Telesciences/ Geoscience:

Sornthep Vannarat, Shinji Shimojo,
Fang-Pang Lin

Pragma 29
2015 10

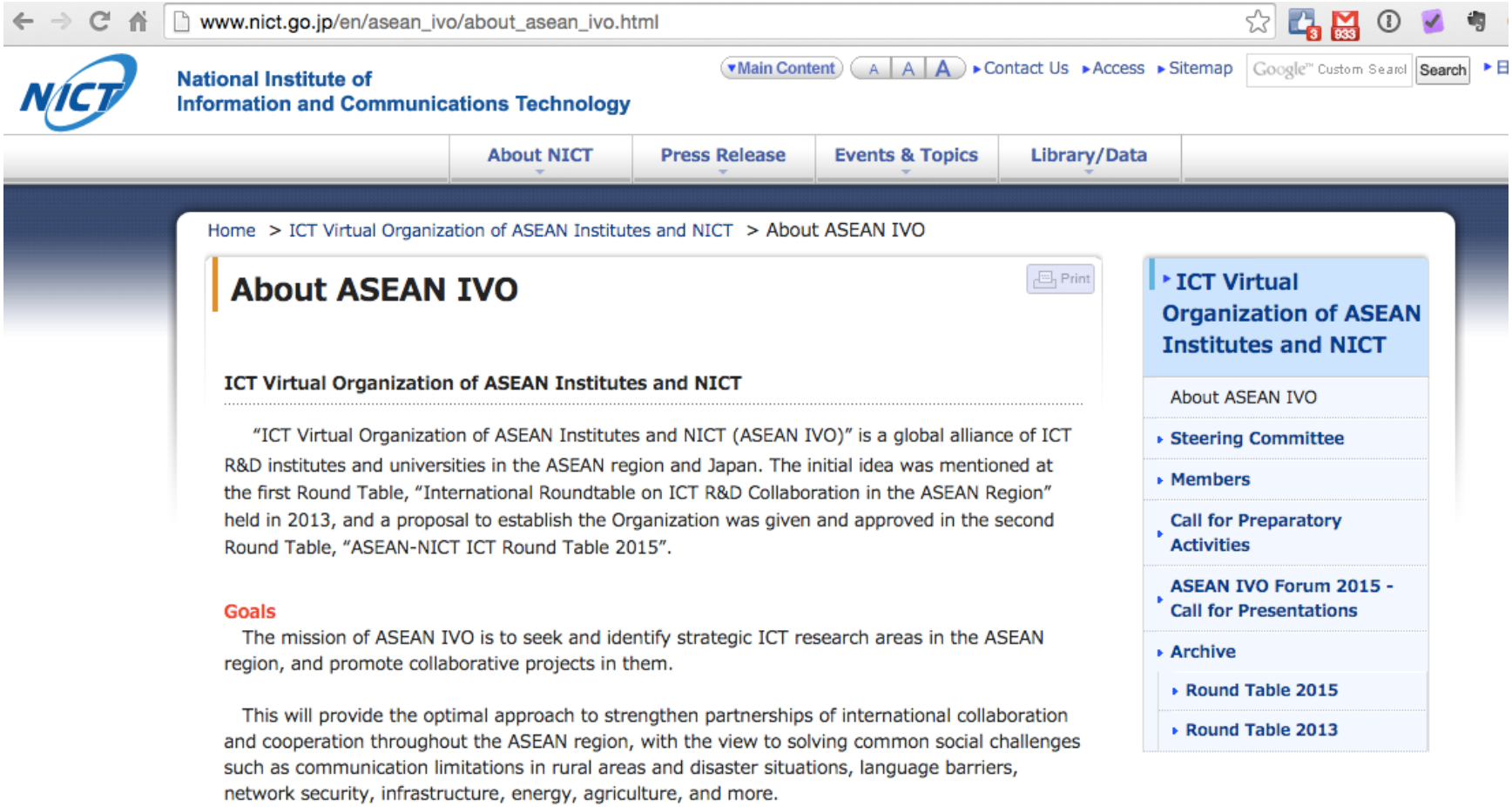
Agenda on Breakouts

- Day 1
  - CENTRA
    - CENTRA and COE introduction
    - How do we proceed, How do we organize, archtecture?
    - What is the role of infrastructure for your application ? Ex. Pragma-ENT, Resources
- Day2
  - Updates
  - Possibly joint with resources

Presentations & Discussions

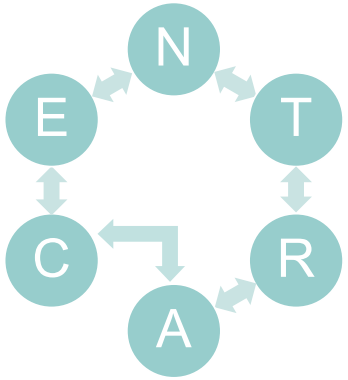
- CENTRA introduction, Software-Defined Systems
  - Center of Excellence (CoE) on Cyber-enablement of Applications, Taiwan
  - CENTRA, UFL
  - ASEA IVO, NICT
- Tele-Science/Geo-Science Research Updates
  - Air pollution Monitoring (hour data from 72 monitoring sites), NCHC.
  - Collaborate with Nat'l Palace Museum to mitigate digital divide (w/ 3D models), NCHC.
  - Disaster Recovery Assistance with Crowdsourcing, Thammasat University.
    - Volunteer and Victims – Trust Management: evolving into a trust network! Reputation workers (good idea). Crowd movement…(Evacuation). Social modeling.
  - Software Defined Infrastructure, MIMOS
    - Sensor Network
      - Agriculture,
      - Public Safety
    - Ceph File System
    - Singapore ASTRINA (Jon Lau)
  - SDN + HPC/Viz for e-Science via SDN, Osaka University
    - SAGE & TDW/Sharing Viz. (using Openflow), Remote Lecture System with high resolution display. (Multiple content)
  - PREDICT (fmon.asti.dost.gov.ph), ASTI (Philippine)
    - Meteorological Monitoring and services
    - 105,000 sensors & external sensors providing national data for research
- Discussions:
    - Challenges: Proper Data sets , Domain Experts.
    - Collaborative discussions & Demos in SEAIP
    - Meet on SEAIP 2015 before PRAGMA 30.

Another project from Japan is proposed



http://event.nchc.org.tw/2015/seaip/

CENTRA: Collaborations to Enable Transnational Cyberinfrastructure Applications

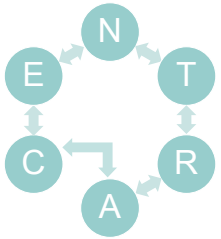


José Fortes

Advanced Computing and Information Systems (ACIS) Laboratory

University of Florida

CENTRA

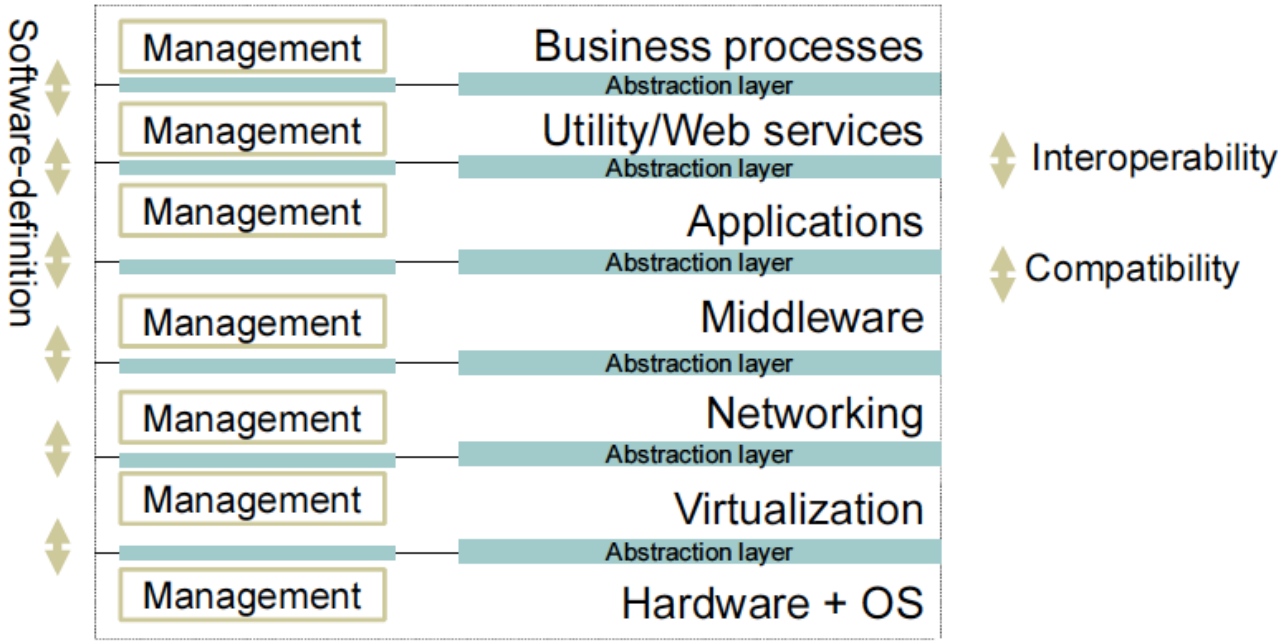


- US—East Asia Collaborations to Enable Transnational Cyberinfrastructure Applications
- Key goals:
  - Scientific advances in
    - Application domains: environmental monitoring (EM), disaster management (DM), smart cities (SC)
    - Software-defined systems: data-sharing, middleware interoperability, coordination
  - Creation of next generation of collaboration networks (of people)
  - Creation of a framework for persistent collaboration among centers/groups in US-EA

CENTRA nature

- Focused scope
  - Disaster management, environmental modeling and smart cities
- Deeper thinking within the scope
- Broader community within the scope
- Requiring long-term, frequent and persistent research collaboration activities
  - Including researcher stays at collaborating sites

Software-defined systems stacks

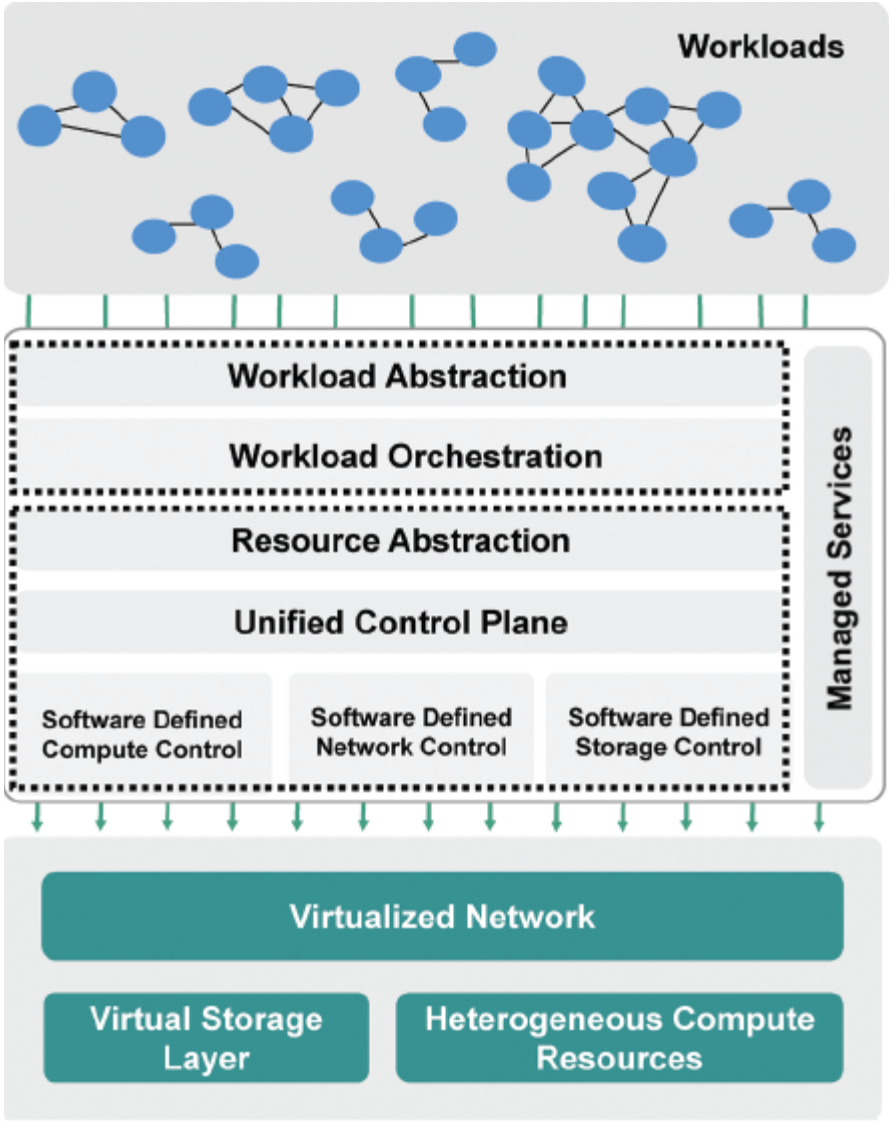


Software-definition at each level can be used to build multilevel resiliency that leads to required system resiliency

Presented by Jose Fortes

Architecture of SD Environments

- Workloads
  - complex wirings of components
  - represented through abstractions.
- Given abstract resources the workloads are continuously mapped (orchestrated) into environment through unified control plane.
- Individual resource controllers program the virtual resources (compute, network, storage).
- Workloads and contexts mapped into best suited resources in heterogeneous pool



C.-S. Li, et al, "Software defined environments: An introduction," IBM Journal of Research and Development, vol.

SD Application Stacks

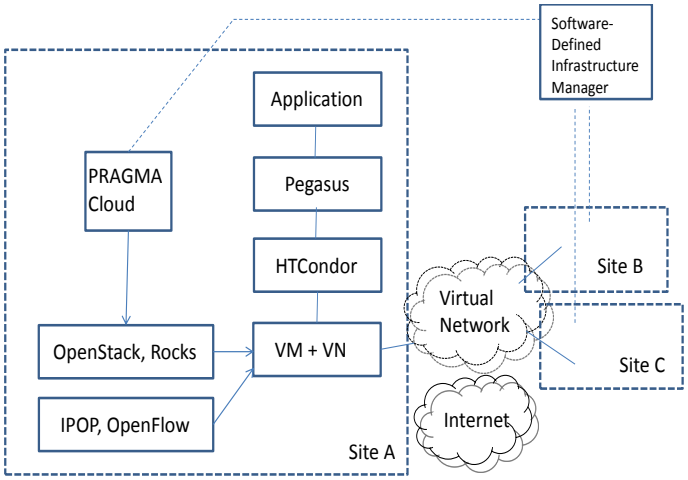


Figure 1- Commonly used HTC/HPC stack for distribution and management of computation and resources in several sites.

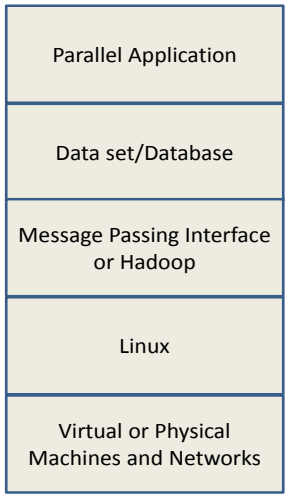


Figure 2- HPC stack with virtualization, Linux, MPI, dataset and application layers. Management components are not shown.

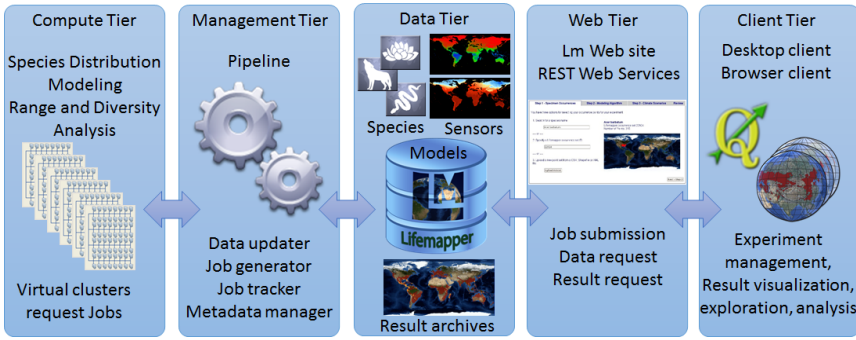


Figure 5 - Tiered view of Lifemapper's software architecture.

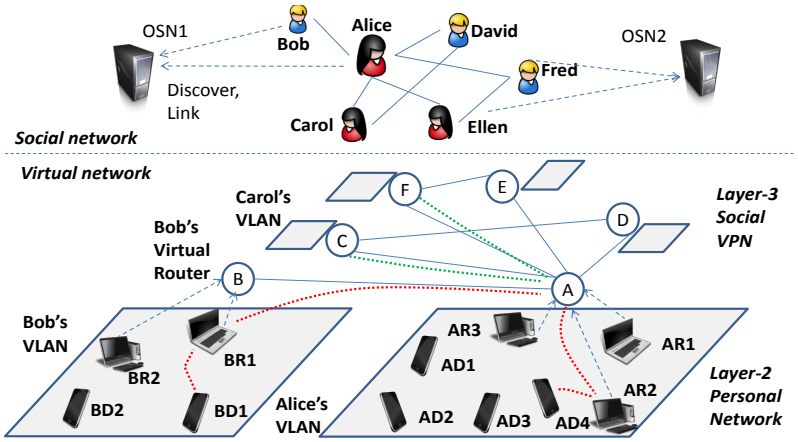


Figure 3 - Social, virtual and physical network stack in a collaborative Online Social Network (OSN)

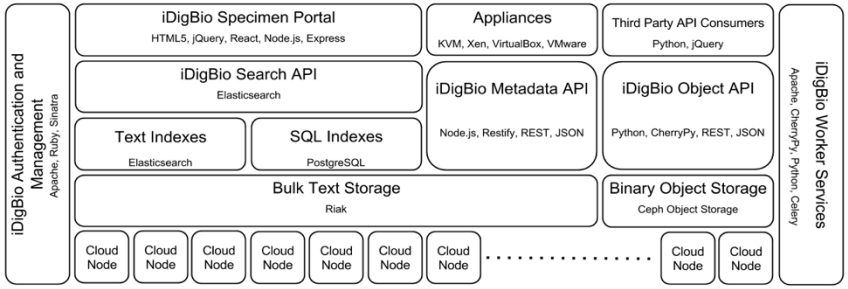
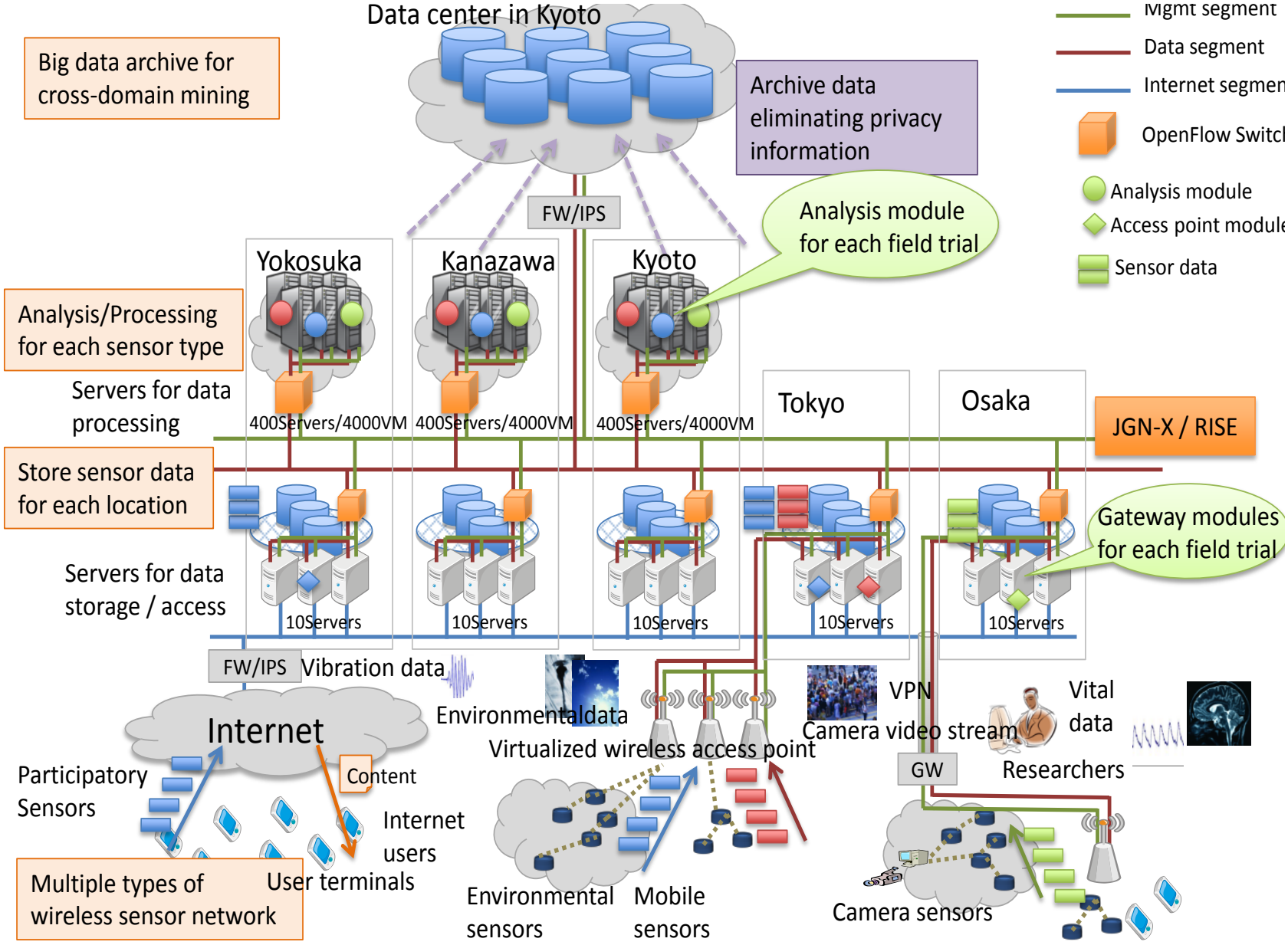


Figure 4- IT stack of iDigBio, an operational system developed by the PI's team to host large amounts of textual and media data in distributed nodes and provide web- and API-based interfaces to query and visualize data. CENTRA will have access to software, expertise and data needed to develop similar testbed systems for CENTRA research.

NICT JOSE – a testbed and a system



Requirement for Resources

- Co-existence of stable and robust resources and breakable resources
- Security and System Configuration Issues
  - Specially important that entire system can be configured repeatedly in software defined.
  - Security issue can be considered separately when we use network virtualization.
- There is a new streaming computational model coming to intention to treat realtime sensor data processing.
- Balance of requirements for data stream, computational power and communication should be carefully considered and arranged.

Attendees

- Wanida wputthividhya@gmail.com
- Prapaporn Rattanatamrong (Nan) rattanat@gmail.com
- Khurethlga Daghdarao huchka@ais.cmc.Osaka-u.ac.jp
- Jen-Gaw Lee jglee0318@gmail.com
- Takuya Yamada yamada.takuya@ais.cmc.osaka-u.ac.jp
- Arata Endo endou.arata@ais.cmc.Osaka-u.ac.jp
- Sri Puji Urami sripujiurami@gmail.com
- Jing-Yuan Luke jyluke@mimos.my
- Yoshiyuki Kido kido@cmc.osaka-u.ac.jp
- Jelina Tetangco jeng@asti.dost.gov.ph
- Shinji Shimojo sshimojo@gmail.com
- Jose Fortes fortes@acis.ufl.edu
- Fang-Pang Lin fangpanglin@gmail.com
- Whey-Fone Tsai wftsai@nchc.narl.org.tw