

PRAGMA22 Workshop

Apr.17-19, 2012
Melbourne, Australia



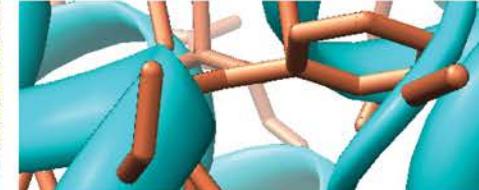
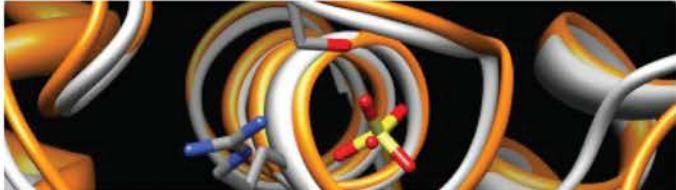
PRAGMA 22 and Beyond

Welcome!



PRAGA

Celebrating 10 Years



PRAGMA is 10 Years Old

PRAGMA 1 – March 2002



Joe Piyawut Srichaikul, Bernard Pailthorpe, Maxine Brown, Rick McMullen, Jysoo Lee,
Habibah Wahab, Yan Baoping, Teri Simas; Sangsan Lee

PRAGMA 22 – April 2012

PRAGMA Meetings

9.
Hyderabad
OCTOBER 2005

17.
Hanoi
MAR 2006

18.
Penang
OCTOBER 2009

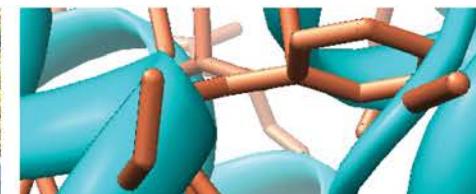
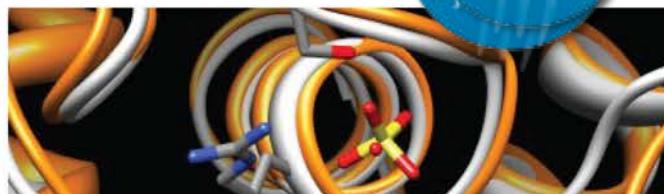
19.
Singapore
MAY 2005

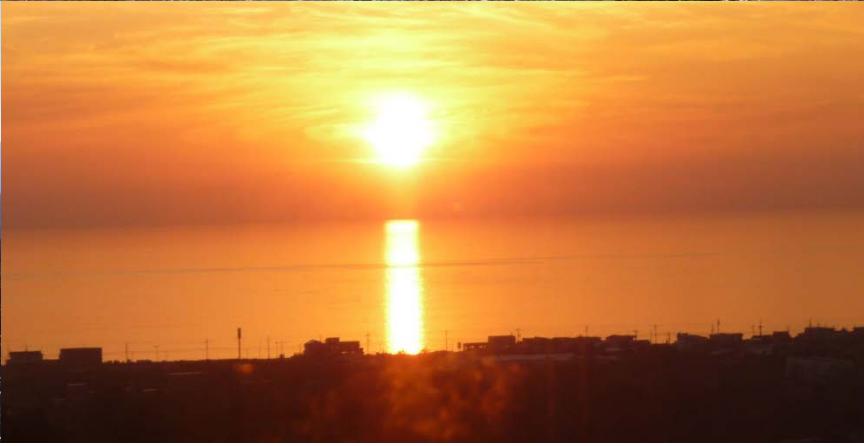
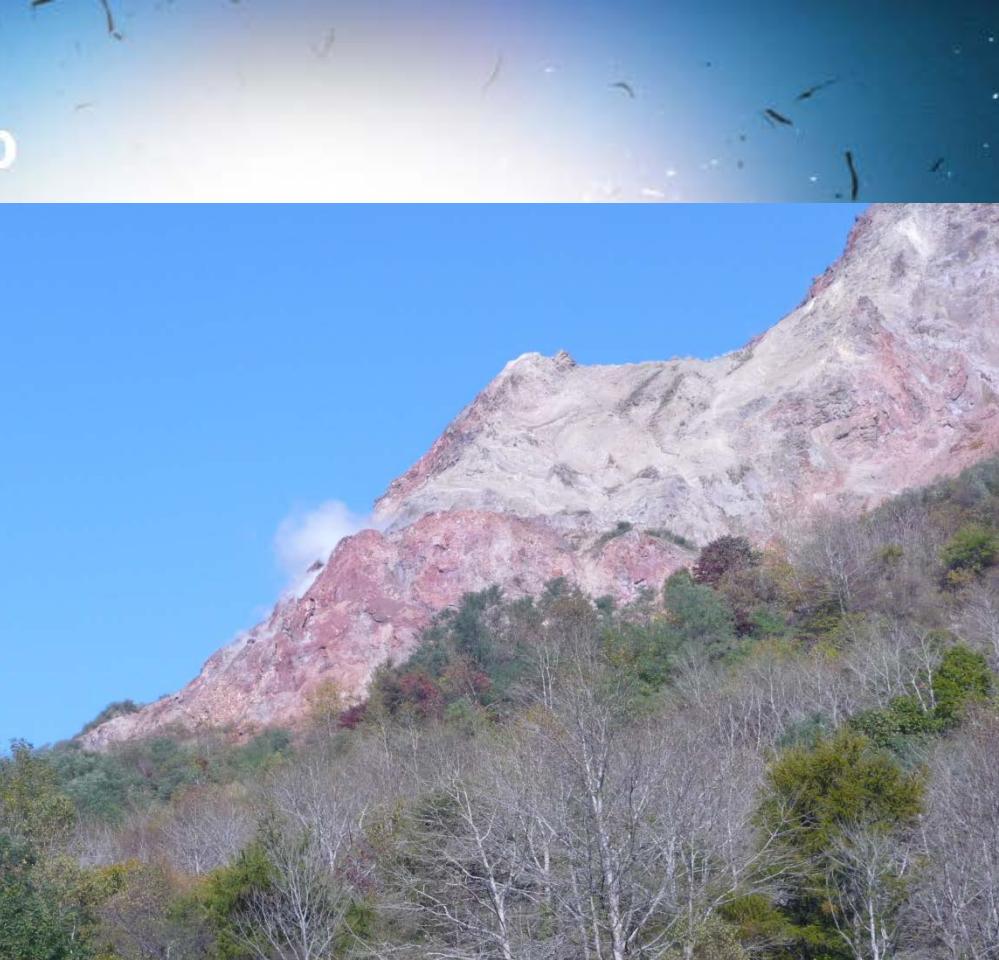
10.
Townsville
APRIL 2006

21.
Sapporo
OCTOBER 2011

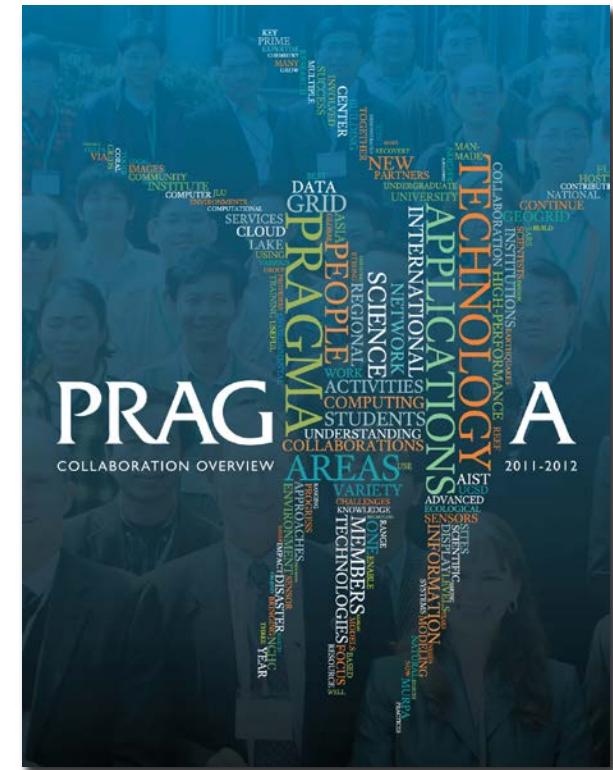
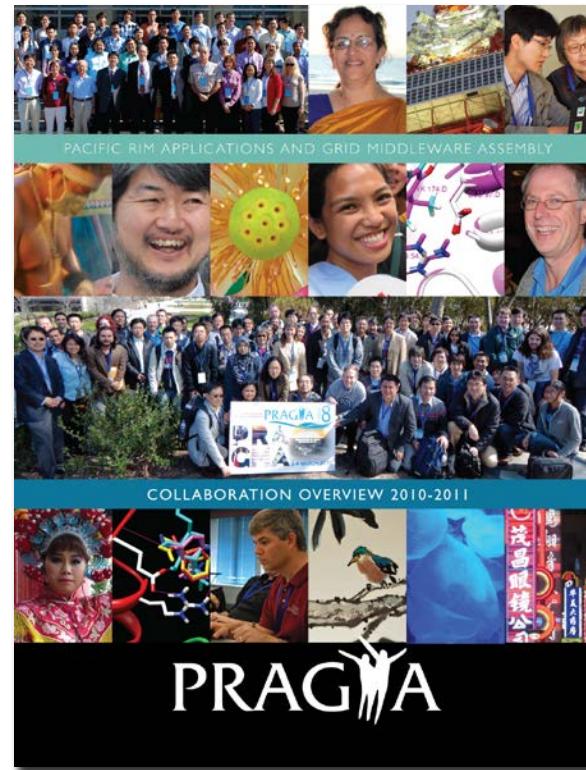
18.
San Diego
MARCH 2010

13.
Urbana-Champaign
SEPT 2007





PRAGMA in review

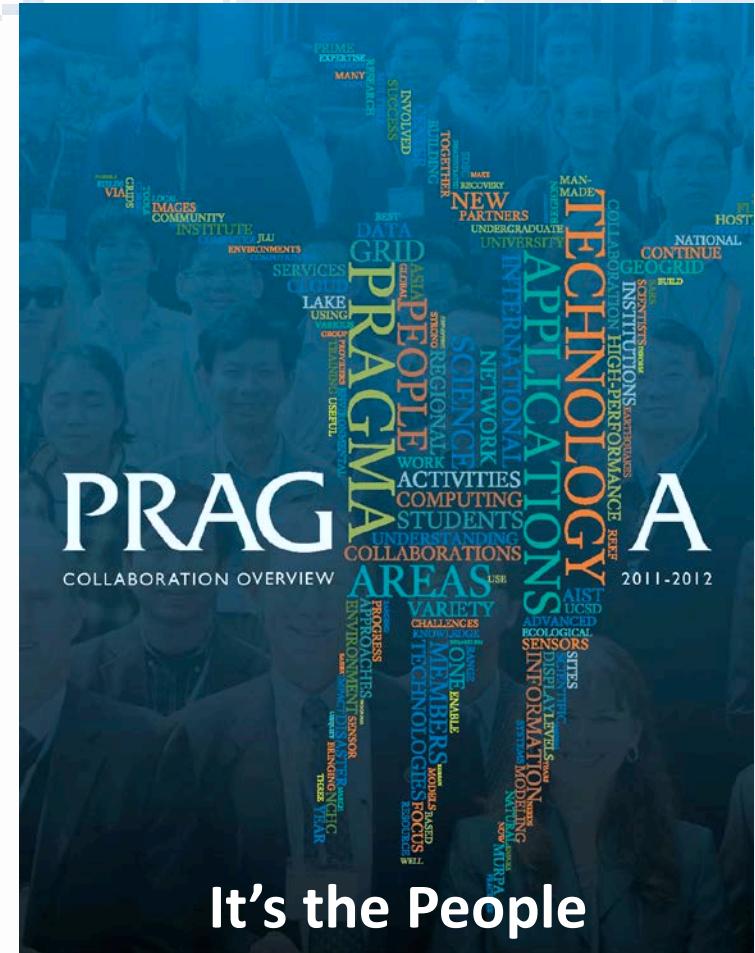


PRAGMA

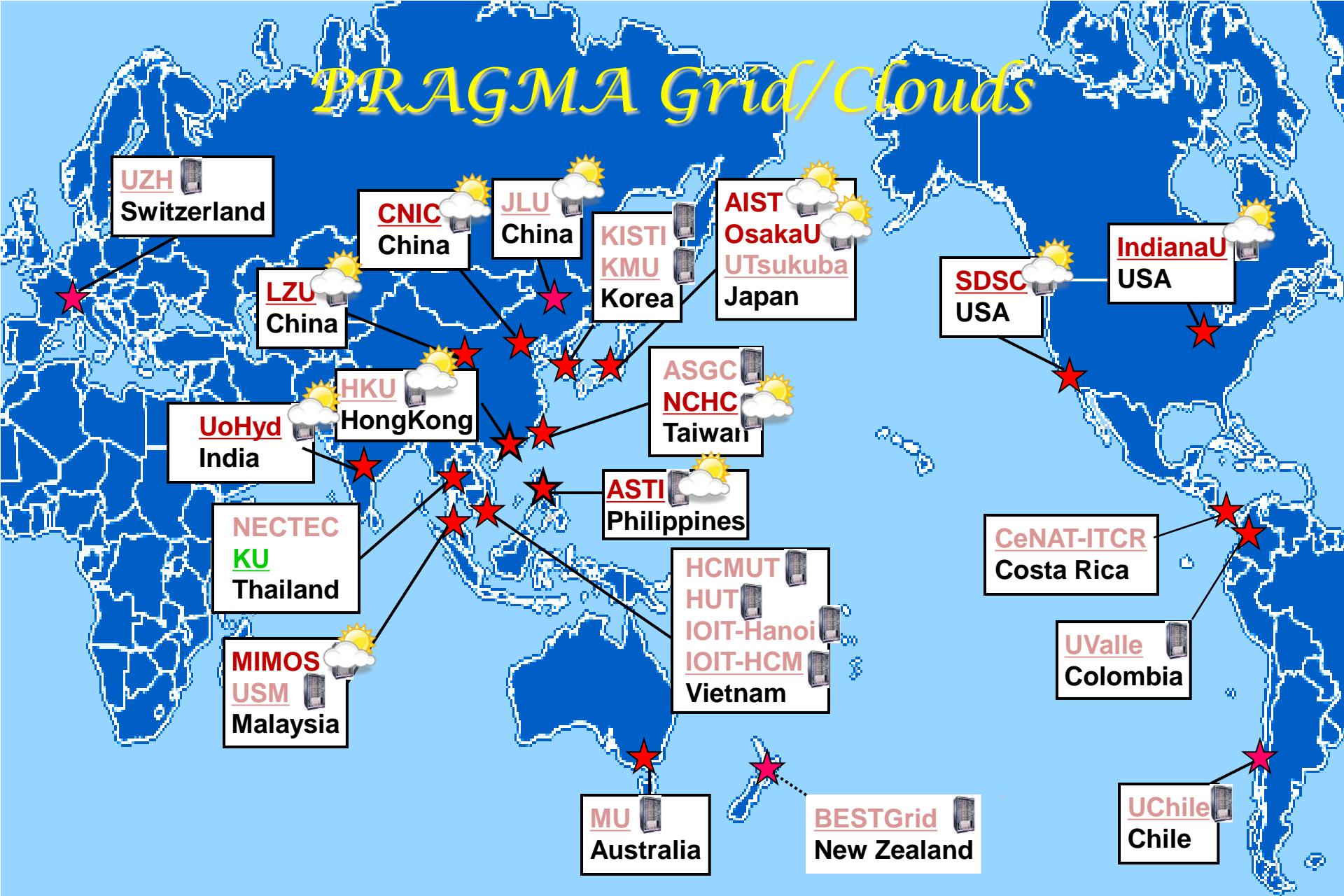
10 Years of Collaboration



- Built and used multi-provider cloud testbed
 - Driven development via Scientific Expeditions
 - Engaged new groups



PRAGMA Grid/Clouds



26 institutions in 17 countries/regions, 23 compute sites, 10VM sites

Software of PRAGMA Members

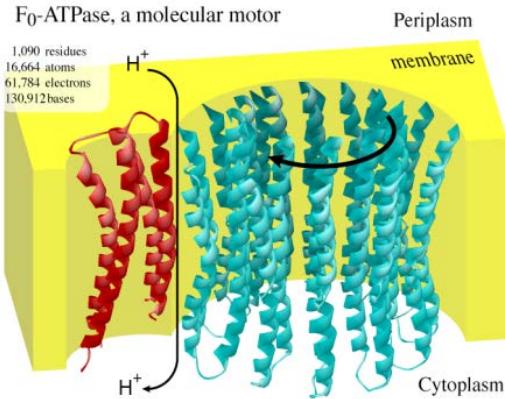
Software	Institution	PRAGMA Enhancement/Use
Ninf-G	AIST / NAREGI	Many applications
Gfarm	AIST and U Tsukuba	Virtualization Tests Avian Flu Grid
Duckling	CNIC	PRAGMA Workshops
CSF4	Jilin U	Avian Flu Grid
SCMSWeb	Kasetsart U	GOC
e-AIRS	KISTI	Tested on PRAGMA Grid
Mgrid	Konkuk/Kookmin	Avian Flu Grid
Nimrod Toolkit	Monash	Savannah experiment; Volcanic Ash Distribution PRIME students
MOGAS	NTU - Singapore	Grid Operations Center
DataTurbine	UCSD Calit2	PRIME, KEON, CREON/Thailand
SAGE	EVL UIC	PRIME
CADD	NBCR	Avian Flu Grid
Opal Toolkit	UCSD NBCR	Avian Flu Grid
INCA	UCSD SDSC	Grid Operations Center
Rocks	UCSD SDSC	Virtualization Tests

Scientific Expeditions

Evaluate and Address Needs of the Science



Savannah Burn 2006



OSG Grid Interoperability Experiment 2007

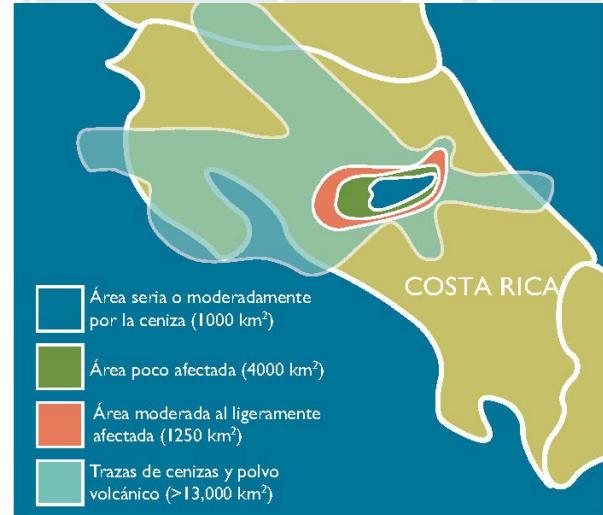
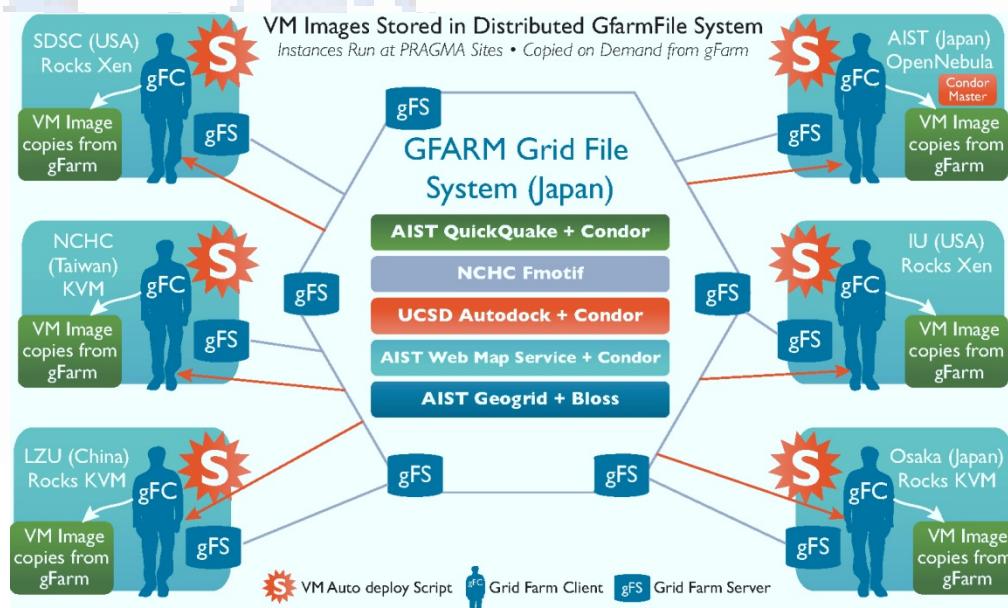


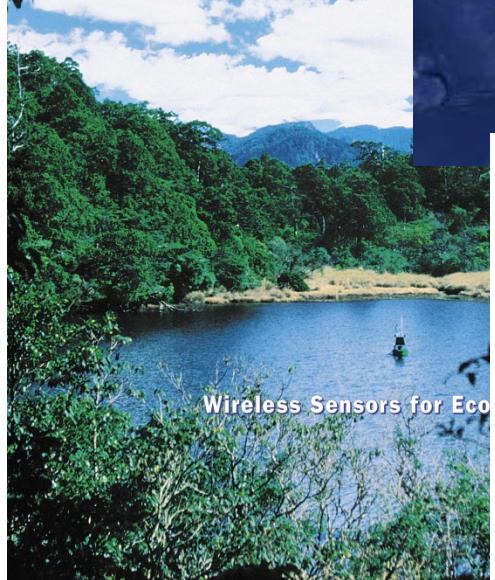
Fig. 1. Irazú volcano location and ash distribution during 1963-1965

Distribution of ash from the Irazu volcano 2010



VM Migration Experiment 2011

From Scientific Expedition to Community Building on NCHC Ecogrid



(2004)

ake to



20
18
16
14
12
10
8
6
4
2
0
Members
Aug
GLEON
global lake ecological observatory network

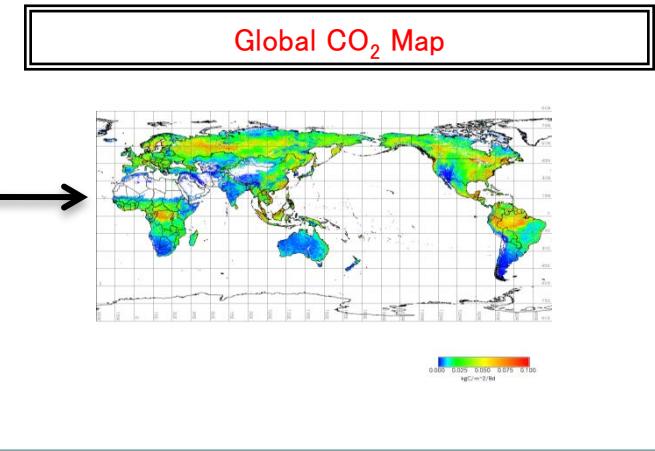
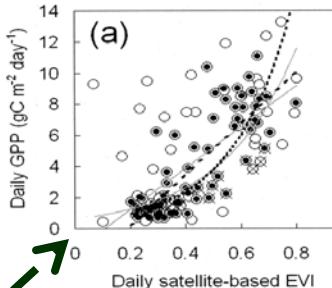
Asia GEO Grid Initiative

PI: Yoshio Tanaka (AIST)

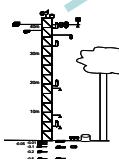


1. Catalogue Search
2. Obtain data
3. Process data
4. visualize

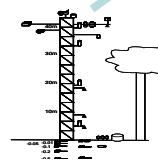
Calibration of satellite Data using in-situ data



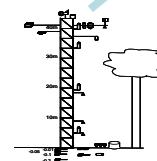
Objective: To deploy Asia GEO Grid Infrastructure in Asia to share Earth observation data and computing resources for Earth sciences.



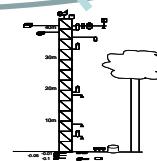
Thailand



Taiwan



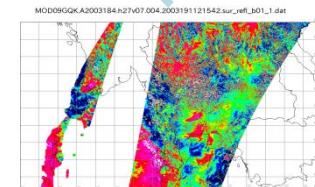
Japan



Japan



Flux Data



Satellite Data

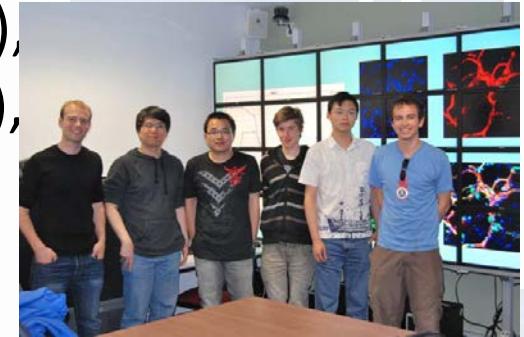
Expanding Our Community

Institutes and Workshops

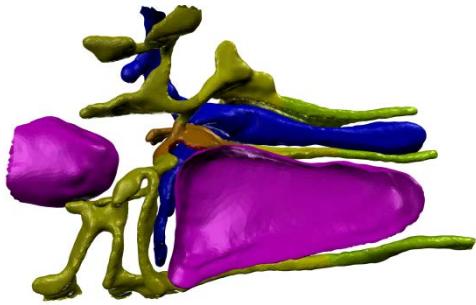


Students Experiences

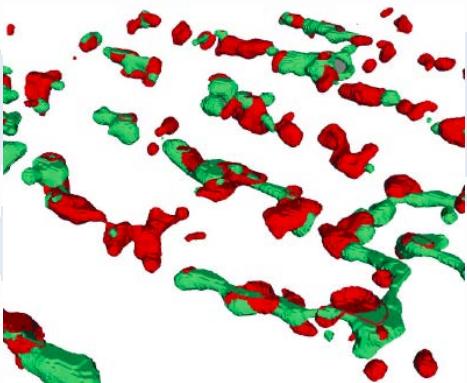
- PRIME (UCSD),
PRIUS (Osaka),
MURPA
(Monash)



Many Supporting Institution



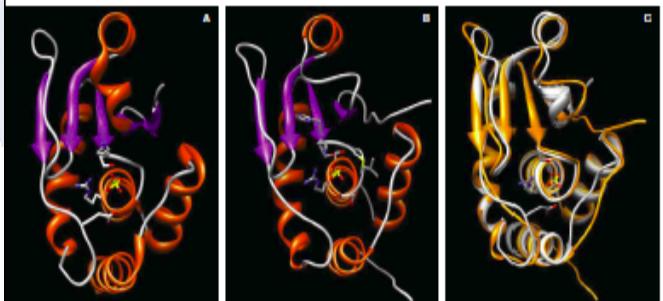
Jerry Tsai: Computational Modeling (Monash)



Joseph Wong, Microscopic Imaging (U Auckland)



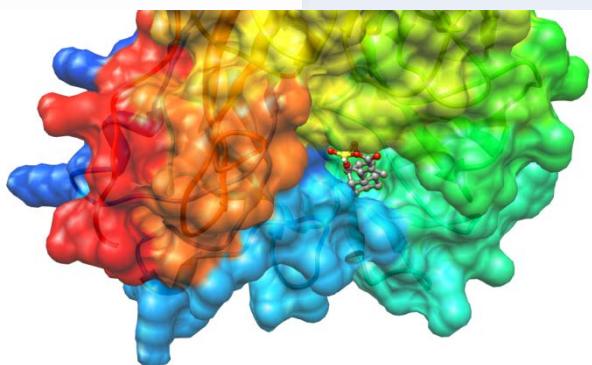
Sara Larsen, Matthew Religioso: Next Cave (NICT)



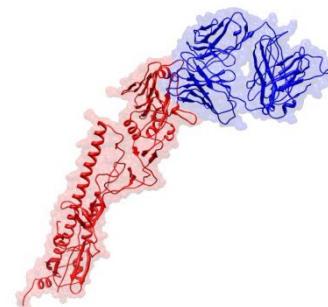
Daniel Li, Brian Tsui, SSH-2 (Osaka)



Wesley Hsu, Lance Castillo, My Gallery (NICT)



Howard Li: Avian Flu (NTU)



Alexandra Delaney, Immunology (USM)



Jeanne Wang, tablet based Sensor-enabled controller(NCHC)



Adrian Tung-Amnuay: Image Classification (TFRI)

PRAGMA Advances by Participants' Collaborative Activities



- GEO Grid: Hosted PRAGMA 21
 - Led by AIST, involving NCHC, NECTEC, VAST/IOIT
- Ezilla: NCHC
- OpenFlow: Applying it by Osaka
- Gfarm: U Tsukuba
- My Gallery: Cultural Heritage Display, e.g., NICT, UCSD, MoPA
- Many more



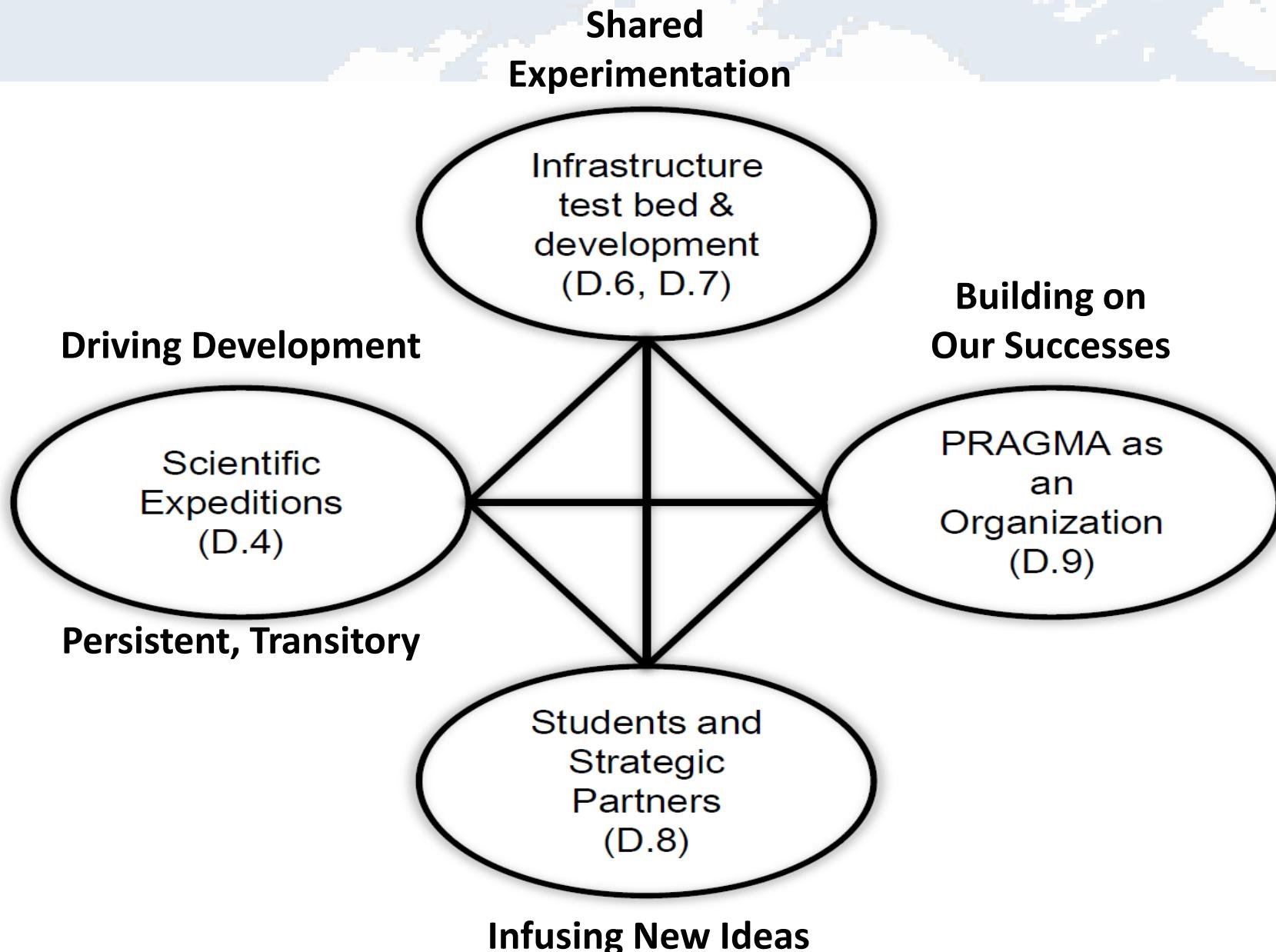


NSF Renewal Proposal

Funds US Contribution to PRAGMA

- Informed by several years of discussion at PRAGMA
 - Starting PRAGMA 17 (Fall 2009)
- Builds on collaborative experience and successes
 - Capitalizing on virtualization technologies
- Reflects and actively extends mission and interaction of three major components
 - Using and expanding a multi-provider cloud testbed
 - Driving developments via scientific expeditions
 - Engaging new groups and researchers / infusing new ideas
 - Beth Plale (IU), Jose Fortes (U FL), Renato Figueiredo, (U FL), Reed Beaman (U FL), Paul Hanson (U WI)

Proposal to Support US Participation in PRAGMA



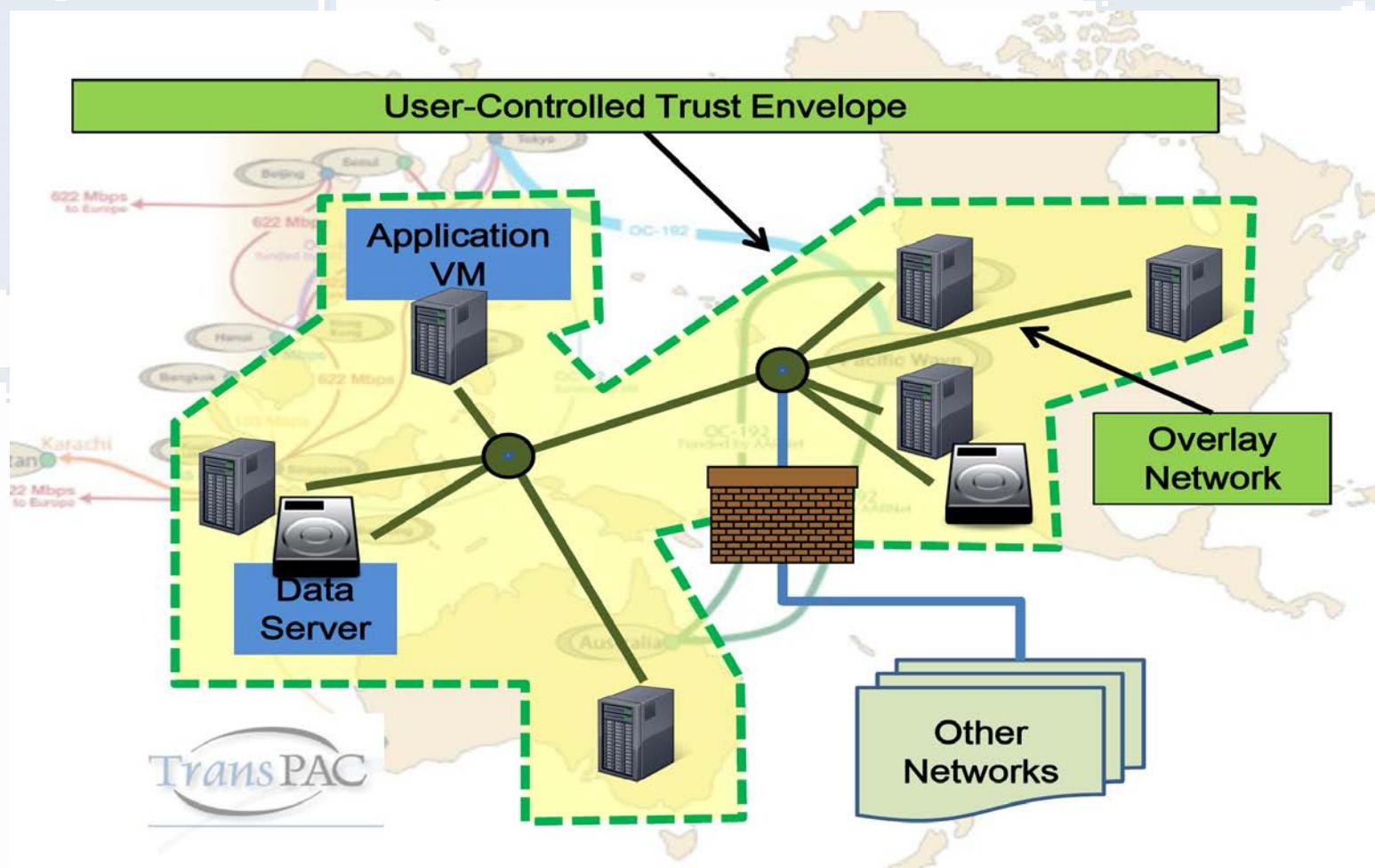
Driven by “Scientific Expeditions”

- Expedition: focus on putting distributed infrastructure builders and application scientists together
- Our proposal described three specific scientific expedition areas for US participation:
 - Biodiversity (U. Florida, Reed Beaman)
 - Global Lake Ecology (U. Wisc, Paul Hansen)
 - Computer Aided Drug Discovery (UCSD, P Arzberger, W Li, +)
- IMPORTANT: Our proposal could describe only some of the drivers and infrastructure that PRAGMA works on together as a group

“Infrastructure” Development and Support. Significant Expansion in # of US

- Data Sharing, Provenance, Data Valuation and Evolution Experiments:
 - Beth Plale, Indiana U
- Overlay Networks, Experiments with IPv6 10
 - Jose Fortes, Renato Figueiredo, U Florida
- VM Mechanics Multi-Site, Multi-Environment VM Control and Monitoring
 - Phil Papadopoulos, UCSD
- Sensor Activities: From Expeditions to Infrastructure
 - Sameer Tilak, UCSD

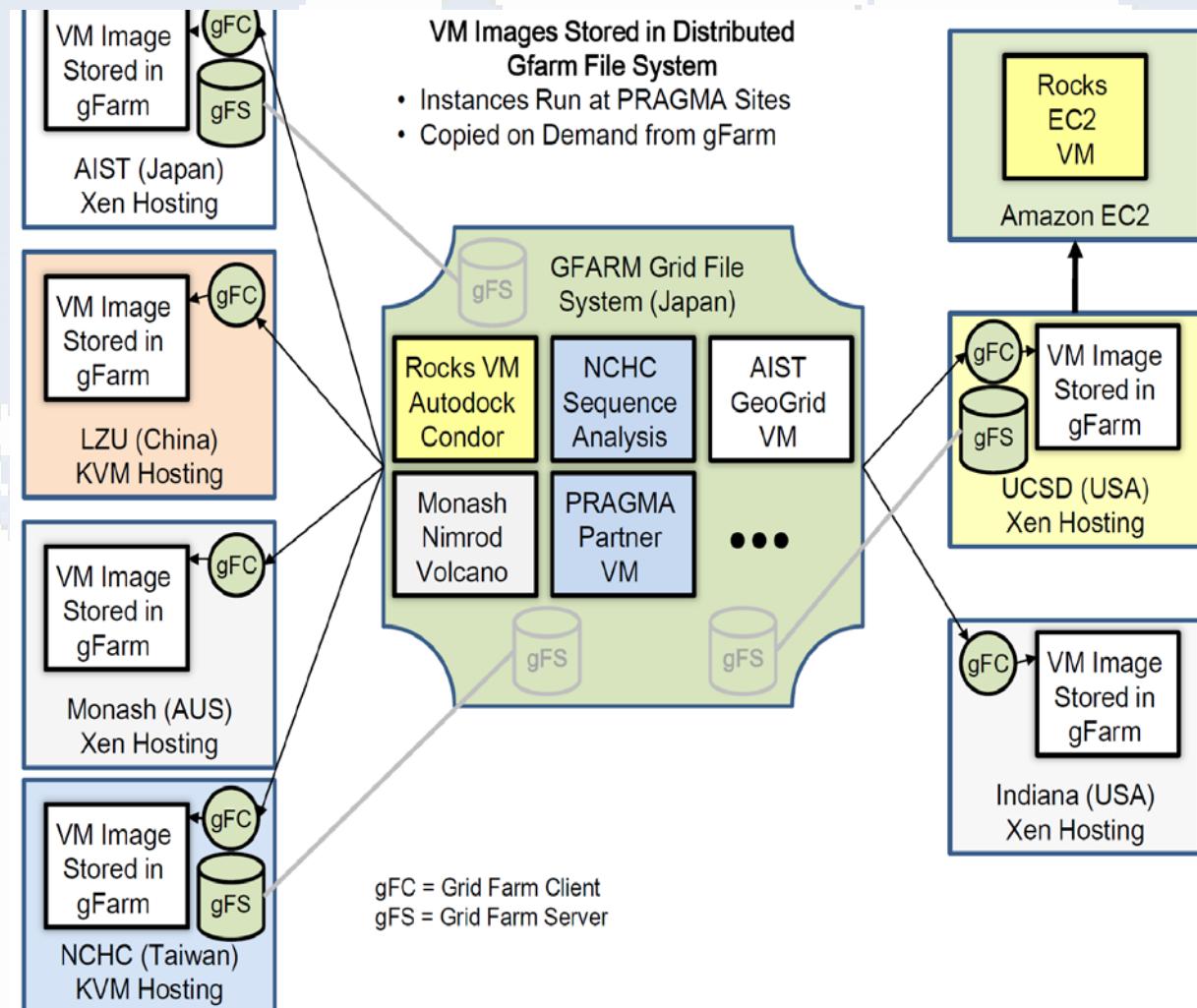
Building on What We've been working on together: VMs + Overlay Networks + Data



Importance of the Trust Envelope

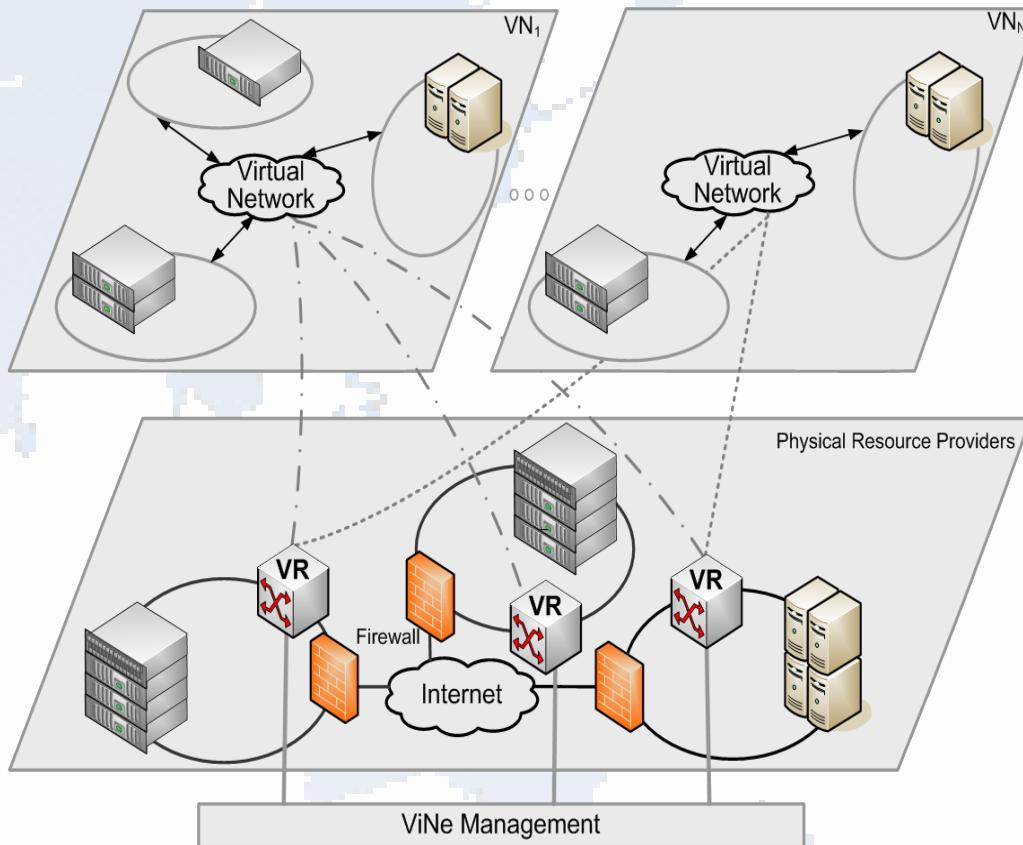
- Provide an infrastructure that initially limits access to data
- Traverse firewalls and *simplify network re-configuration* of application VMs

Build on PRAGMA's Multi-Cloud



PRAGMA's multi-provider cloud. GFarm is a
strongly authenticated VM repository

Add Overlay Networking



Virtual Network architecture based on deployment of user-level virtual routers (VRs). Multiple mutually independent virtual networks can be overlaid on top of the Internet. VRs control virtual network traffic, and transparently perform firewall traversal

- In Our Proposal
 - Led by U Florida (Jose' Fortes, Renato Figueiredo) (ViNE and IPOP)
 - Extend to IPV6 Overlays
- Not in our proposal but *we are already supporting experiments*
 - OpenVswitch led Osaka, AIST (see Demos)

Refine Focus on Data Products and Sensing

- Data Integration and tracking how data evolves in PRAGMA
 - Led by Beth Plale, Indiana University
 - *“develop analytics and provenance capture techniques that result in data valuation metrics that can be used to make decisions about which data objects should be preserved over the long term and which that should not”*
- Sensor data infrastructure
 - Led By Sameer Tilak, UCSD
 - *utilize the proposed PRAGMA infrastructure as an ideal resource to evaluate and advance sensor network cyberinfrastructure.*
 - Capitalizes on established history of working across PRAGMA and GLEON (with NCHC, Thailand, and others)

Controlling VM Infrastructure

- Over the last 15 Months, we (PRAGMA) have made great progress in sharing of VM images.
- Our proposal activity is to work with PRAGMA to evolve this capability and build a “remote control” structure
- Basic Approach
 - Utilize Condor’s ability to start virtual machines on remote clouds (like EC2)
 - Write adapters to extend this to start VMs within PRAGMA’s multi-cloud
 - Further extend (as required) to build required overlay networks

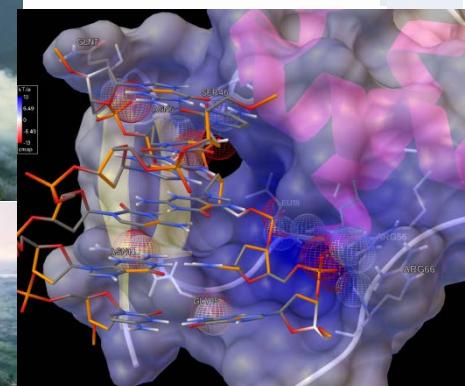
Future Scientific Expeditions

Proposed - Persistent

- Biodiversity
 - Understanding Adaption in Extreme Ultramafic Regions: Reed Beaman U FL
- Lake Science:
 - Predicting Impact of Eutrophication on Lake Ecosystem Services: Paul Hanson, U Wisconsin
- Drug Discovery:
 - Focusing on Infectious Diseases: Wilfred Li, UCSD

What Others?

- Disaster Mitigation
- Cultural Heritage Sharing
- Many others



Building Future Leaders Infusing New Ideas

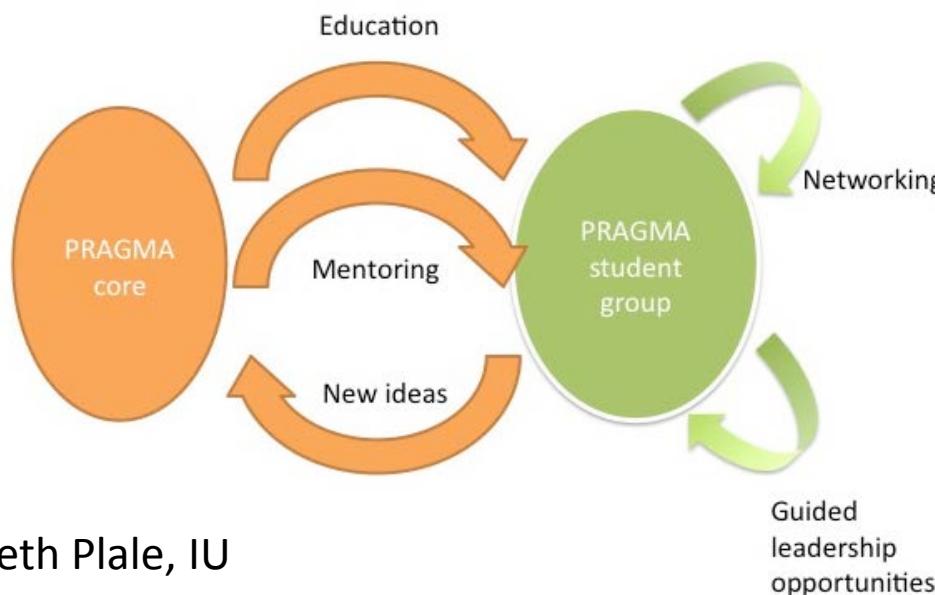
Established PRIME, PRIUS, MURPA

- Integrating research project and cultural awareness
- Advanced science and collaborations

Structuring PRAGMA for Students

- Motivated by GLEON Student Association
- Asked the question: Could something like this work in PRAGMA, to benefit students and the organization?

Beth Plale and Karpjoo Jeong



Infusing New Ideas

Strategic Partners

- Growth in the past was mostly “community” driven
 - SEAIP (Southeast Asia Institute International Joint Research and Training Program in High-Performance Computing Applications and Networking Technology) with the PRAGMA Institute
- As we think about our future, we need to consider expertise, impact, and growth opportunities
 - New technology areas: Based on needs and areas we did not have represented
 - New scientific expeditions: Exciting science, opportunity to engage more scientists, build communities
 - New institutions/regions to engage
 - New participants



Good Ideas Don't Wait for Funding

aka Planning for Success

- Biodiversity Workshop
 - Defining persistent scientific expeditions
 - Engage more researchers
- PRAGMA Graduate Student Activity
 - Explore this concept
 - (8 students, 5 institutions)
 - Engage students in workshop
- New Participants
 - New ideas



Please Welcome
New Participants

Posters and Demos

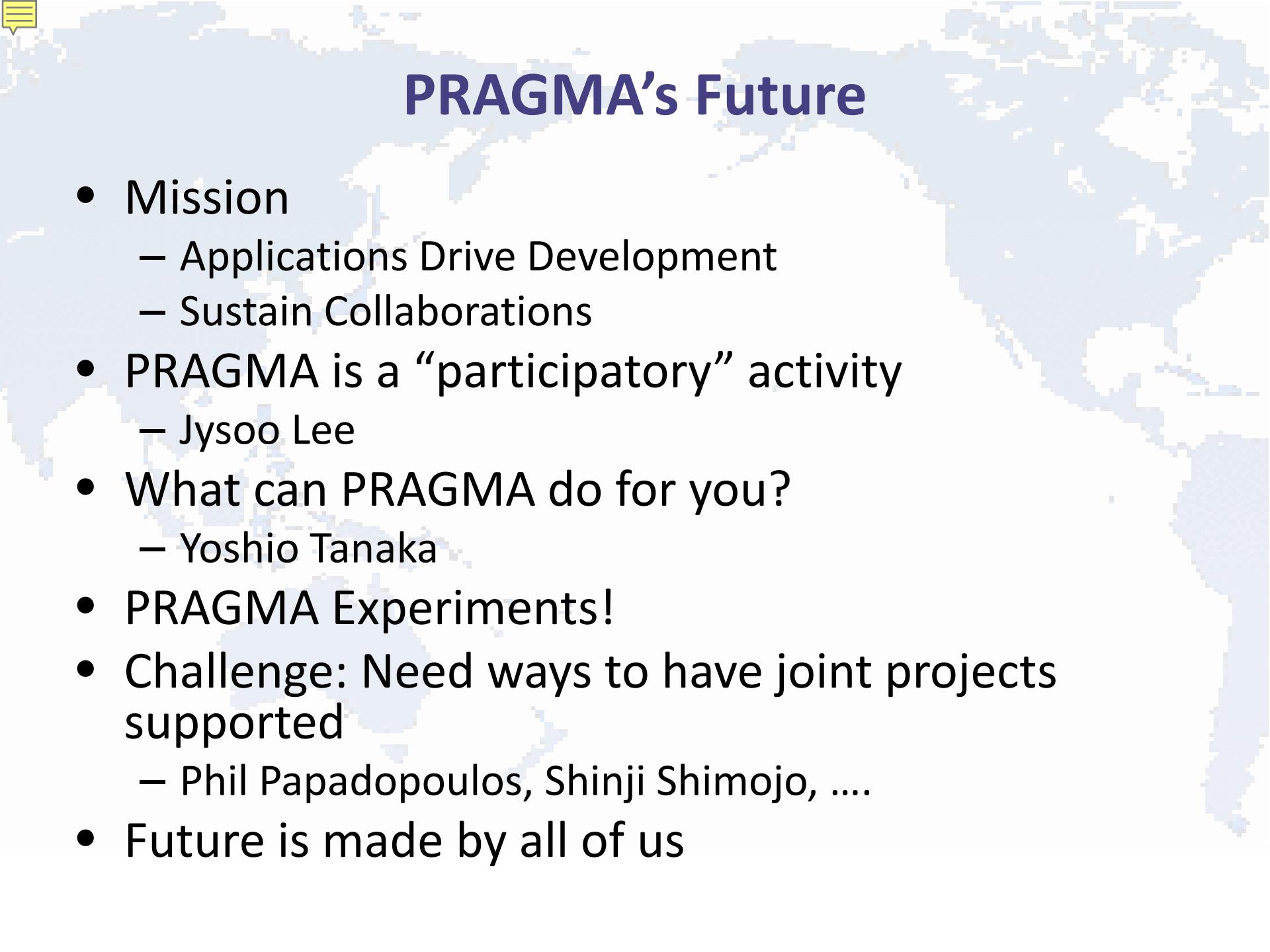
Contribution by Participants

Highlight Technology Trends

- Contribute to
 - Development of PRAGMA testbed;
 - Enabling scientific expeditions
 - Developing new tools and approaches
- When viewing posters and demos
 - “How can this technology help my work?”
 - “Is there a collaboration waiting to happen?”
- Posters
 - 10 of the 15 posters by students
 - Please visit the posters!

Steering Committee Discussions

- Future of PRAGMA
 - Do the structures and topics in PRAGMA best reflect the directions of PRAGMA?
 - Student Activities in PRAGMA
- Future Meeting Host Site Applications
 - PRAGMA 23
 - PRAGMA 24
- Specialize Workshop Opportunities



PRAGMA's Future

- Mission
 - Applications Drive Development
 - Sustain Collaborations
- PRAGMA is a “participatory” activity
 - Jysoo Lee
- What can PRAGMA do for you?
 - Yoshio Tanaka
- PRAGMA Experiments!
- Challenge: Need ways to have joint projects supported
 - Phil Papadopoulos, Shinji Shimojo,
- Future is made by all of us

Thanks

- David Abramson, Host
- Program Committee
 - Especially Chao Jin!
- All of you

And the
band!



