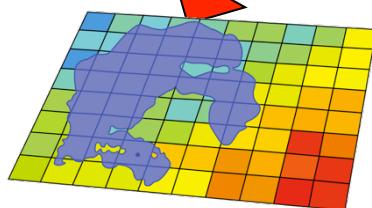


Paul C. Hanson (U. Wisconsin)
Cayelan C. Carey (Virginia Tech)
Renato J. Figueiredo (U. Florida)



Inter-disciplinary collaboration

Engage and build the community
Research, education



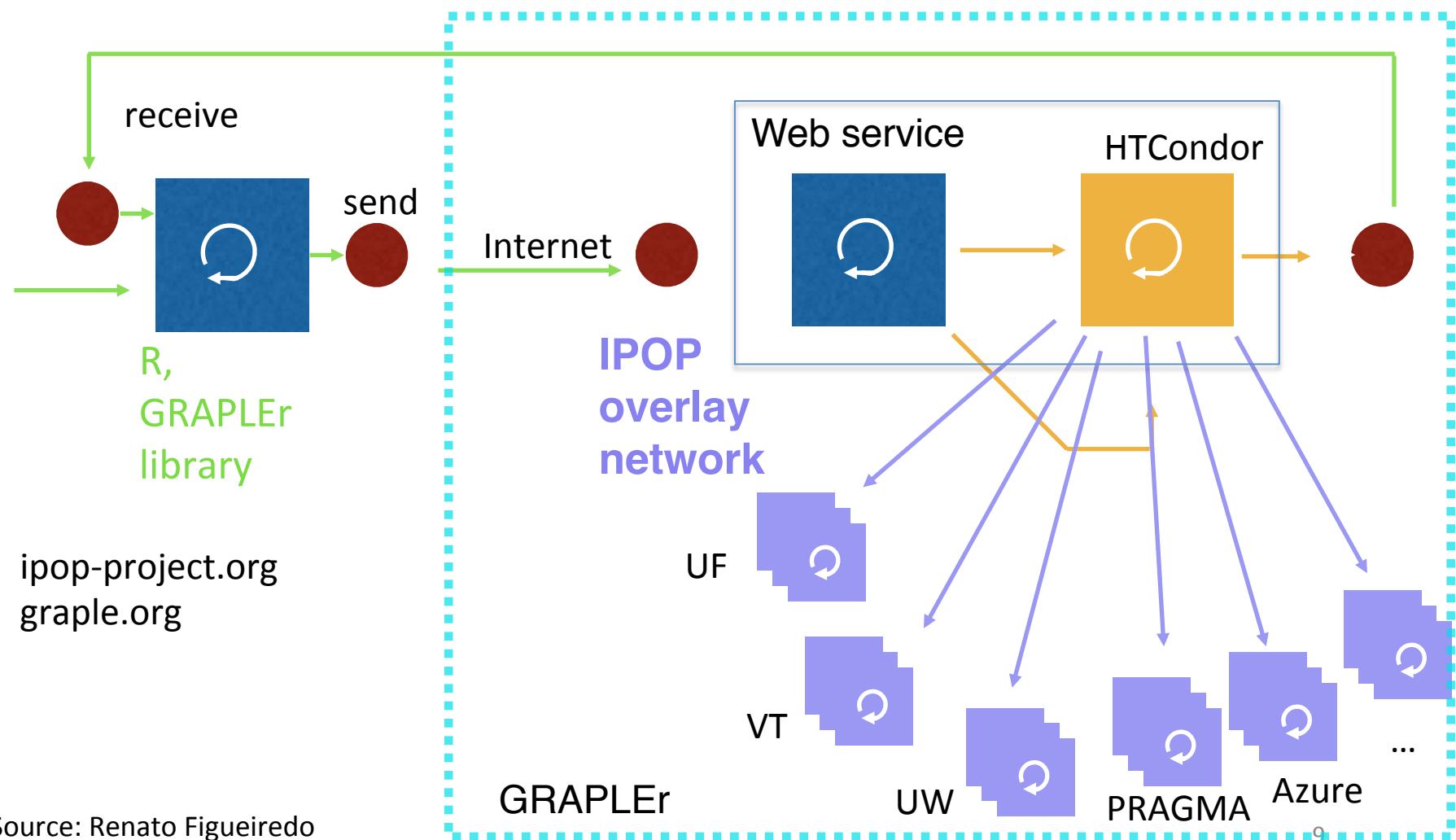
GRAPLER

Source: Renato Figueiredo



Technology that Enables Science

- IPOP (IP-over-P2P): PRAGMA user-level overlay virtual network
- HTCondor: high-throughput computing job manager
- GRAPLER: Web service – R client interface



Virtual Biodiversity Expedition

Predicting Species Distribution

- Biodiversity
 - Understanding biodiversity critical to life
 - Southeast Asia: Area of growth, biodiversity, and biodiversity loss
 - Mt. Kinabalu: Biodiversity



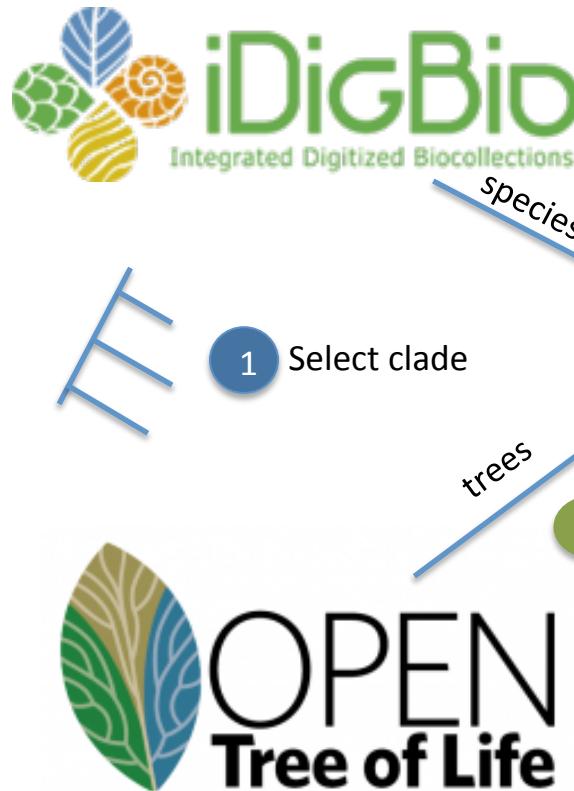
Mt Kinabalu, Sabah, Malaysia
Biodiversity in Extreme
Environments



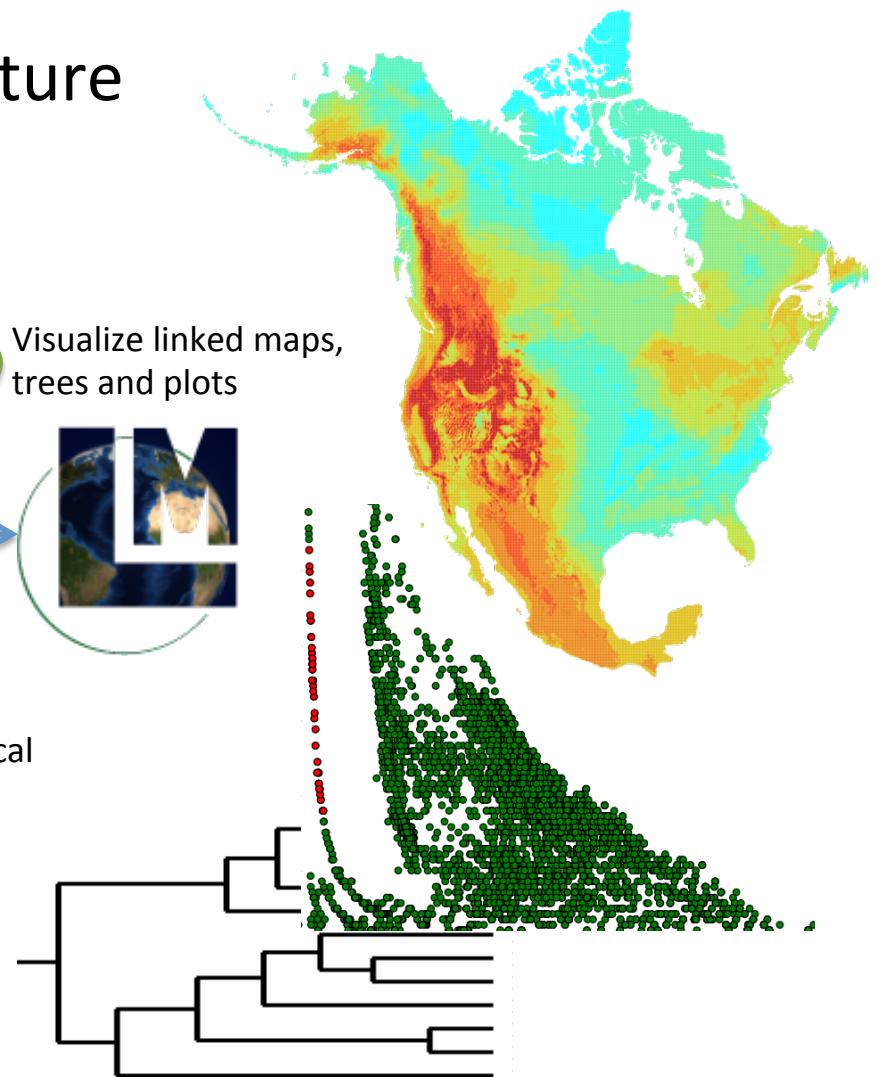
UAV at Kinabalu Donkey Ears
June 2014

Lifemapper: Key to Virtual Expedition

- Biodiversity modeling, analysis, visualization
- Single and multi species
- Complex software infrastructure



- 1 Select clade
- 2 analyze multi-species data:
 - measure macro-ecological shifts over time
 - quantify and qualify biodiversity
- 3 Visualize linked maps, trees and plots



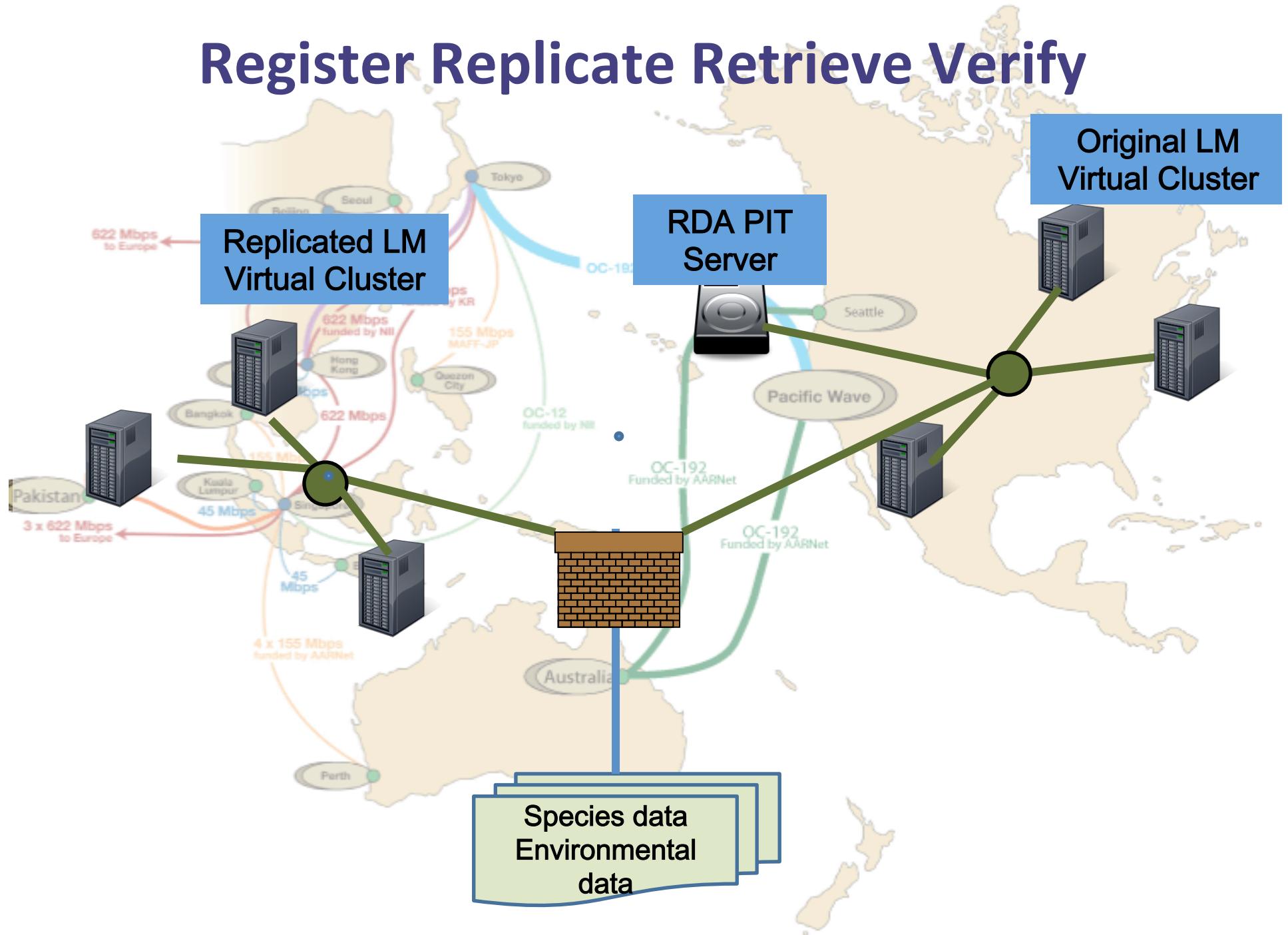
Lifemapper on PRAGMA Testbed

Deploy computational model remotely

Use on sensitive or licensed datasets



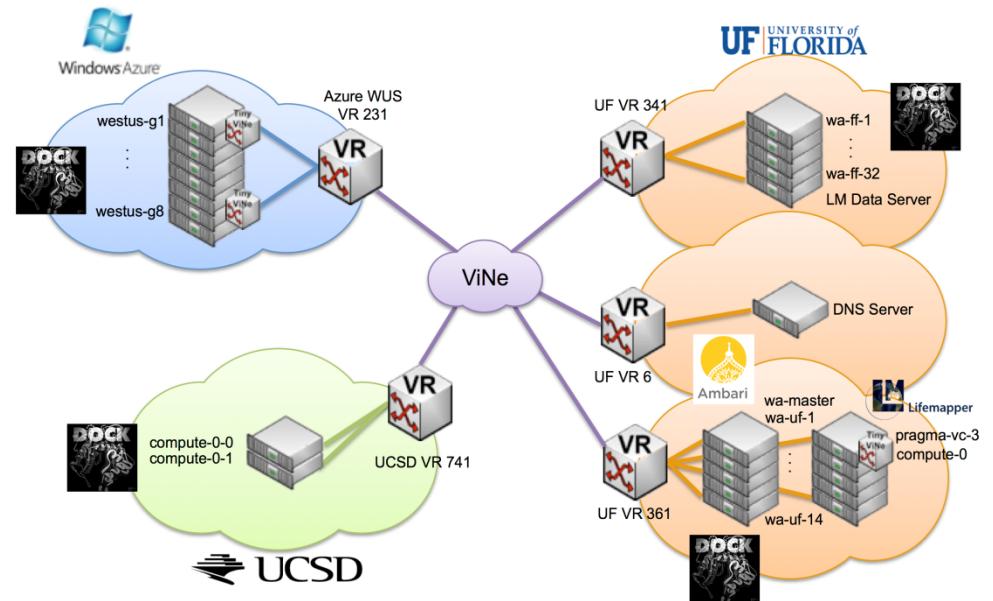
Register Replicate Retrieve Verify



Biosciences

Focusing Infrastructure Efforts to Combat Infectious Diseases

- Virtual Screening
 - Multicloud Environment for virtual screening
 - Unified natural products database, starting from Professor Shigehiko Kanaya's (NAIST) KNApSack Family
- Genomic Analysis
 - Create a platform for genomics analysis using Galaxy



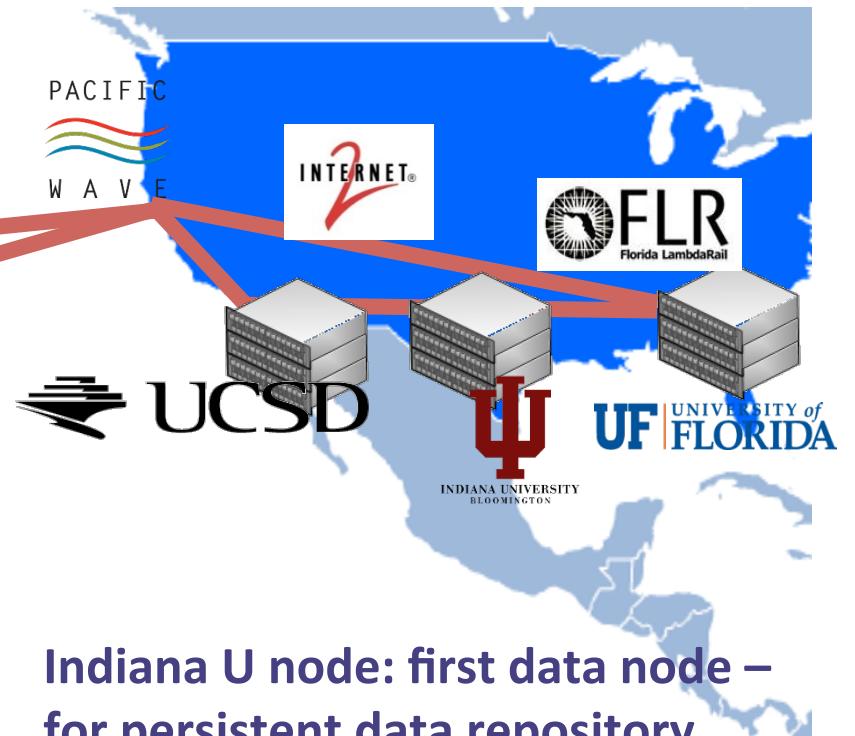
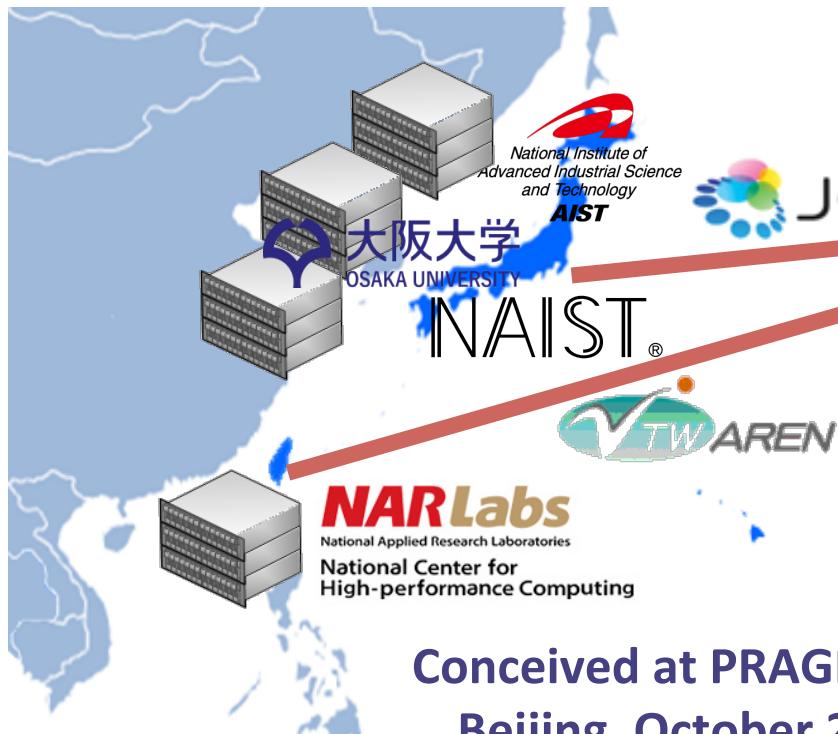
Multicloud, courtesy
A. Matsunaga

Participants: AIST, USM, HKU, UI, ICST, VNU

PRAGMA Experimental Network Testbed (ENT)

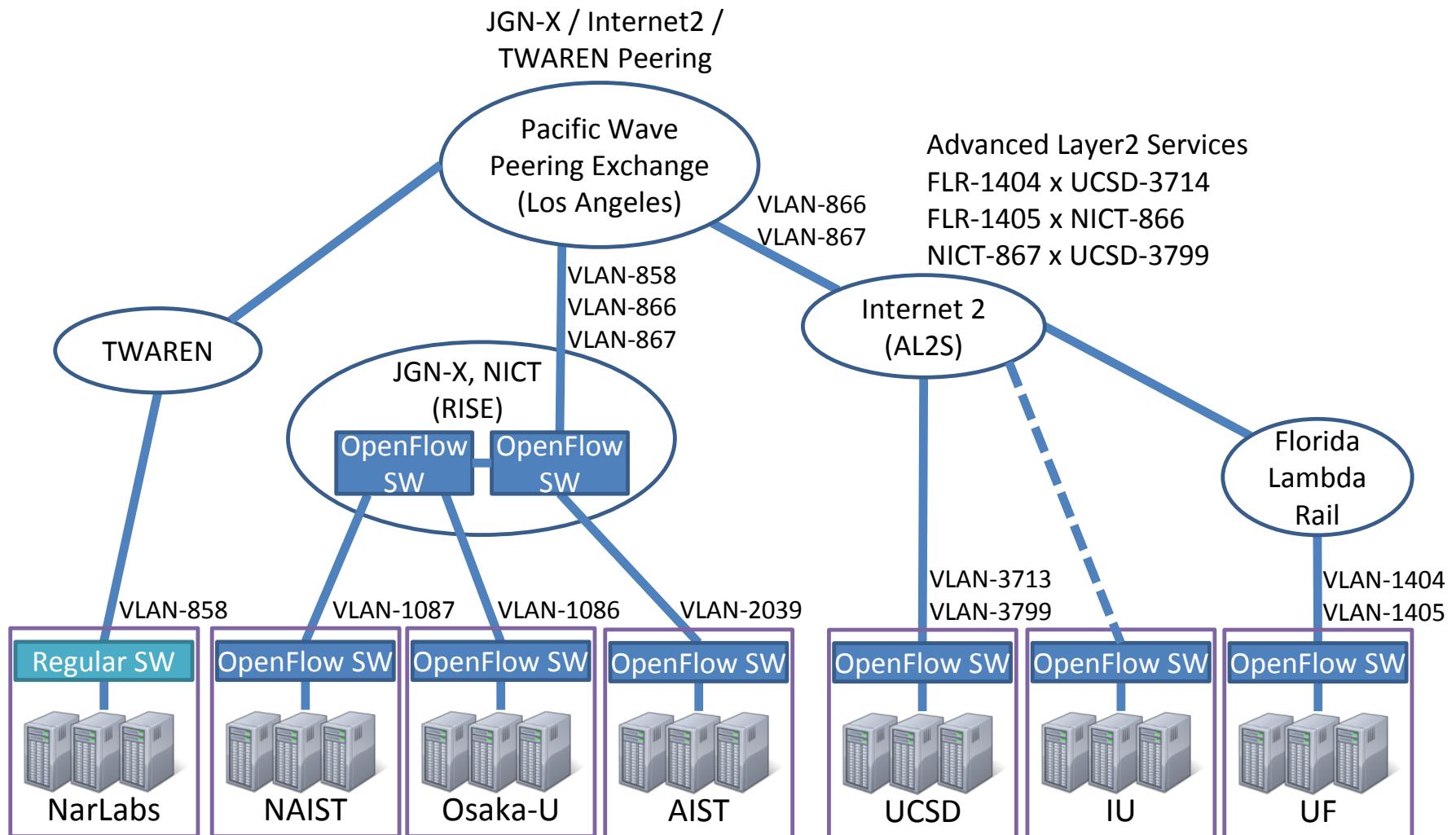
A Resource for the PRAGMA Community

- An international SDN/OpenFlow testbed for use by PRAGMA researchers and collaborators
 - provides complete freedom to access and configure network resources

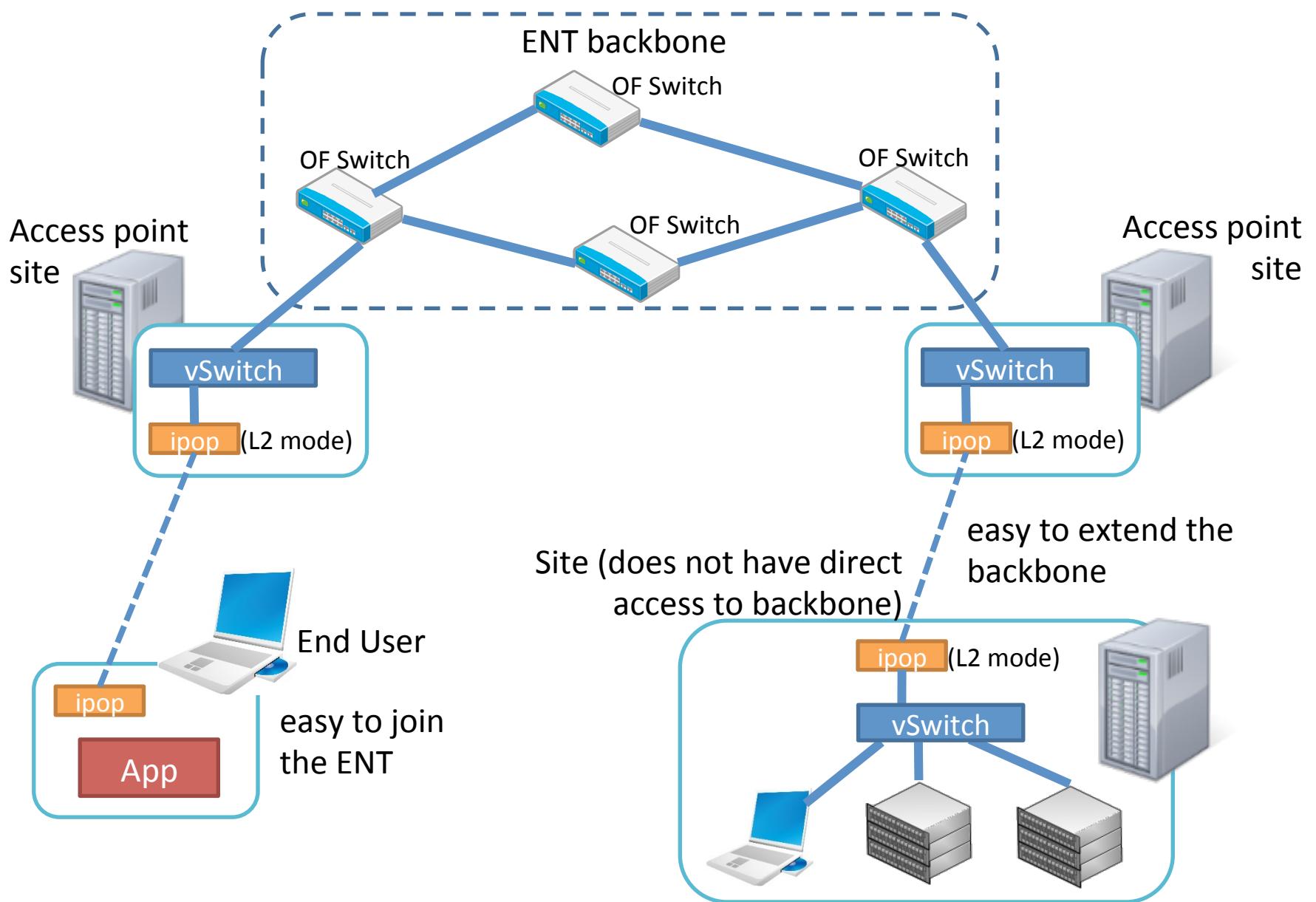


Backbone of PRAGMA-ENT

Currently, seven institutions are involved in the project.
Their resources are connected each other through
academic network backbones



Activities: Extending backbone through IPOP



Activities: Usability study of ENT

- Based on usability study, we have been re-organizing the PRAGMA-ENT documents on github wiki
 - https://github.com/pragmagrid/pragma_ent/wiki

Documentation Then

Official PicOS documents – 34 pages

vSwitch documents – 257 pages

Single user thread

Documentation Now

PicOS documents for ENT – 4 pages

vSwitch documents for ENT – 5 pages

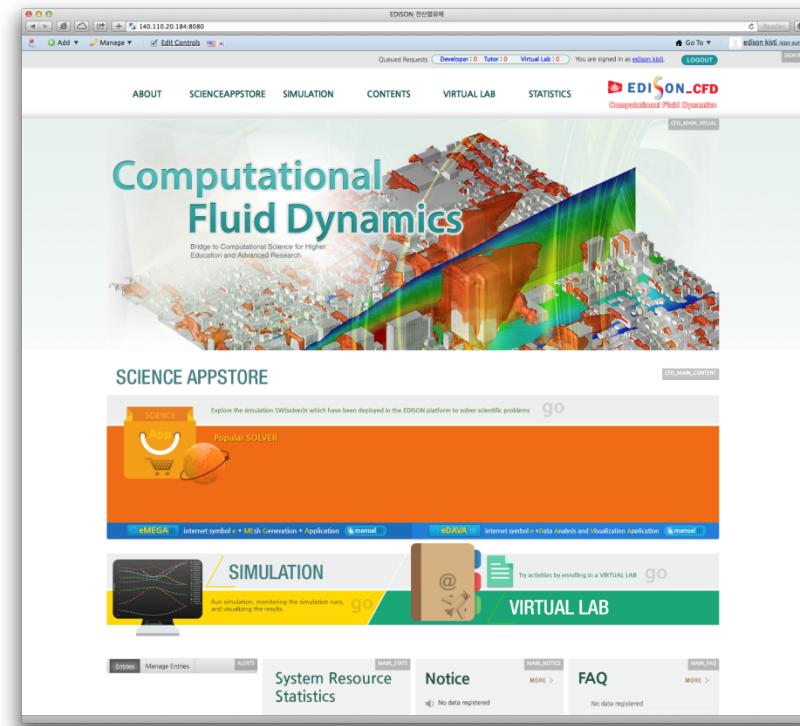
Multiple user thread

- Application user
- Infrastructure user

Cyber-Learning

Propagating EDISON and Computational Science from KISTI to NCHC

- EDISON: EDucation-research-industry Integration through Simulation On the Net.
 - A simulation based Cyber-Learning system
 - In Korea, 32,000 users from more than 150 universities
 - Five Computational Science and Engineering disciplines
- Challenges Overcome:
 - system configurations, firewalls, account management, computing resources, and graphic user interface (GUI) for Chinese



Edison CFD site at NCHC

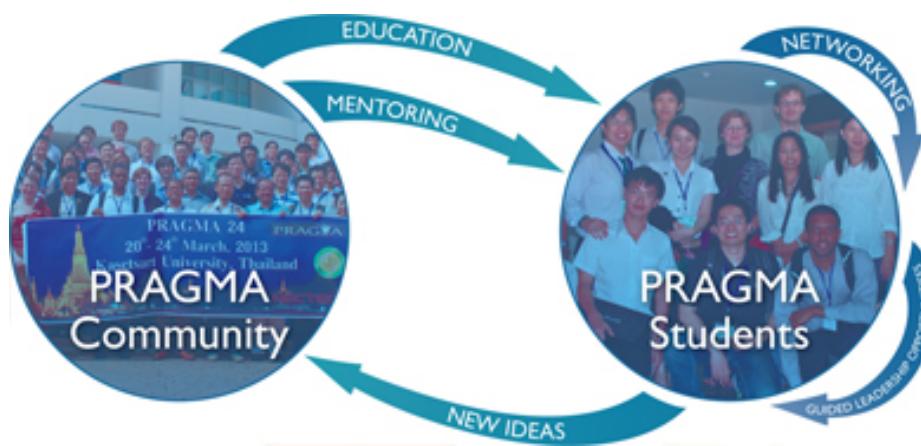
Participants: KISTI, NCHC

Infusing New Ideas

Developing and Stimulating Community

Developing PRAGMA Students

- Make student network, strengthen student research!



Helping Launch New Collaborations

- US—East Asia Collaborations to Enable Transnational Cyberinfrastructure Applications

Engaging Communities

- Biodiversity



- Lake



- Disaster Mitigation



- New Members



- International Clouds for Data Science

PRAGMA Students

Student Led Activities for Professional Growth

- Value to students
 - Stimulates inspiration, information sharing and collaboration
 - Strengthening research and ability for scientific exploration through activities and interactions
 - Short term residence at other PRAGMA sites
- Contribution to PRAGMA
 - Organize posters and student focused workshops
 - Engage in research



PRAGMA Student co-Leads: Quan (Gabriel) Zhou, Meilan Jiang,
Pongsakorn U-chupala, Chawanat Nakasan



SEAIP

Southeast Asia International
Joint Research and Training Program
東南亞國際合作高速計算應用與網路共同研究暨培訓研習會



- 2014:
 - Taichung and Kaohsiung, December 1 – 5, 2014
- 2015
 - Taichung and Keelung, December 7 – 11, 2015



- Biodiversity Expedition
- CENTRA
- New members in PRAGMA



SEAIP is Important for the PRAGMA Community

Current and Future Workshops

Open Meetings, Share Progress, Set Goals

- PRAGMA 30. January 27-29, 2016, Advanced Science and Technology Institute (ASTI). Held in conjunction with the 41st Asia-Pacific Advanced Network (APAN) meeting.
 - Manila
- PRAGMA 31: September 7-9, 2016, Thammasat University
 - Bangkok
- PRAGMA 32: (tentative) March/April 2017, U Florida
 - Gainesville, FL



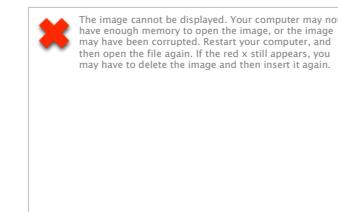
DOST-ASTI



CENTRA – CECEA – ASEAN IVO

Culmination of Joint Work and Merging of Shared Vision

- US-CENTRA: Collaborations to Enable Transnational Cyberinfrastructure Applications
 - Lead: U Florida, Jose Fortes
- CECEA: Center of Excellence for Cyber-Enablement of Applications
 - Lead: NCHC, Fang-Pang Lin
- ASEAN IVO: ASEAN - International Virtual Organization
 - Lead: NICT, Shinji Shimojo

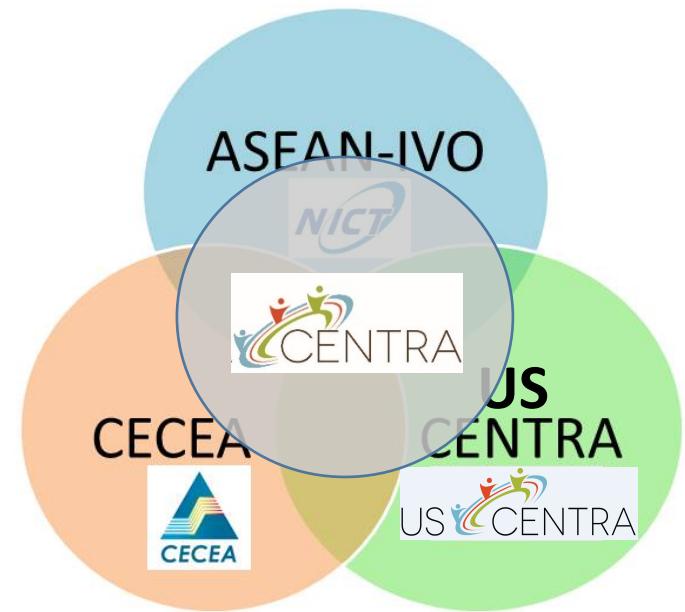


CENTRA is the aggregation of US CENTRA, CECEA and NICT-IVO



Shared Vision, Synergistic Activities

- An international community of scientists, educators, policy makers, and citizens invested in advancing research on transnational cyberinfrastructure and its applications
- A transnational network of instrumented cyberinfrastructure testbeds accessible to international teams of researchers
- A framework for the formation of long-lived collaboration teams across borders and enables their members to work together via remote communication and stays at collaborating sites.

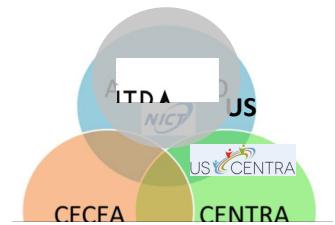


Initial Foci and Activities

Open to Ideas and Participation

- Research focus
 - Environment
 - Disaster management
 - Smart and connected communities
 - Intersection of these
- Technology focus
 - Software-defined systems: data-sharing, middleware interoperability, coordination
- People focus
 - Graduate students, junior faculty
- Background
 - Shonan Meeting
 - SEAIP Workshops
 - PRAGMA
- Initial Activities
 - SEAIP 2015
 - ASEAN IVO (APAN 41)
 - Kick-off meeting March 30 – April 1, 2016, Taipei
- Initial Collaborators
 - US, Taiwan, Japan
 - Southeast Asia

Contact: Jose Fortes , Fang-Pang Lin, Shinji Shimojo



Possible Areas for Collaboration

APAN and PRAGMA

- Disaster Management
 - Workshop with APAN WG Disaster Management, on Wednesday
- Cloud Computing
 - Cloud WG Workshop, on Tuesday
- Experimental Network Testbed
 - Represented at above workshops; Future Internet Testbed
- Student Opportunities
 - Posters at PRAGMA Meeting
- Others: Lake Ecology, Biodiversity, Biosciences, Cyberlearning
- US CENTRA – CECEA – ASEAN IVO

PRAGMA's Approach: Pragmatic!

- Start with a problem of mutual interest
- Identify people willing to work, and resources available
- Take small and concrete steps
- Work between meetings to show at the next meeting
- Set new goals, take more steps, show at next meeting



Acknowledgements and Thanks

- Organizers of APAN 41 and PRAGMA 30
 - And ASTI
- All PRAGMA participants
- National Science Foundation

