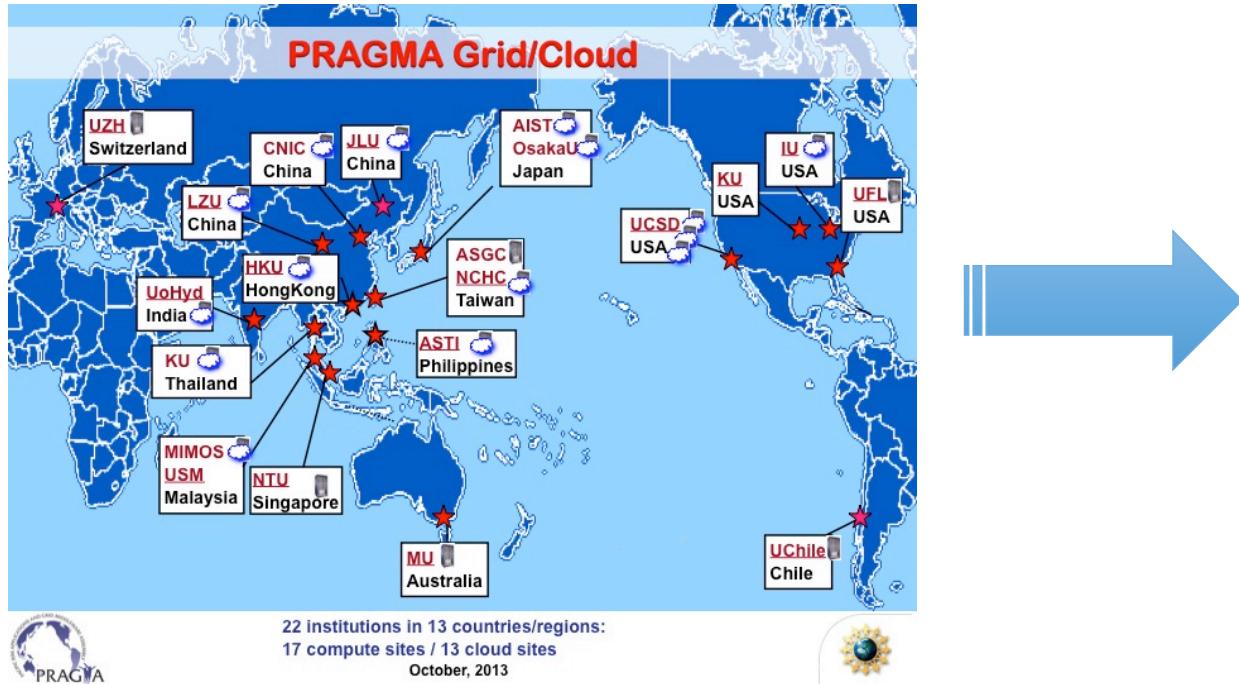


Resources Working Group Update

Distributed Resources

- How do we make a worldwide collection of resources usable for sharing of data/computation?
- Drive infrastructure by needs of specific use cases
 - Biodiversity expedition
 - Lake Ecology Expedition
 - Experimental Networking Testbed
 - ++ Needs of other PRAGMA Working group
 - We're trying something new this meeting

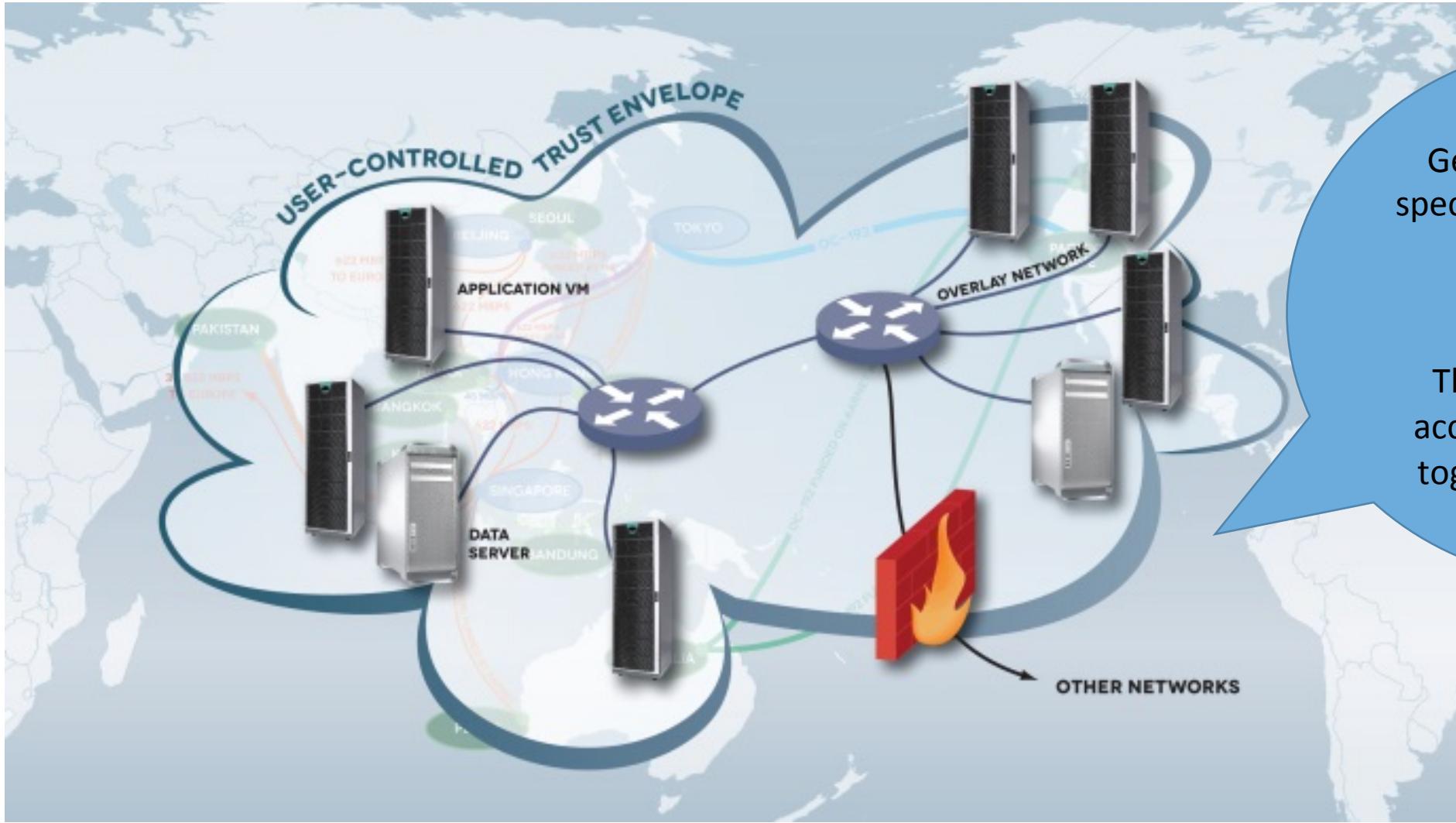
In progress goal: Rebuilding the PRAGMA Worldwide Testing Infrastructure



Next
Generation

Trying to rebuild infrastructure AND make scientific progress

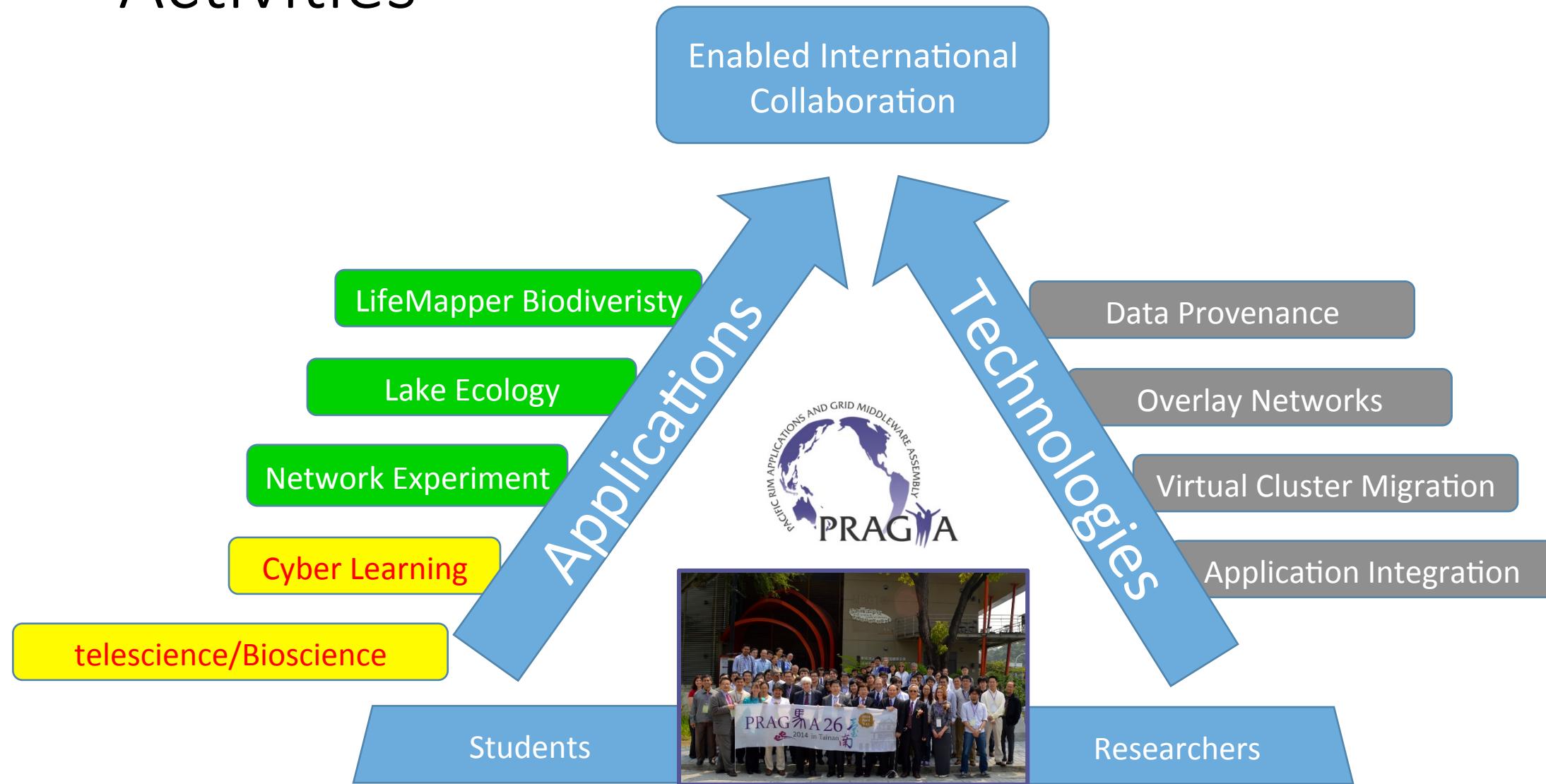
We need controlled sharing for resources



General Idea: identify specific resources needed by distributed researchers.

Then build a “limited access” network to knit together the resources

Where Resources fits in for PRAGMA Activities



Improving Interaction of Resources WG with others

- Resources WG met yesterday for about 2 hours for a pre-meeting
- Today (Thursday):
 - NO Resources Working Group
 - Instead: resources WG will participate in the cyberlearning, telescience, bioscience working groups
 - Goal: find out specifically what is needed
 - Goal2: Refine the focus for resources
- We want to expand the scientific activities that resources supports

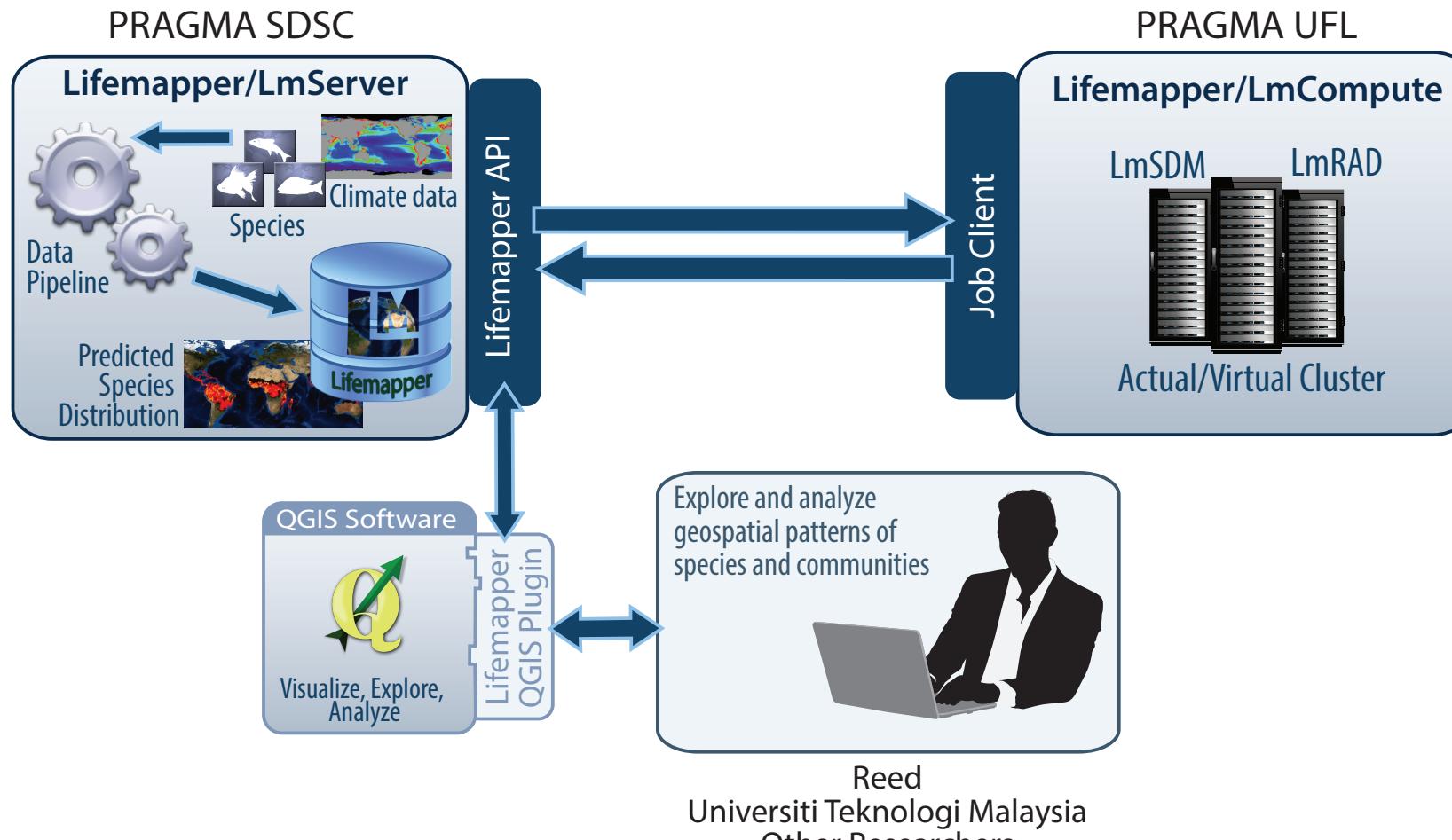
Some Specific Updates

- Refined integration of Lifemapper – initial ability to access non-public, remote data with a VINE network overlay
- First steps towards a resource scheduling (Demo) that will simplify request to access resources at multiple sites.
- Improvements and additional applications running on the PRAGMA experimental testbed
- Improvement to IPOP (a different overlay network technology)

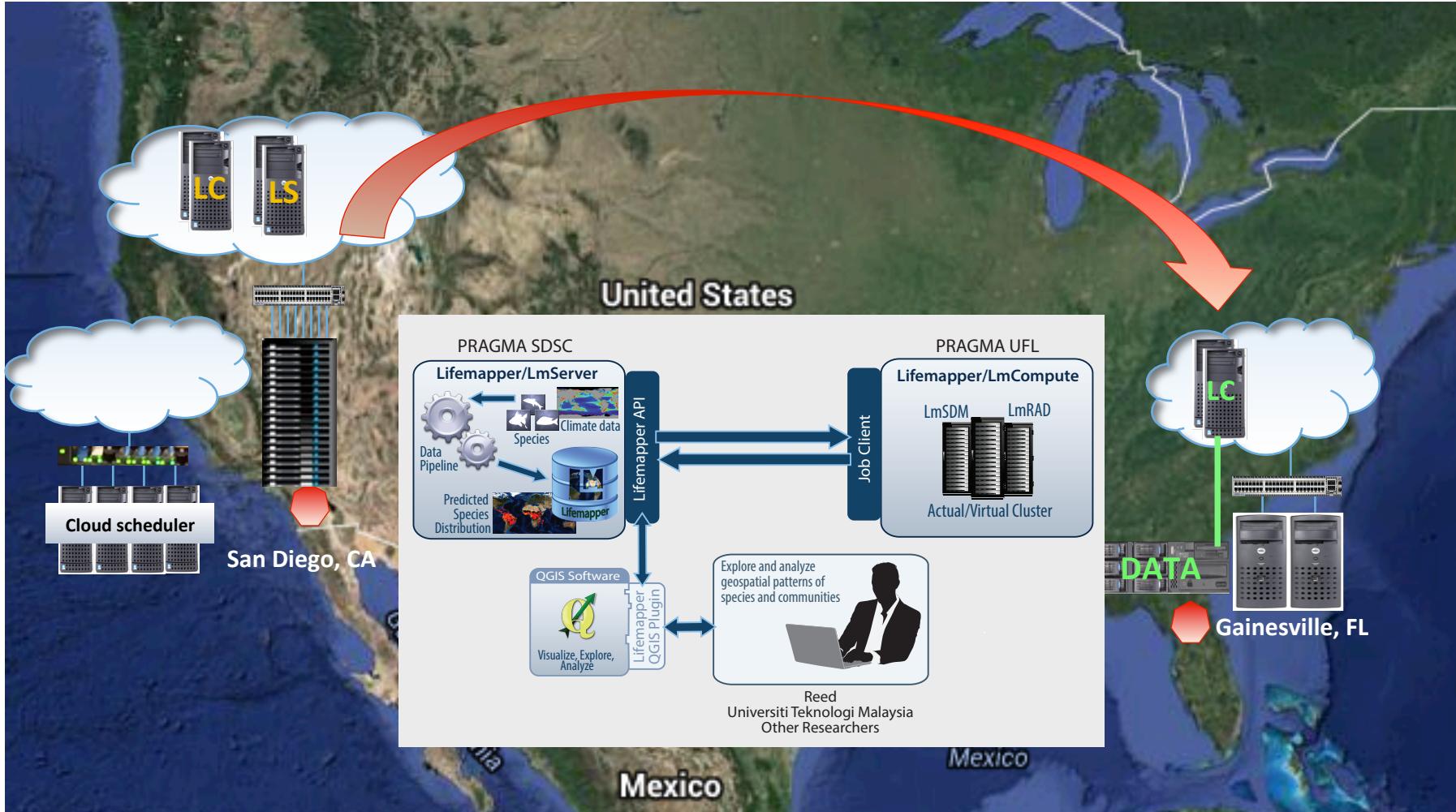
Distributing Lifemapper across the PRAGMA Infrastructure: the goals

1. Increase scalability, availability and flexibility of Lifemapper software.
2. Run Lifemapper on PRAGMA testbed with enabled access to private satellite data.
3. Increase usability of PRAGMA infrastructure as a framework for deployment of scientific applications and data resources.

Lifemapper on PRAGMA Testbed



Lifemapper on PRAGMA Testbed



PRAGMA 28

PRAGMA Experimental Network Testbed (ENT)

Maurício Tsugawa (UF)

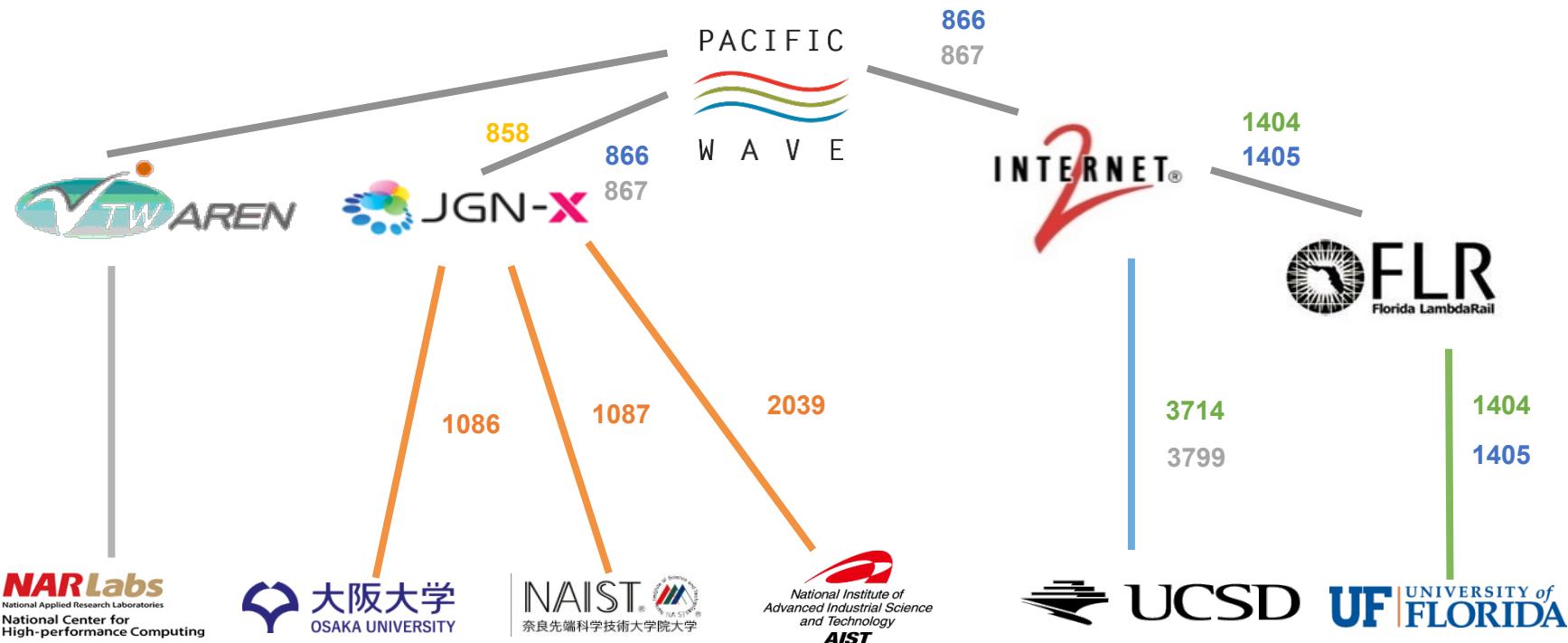
Kohei Ichikawa (NAIST)

ENT Goals

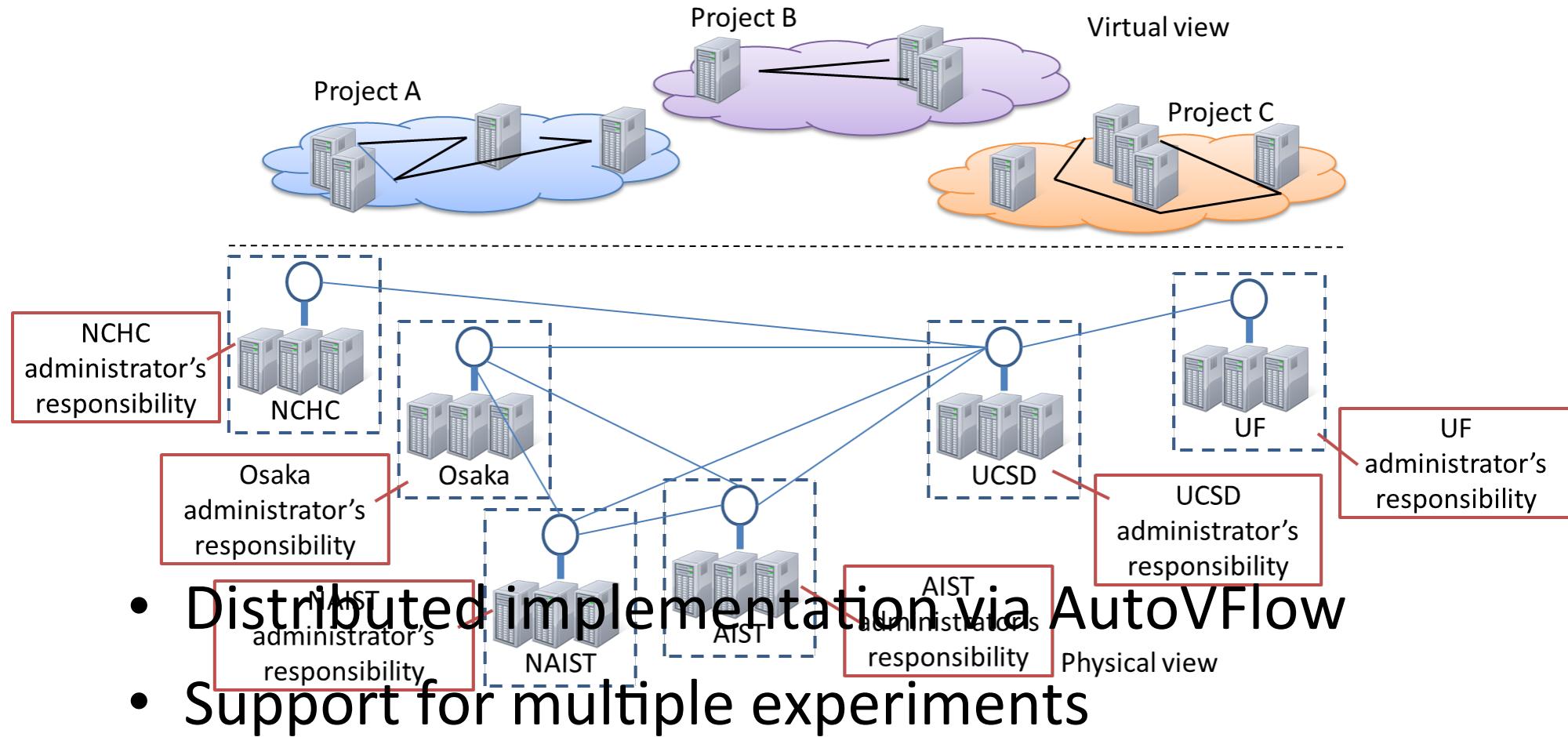
- Build a breakable international SDN testbed for use by PRAGMA researchers
 - By no means a production system
 - Complete freedom to access and configure network resources
- Provide access to SDN hardware/software to PRAGMA researchers
- Offer networking support for PRAGMA multi-cloud and user-defined trust envelopes

ENT Activities

- ENT Backbone
 - TWAREN connected through Pacific Wave
- OpenFlow Network Slicing
 - AutoVFlow deployed and tested (demo)



ENT Activities – Control Plane



ENT Accomplishments

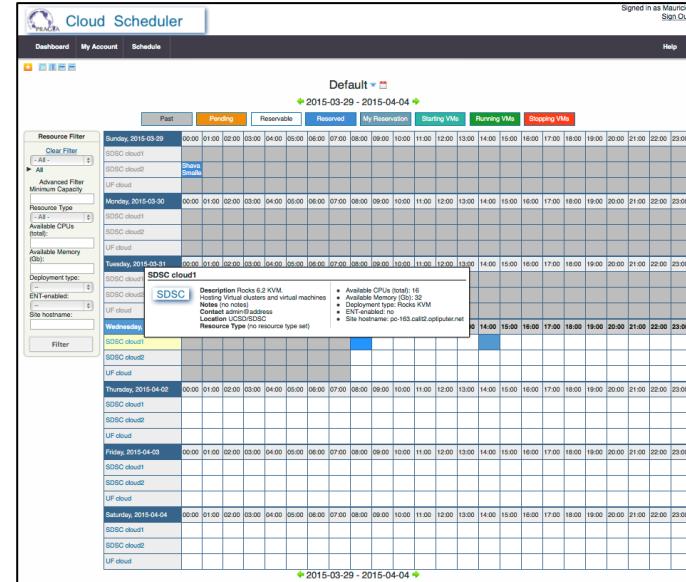
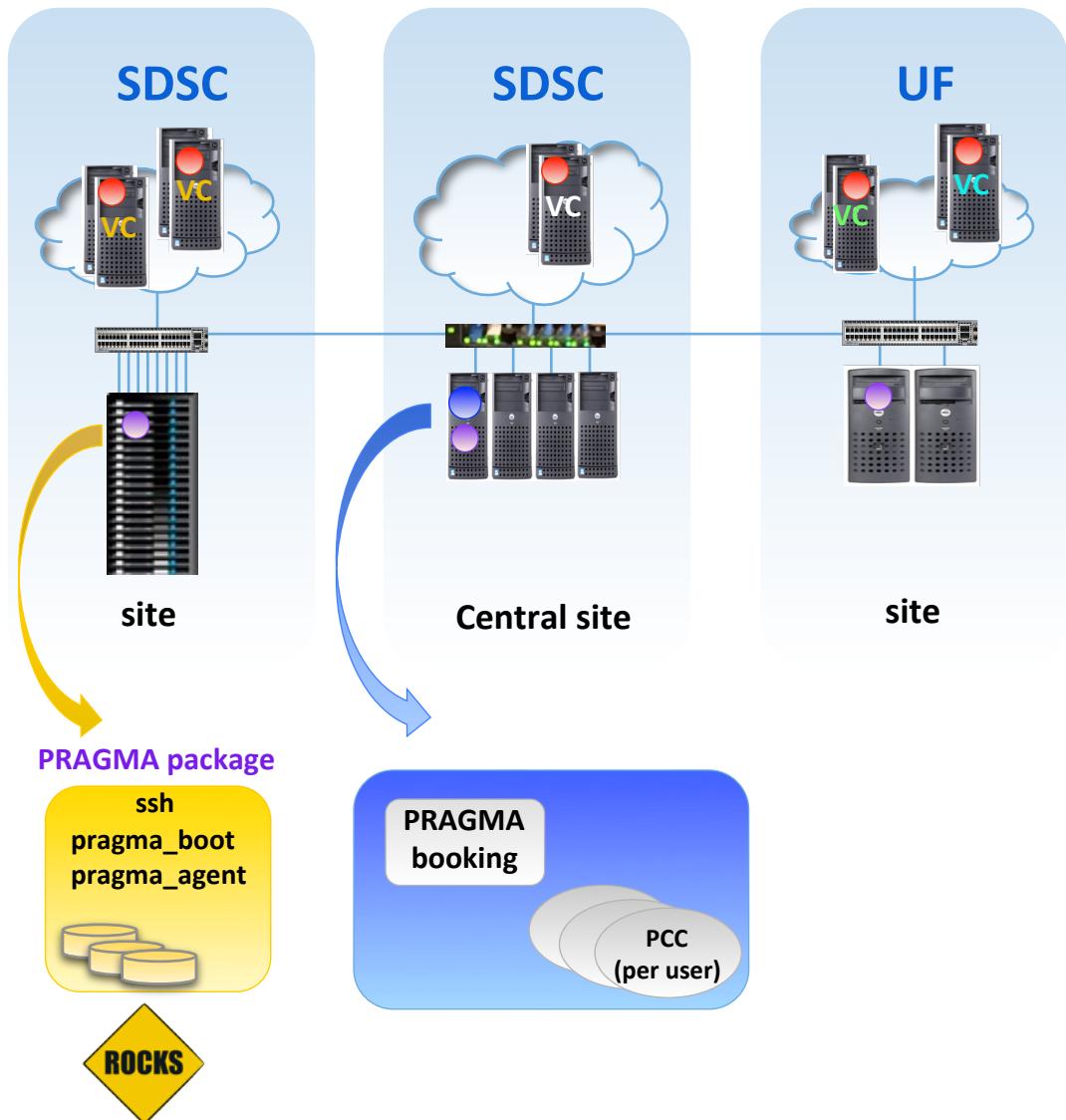
- ENT backbone live
 - Connection with TWREN established
 - Static L2 links: NAIST, Osaka U, AIST, UF, UCSD, NARLabs
- OpenFlow slicing tested
 - AutoVFlow deployed at NAIST, UF, UCSD
- ENT presented at Internet2 Focused Technical Workshop: International SDN/Openflow testbeds

Future Plans

- Network expansion (more sites)
- DOCK simulations
 - Use SDN monitoring capabilities to profile communication pattern while running DOCK
- LifeMapper
 - Address data licensing and security with SDN
- End user support
 - ENT operations center

Using a “Room” scheduler to
acquire resources from PRAGMA
institutions

PRAGMA scheduler



Planned VM/VC provisioners

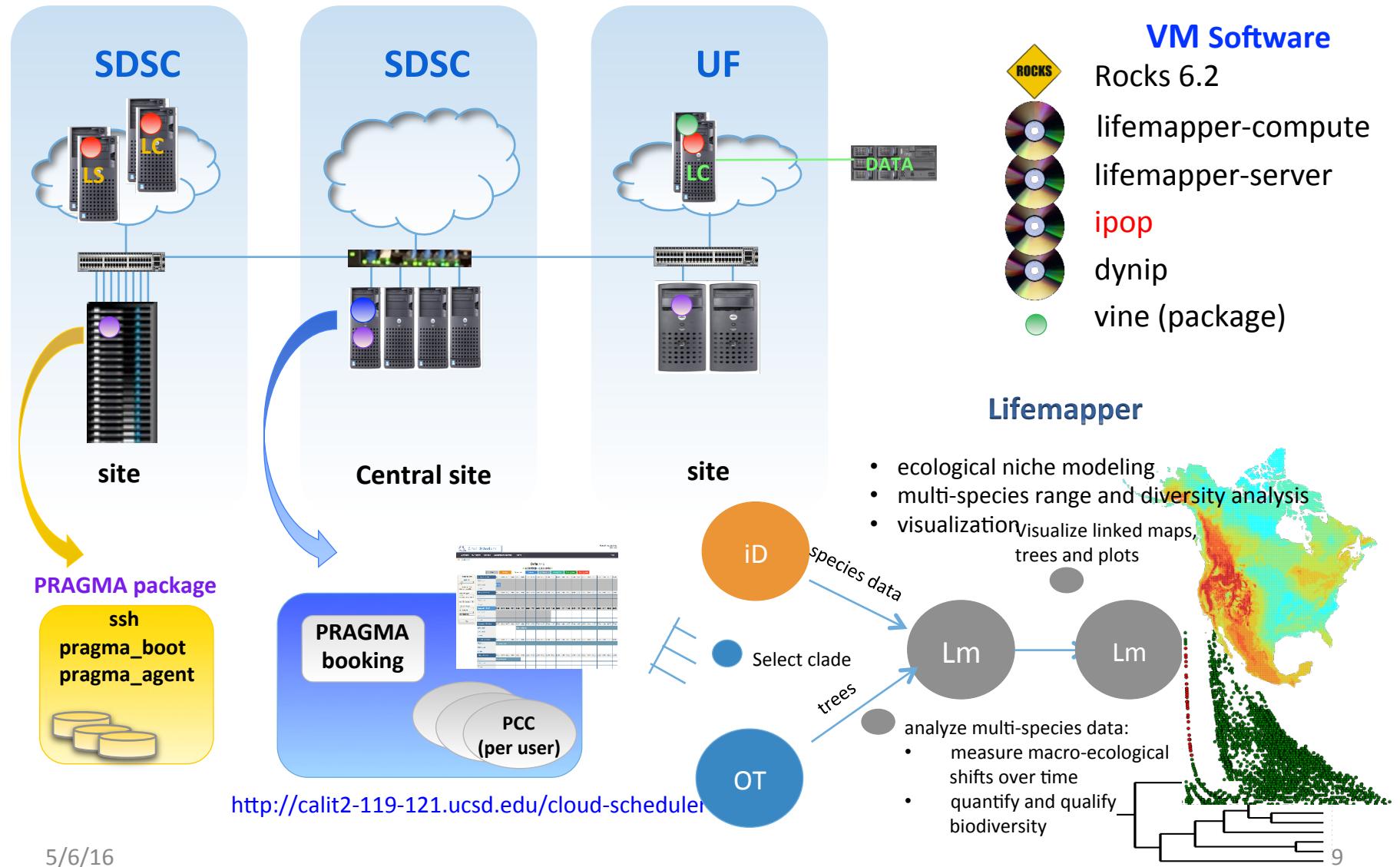


apachecloudstack™
open source cloud computing

openstack
CLOUD SOFTWARE

one

Integral components



Updates and advances in IPoP
overlay network technology

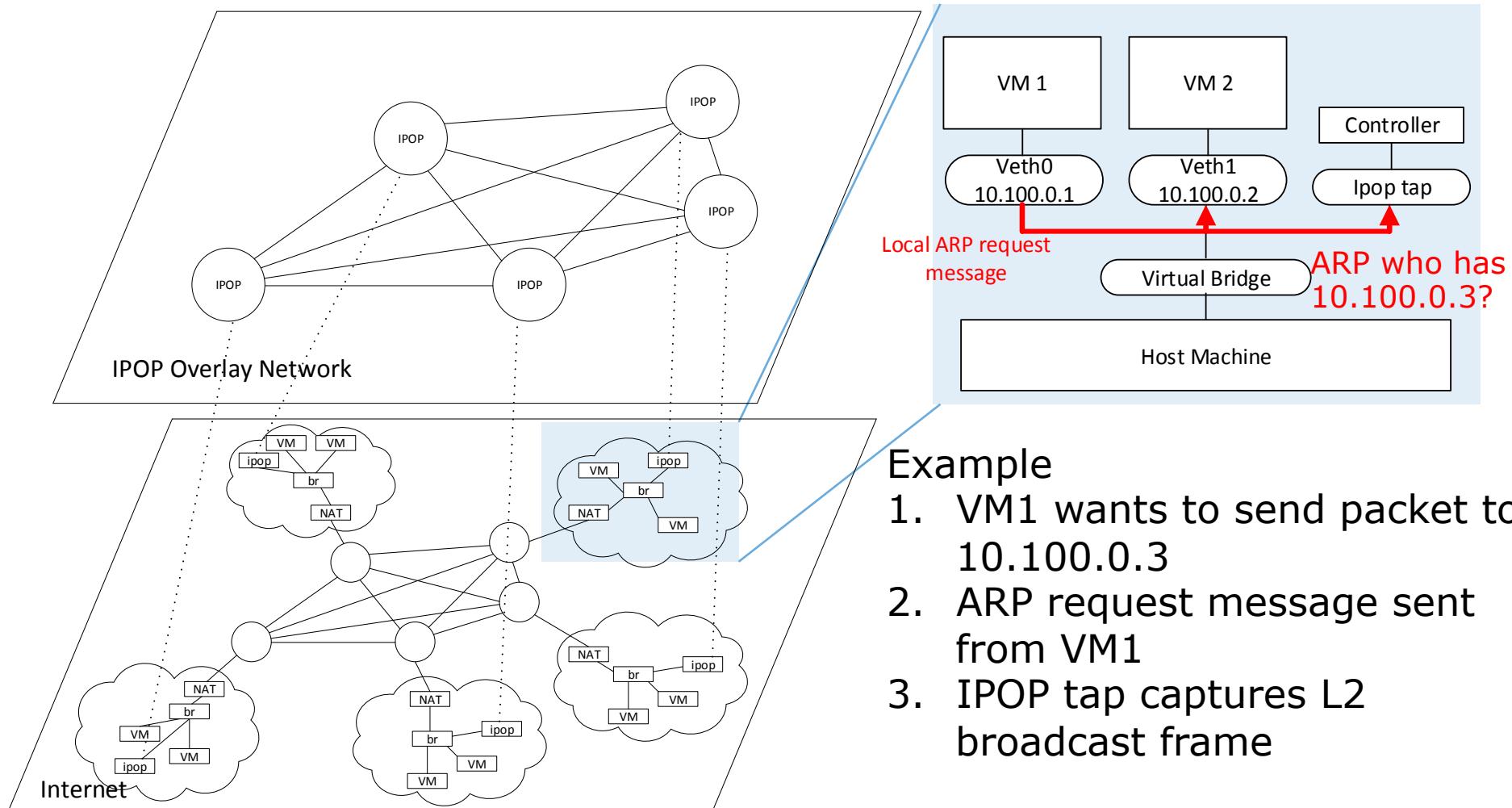
IPOP Progress and activities

- Software codebase – 15.01
 - L2 switch mode
 - Ganglia monitoring
 - Multi-user chat based GroupVPN
- Ongoing development
 - OpenFlow vswitch bypass
- Lake expedition and resources
 - Windows bug fixes, watchdog service
 - Upgrade of VM pool at UF; Azure award (\$20k)
- Rocks integration
- Community engagement
 - Google Summer of Code (expect 2-3 students)
 - Web-based configuration/management UI
 - Authentication enhancements

Switch mode

- In this mode, IPOP GroupVPN nodes behave as virtual Ethernet switch
 - IPOP captures outgoing L2 frame
 - Is it broadcast?
 - TinCan forwards to all links
 - Is it unicast?
 - TinCan looks up (MAC, link) table and forward along matched link, if found
 - IPOP captures incoming L2 frame
 - Adds to table: src MAC address, TinCan link

Example: ARP, Containers



Overlay Bypass

- On-going prototype development
 - Motivated by containers-within-VM use case
- Replace bridge by openvswitch
 - IPOP controllers detect endpoints are local and configure forwarding/mapping via OpenFlow

