

PRAGMA 29

# PRAGMA Experimental Network Testbed (ENT)

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# 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

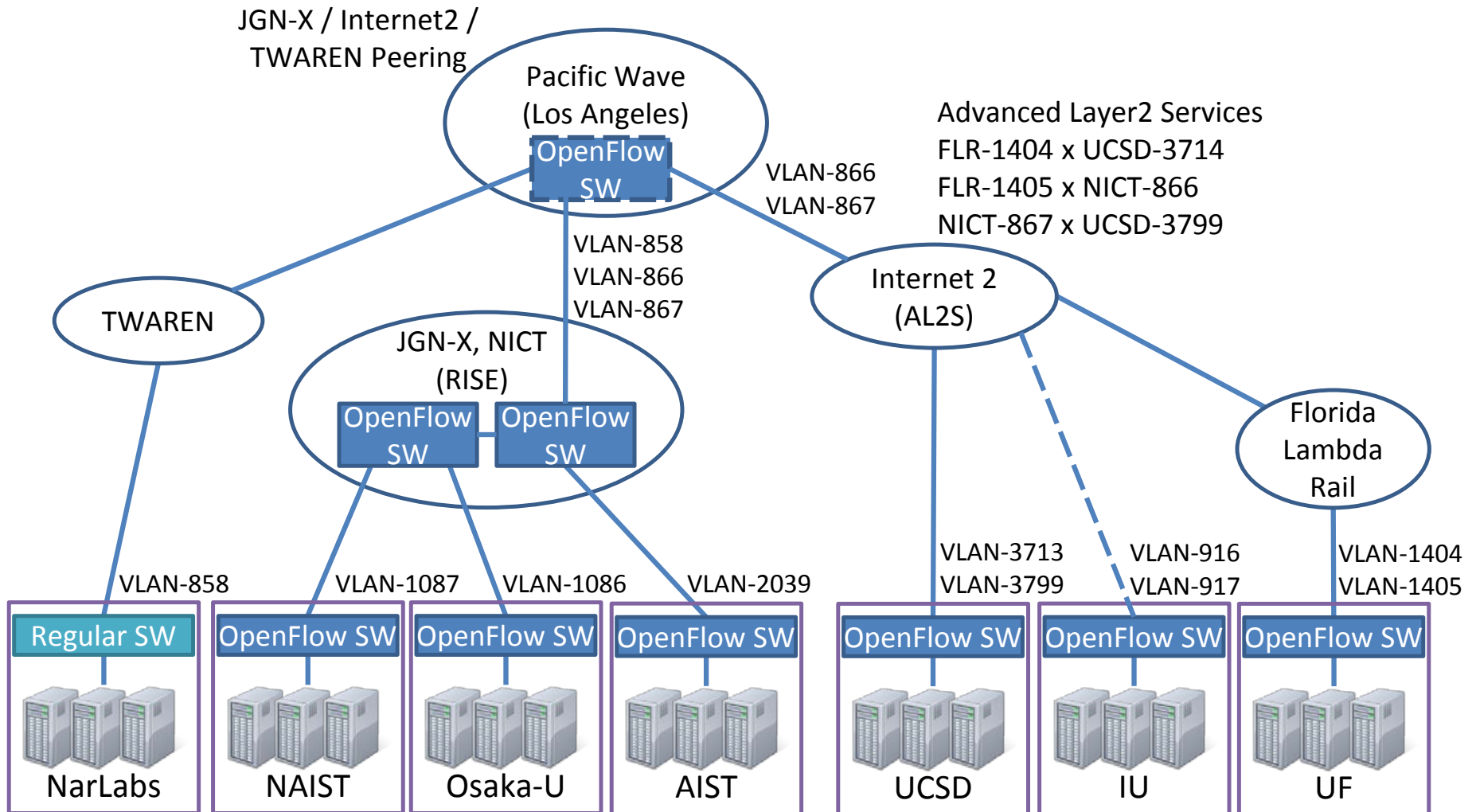
# ENT Progress

- PRAGMA 25 – Start of the project
- PRAGMA 26
  - Preliminary international links configuration
  - Preliminary tests using GRE tunnels
- PRAGMA 27
  - International links connecting Japan (NAIST, AIST, Osaka U) and US (UF and UCSD) established
  - Experiments with multi-path controllers
- PRAGMA 28
  - Connection to Taiwan (NCHC) established
  - Network slicing with AutoVFlow
- PRAGMA 29
  - IU nodes joined via GRE
  - perfSONAR monitor deployed

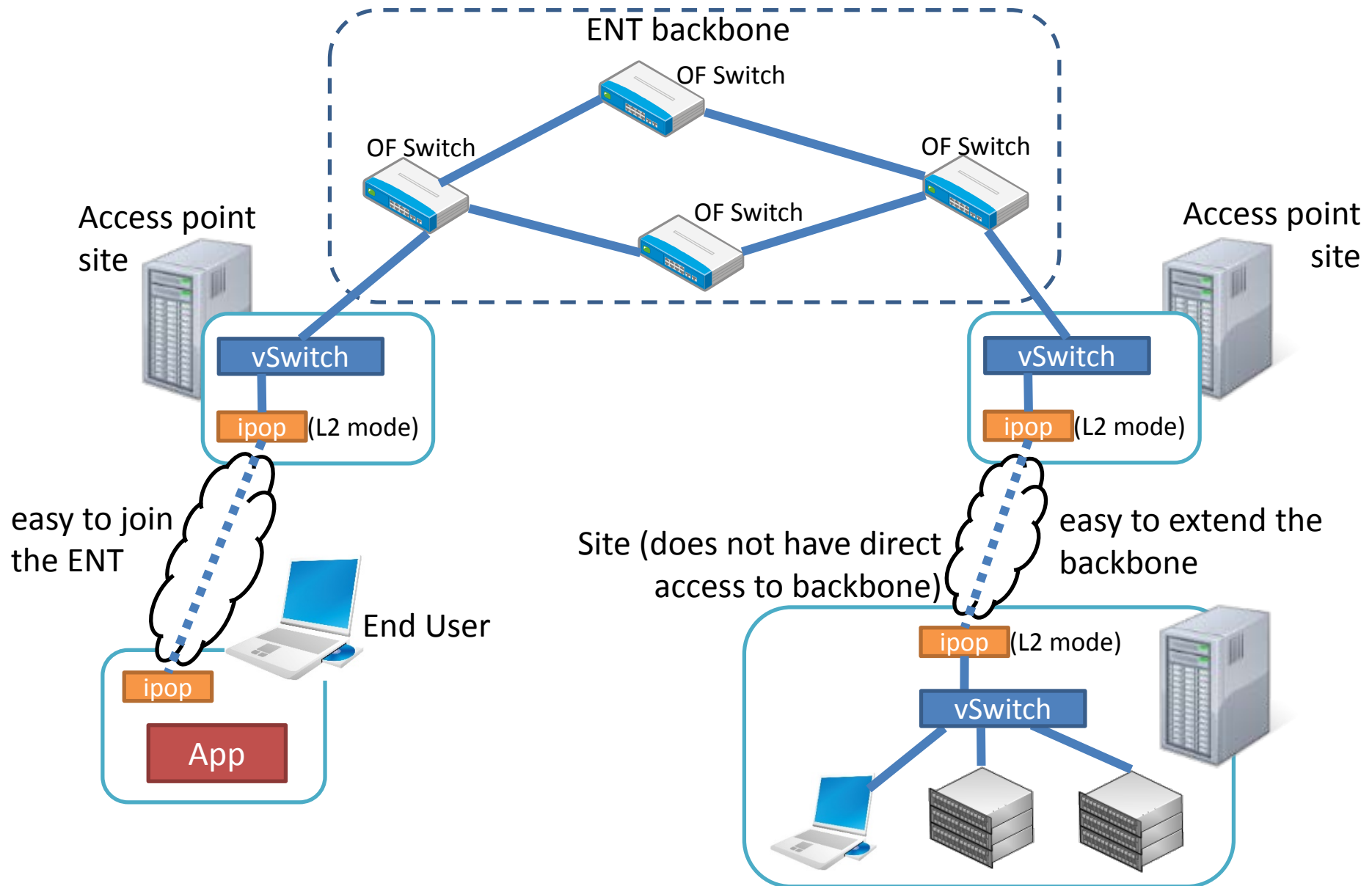
# ENT Accomplishments & Activities (PRAGMA 30)

- ENT backbone
  - Connection to IU with L2 VLANs (partly done)
  - RISE OpenFlow SW at LA will be available shortly
  - Jelina and Wanida are preparing their nodes
- Extending ENT through IPOP
- Data sharing experiments with IU data nodes
  - Needs a security mechanism
- Usability study by Andy (student from UCI)
  - Gabriel, Jelina and Wanida working with Andy
  - Re-organized and added new documentations for ENT

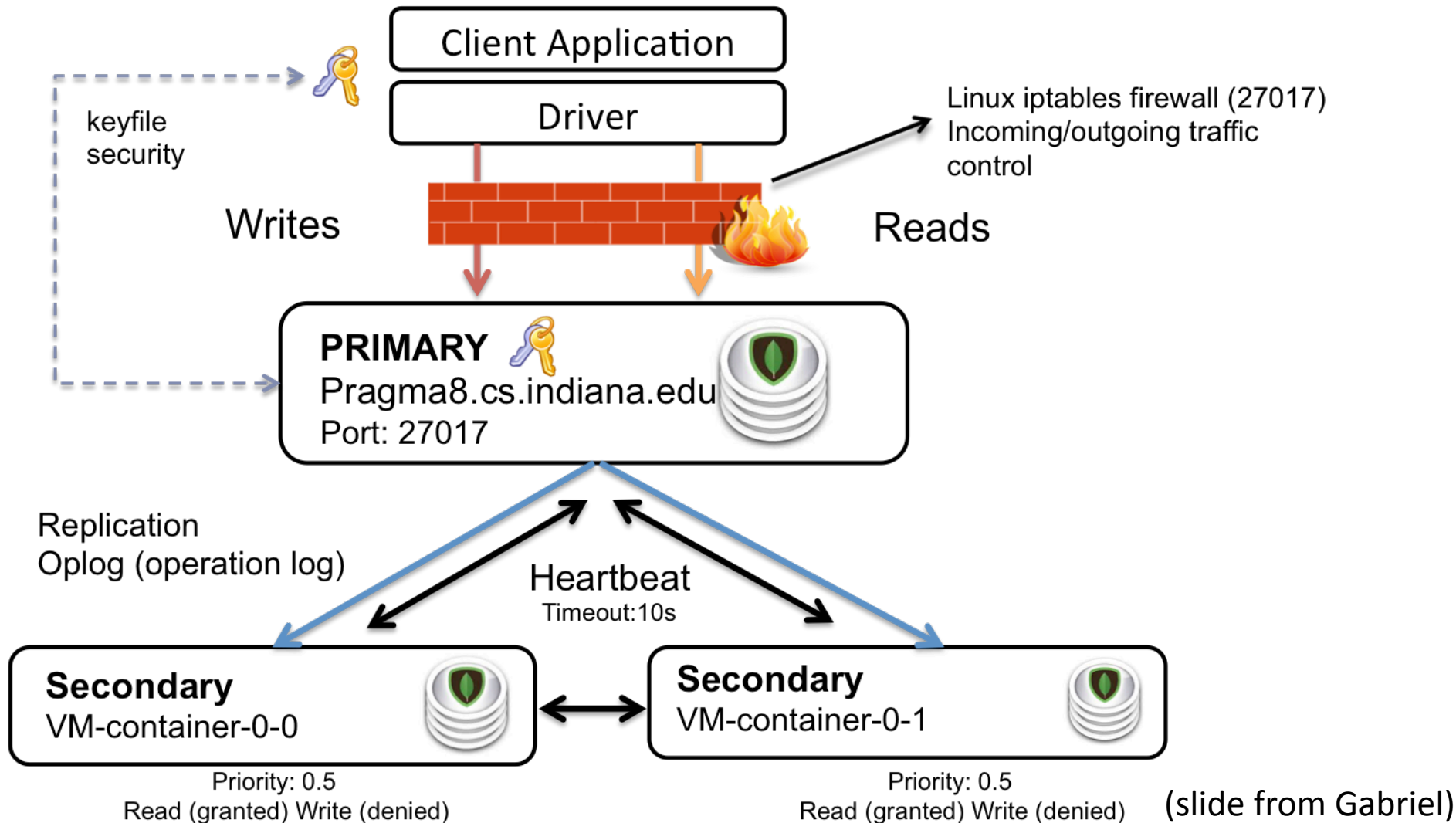
# Backbone of PRAGMA-ENT



# Extending backbone through IPOP



# IU data sharing through ENT



# Usability study for ENT

- Improve the usability of ENT
  - Andy has been working on interview to Gabriel, Jelina and Wanida
    - Figured out what is difficulty for users to join and use ENT
    - Provides ideas to improve the documents of ENT
      - Wiki: [https://github.com/pragmagrid/pragma\\_ent/wiki](https://github.com/pragmagrid/pragma_ent/wiki)



# Future Plans

- Network expansion (more sites)
  - Interconnecting RISE (JGN-X) & FSFW (Internet2)
- Trust data sharing  
(HathiTrust Digitalized Books Corpus)
  - Address data licensing and security with SDN
- End user support
  - Visualization
  - ENT operation center
  - Wiki: [https://github.com/pragmagrid/pragma\\_ent/wiki](https://github.com/pragmagrid/pragma_ent/wiki)

# Roadmap of ENT

- Pragma31
  - Expand ENT to more Asian countries
  - Stable AutoVFlow
  - Monitoring & visualization tool
  - Reservation or scheduling service
    - VM & Network
- Pragma32
  - User friendly UI & API
  - Making reservation from Web or API & automation
- Pragma33
  - Expand ENT to at least 10 institutions