



Cyber Learning **wG Update**

October 16, 2014

**Ruth J Lee (KISTI),
Hsi-ching Lin (NCHC),
Putchong Uthayopas (KU)**



1. Overview of Cyber-Learning WG
2. Review of Cyber-Learning WG @ PRAGMA 26 meeting
3. Activities Done after PRAGMA 26
4. Future Directions for Cyber-Learning
5. Meetings @ PRAGMA 27

Cyber-Learning/Distance Learning WG



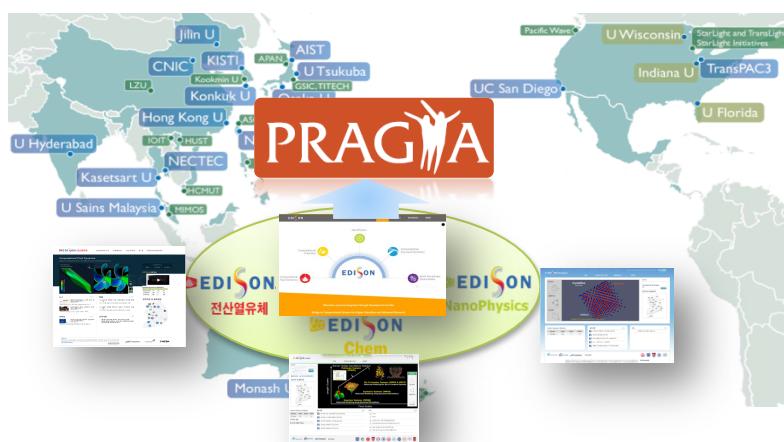
Expanding Cyber-Learning/Distance Learning Community in PRAGMA(Pacific Rim Applications and Grid Middleware Assembly)

❖ Establishment of PRAGMA Cyber-Learning WG

- Proposing Cyber-learning WG at the 24th PRAGMA Workshop (2013.3.20~23, Bangkok, Thailand)
- Chair(Lee, JongSuk Ruth), and Co-chair(His-Ching Lin, NCHC/Putchong Uthayopas, KU)

❖ Main Results

- **Promotion of Cyber-Learning WG & Spreading Cyber-Learning through EDISON to the PRAGMA community (Taiwan, Thailand and Hong Kong)**
- **Establishment of English EDISON web portal(CFD, Nanophysics, Computational chemistry) & user service open**
- **Held a workshop on Cyber-Learning at PRAGMA 26**
(2014.4.9~11, Taiwan)
- **Kicked-off “Korea-Taiwan International Joint Research Project ”**
(13.7.29-15.7.28, 50million won, Research Society)



Cyber Learning

Objectives

- ➲ Providing cyber education & research environments in computational science
- ➲ Utilizing Computing resources & services in PRAGMA community
- ➲ Promoting developing & utilizing activities through global collaborations

Goals

- ➲ Development and sharing of Cyber-Learning open platform and various education/research simulation S/Ws for PRAGMA
- ➲ Establishment of international cyber-learning community and connections to higher education
- ➲ Construction of collaboration channels amongst PRAGMA members and among other WGs

Activities

- ➲ Collaborating with Resource/Tele-Science/Bio/Geo Working Groups
- ➲ Co-developing and sharing of various simulation SWs and contents for Cyber-Learning in PRAGMA Community
- ➲ Sharing of information and experience on Cyber-Learning in PRAGMA Community
- ➲ Holding Joint Workshop/Seminar/Contest on Cyber-Learning
- ➲ Providing Cyber-Learning service to PRAGMA Community through Web Portal

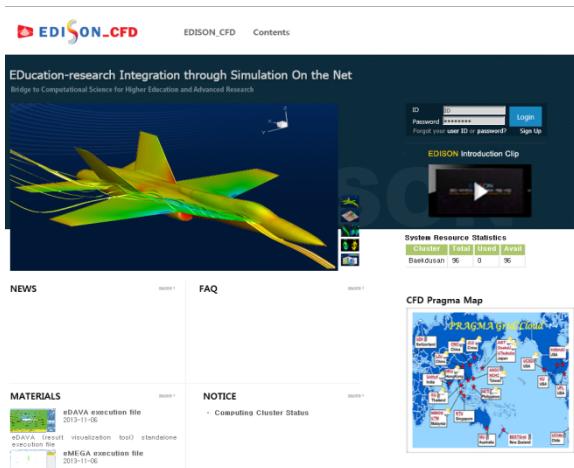
0. Review of CL WG@PRAGMA 26

- **Taiwan-Korea Cyber-Learning Joint Workshop** : April 9(Wed), 2014 @Chung-Hua Hall
- **Breakout Session I** : 16:00~17:00, April 10(Thur), 2014 @Room IV
 - ✓ Participants : 13 People from Indonesia, HongKong, Taiwan, and Korea
 - ✓ Presentation on ActiveFolder by Prof. Suntae Hwang
- **Cross WG Session** : 9:50~10:50, April 11(Fri), 2014 @Chung-Hua Hall
- **Breakout Session II** : 14:00~15:20, April 11(Fri), 2014 @Room IV
 - ✓ Participants : 11 People from Indonesia, HongKong, Taiwan, and Korea
 - ✓ Two demos on ActiveFolder and EM
 - ✓ Discussions on future action and collaboration items among participants
- **Cyber-Learning related Demo on EDISON_NanoPhysics** : 17:00 ~18:00, April 10(Thur), 2014 @Chung-Hua Hall

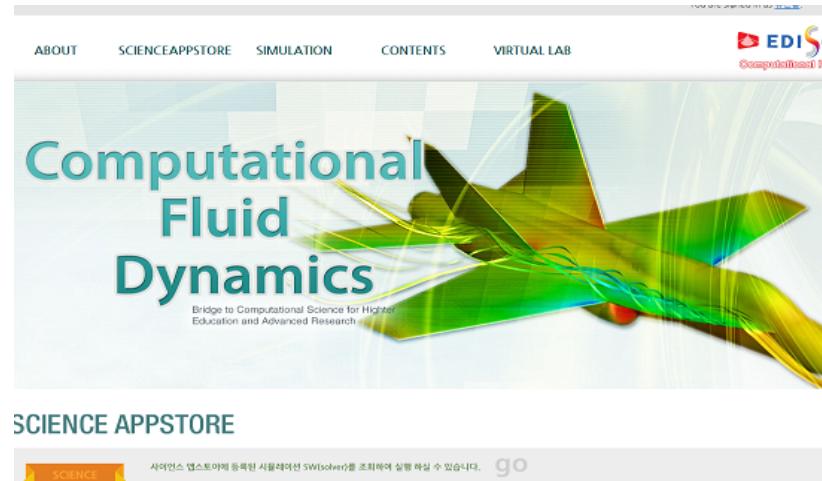
0. To do list by PRAGMA 27 and afterward

- **Open for trial use by WG members**
 - ✓ EDISON portals: EDISON_CFD, EDISON_Chem & EDISON_NanoPhysics
 - ✓ EM system
 - > To find out collaboration items for educational/research purposes
- **Integrating various systems and simulation solvers/digital contents onto the EDISON platform**
 - ✓ ActiveFolder : Prof. SunTae Hwang, Kookmin Uni., Korea
 - ✓ BioKnowledge Viwer : Dr. Sukjong You, KISTI, Korea
 - ✓ EM contents : Dr. Hsi-ching Lin & Heng-Chuan Kan, NCHC, Taiwan
- **Testing feasibility of running simulation jobs on PRAGMA resources through EDISON portal**
- **Other things to do and consider ...**
 - ✓ How to get more people attend to Cyber-Learning WG from PRAGMA members? → Possibly combining related WGs such as BioScience WG and Cyber-Learning WG, and etc
 - ✓ How to and what to collaborate and integrate with other WGs?
 - ✓ Need to clarify/modify/add the short/middle/long term goals, vision and roadmap?

1. Activities Done After PRAGMA 26 (1/2)



CFD
Web Portal
Migration



EDISON Web Portal for CFD

- **Web Framework : Joomla -> Liferay**
- **Web Portal Account**
 - ✓ Student ID is assigned by Virtual Class Tutor
 - ✓ Class tutor must be approved by web portal admin
- **Submit the Simulation Job**
 - ✓ Several way of simulation : Simulation Menu, Science Appstore Menu
 - ✓ User can easily find out the want-a-solver by solver filter, popular solver list, search box using solver feature or name
- **Unified Computing Resources**
 - ✓ Computing Resources are adjusted based on the diverse EDISON field schedule
- **Solver features and Manual are tied to the solver**
 - ✓ User can access the manual and features (description and snapshot) on the solver selection box

1. Activities Done After PRAGMA 26 (2/2)

➤ Provision of EDISON Web Portals for PRAGMA Users

- ✓ Trial use of EDISON Web Portal Service in 2 Areas(NanoPhysics, Computational Chemistry) to Hong Kong Univ.
 - NanoPhysics : Dr. Sha Wei of Electrical and Electronic Engin.
 - Computational Chemistry : More than 40 users tried to use.
- ✓ Provides ID and password for trial use of EDISON web portal

EDISON Web Portal for Computational Chemistry
[\(http://chem.edison-project.org\)](http://chem.edison-project.org)

EDISON Web Portal for Nano Physics
[\(http://nano.edison-project.org\)](http://nano.edison-project.org)

2. Activities Done After PRAGMA 26 (1/3)



Integrating All the Activities of Simulation on File System

- ➲ Active Folder – good for case comparative study
 - Tasks
 - ✓ Described as regular folders and files
 - Product
 - ✓ Input or output of simulation
 - ✓ Can be handled like regular file by using legacy software
 - ✓ Contains provenance information (meta data, task info, etc)
 - ✓ Can be reproduced by the task which is extracted from the provenance information
 - Apps(Computing Resource)
 - ✓ Computing server(Local, Grid, Cloud, what ever, ...) is registered as regular folders and files
 - ✓ To submit a Job(task), just Drag&Drop the task folder to the folder which represents computing server

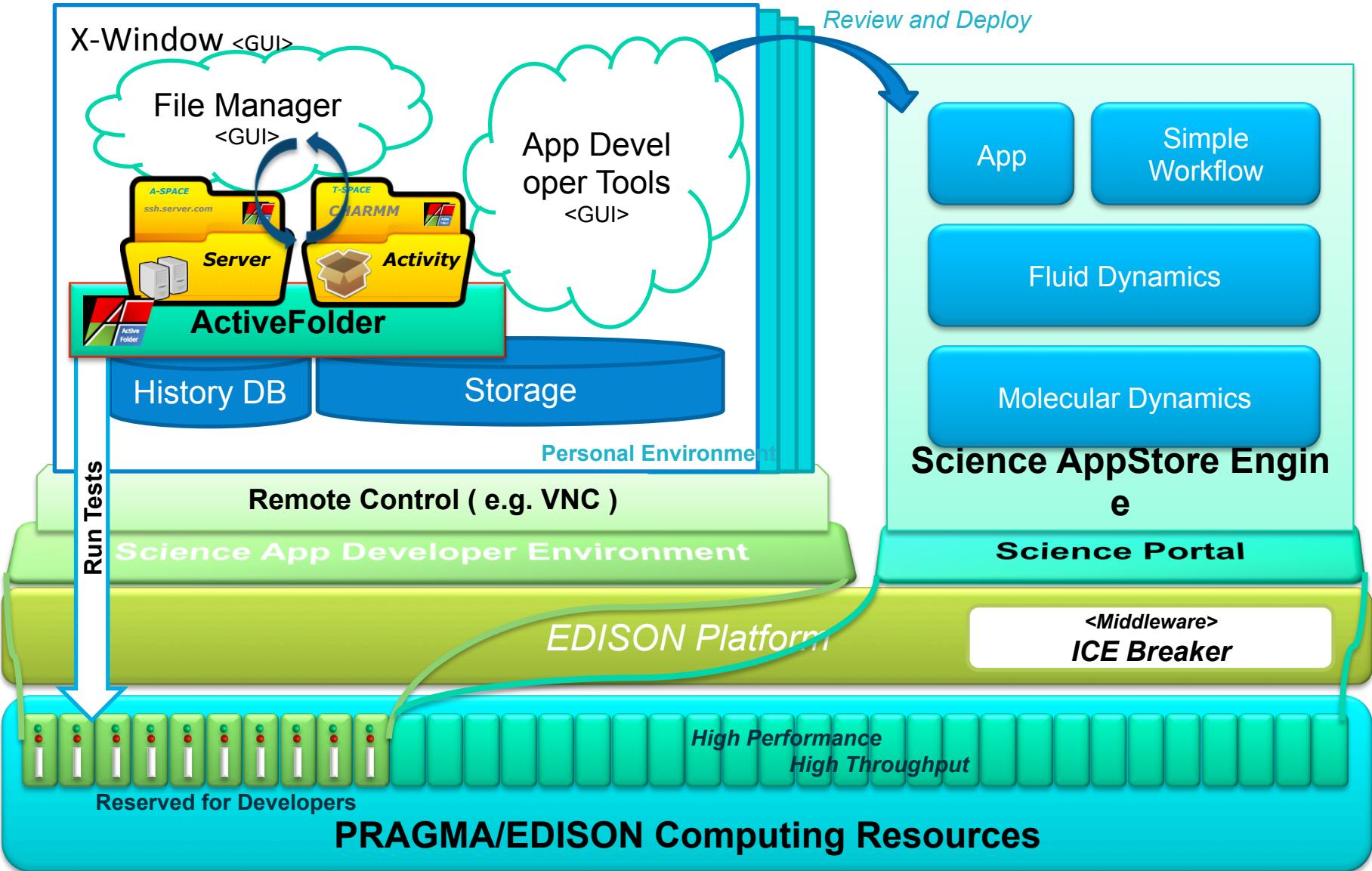
2. Activities Done After PRAGMA 26 (2/3)

➤ Meeting for Collaboration between EDISON and ActiveFolder

- ✓ Date: May 9, 2014
- ✓ Place: Seoul, Korea
- ✓ Participants: Prof. Sun-tae Hwang (Kookmin Univ.); Dr. Ruth Lee (KI STI) and related 4 researchers
- ✓ Discussions:
 - Identify the possibility of integration between IceBreaker on EDISON and ActiveFolder
 - Identify the correlation relationships between Science AppStore and ActiveFolder
- ✓ Possible Scenarios:
 - ActiveFolder Task Manager registers the results downloaded from EDISON and manages pre/post process information of the solver
 - ActiveFolder could be worked as a local system once the jobs passed by EDISON portal

2. Activities Done After PRAGMA 26 (3/3)

Science AppStore Developer Environment Using ActiveFolder

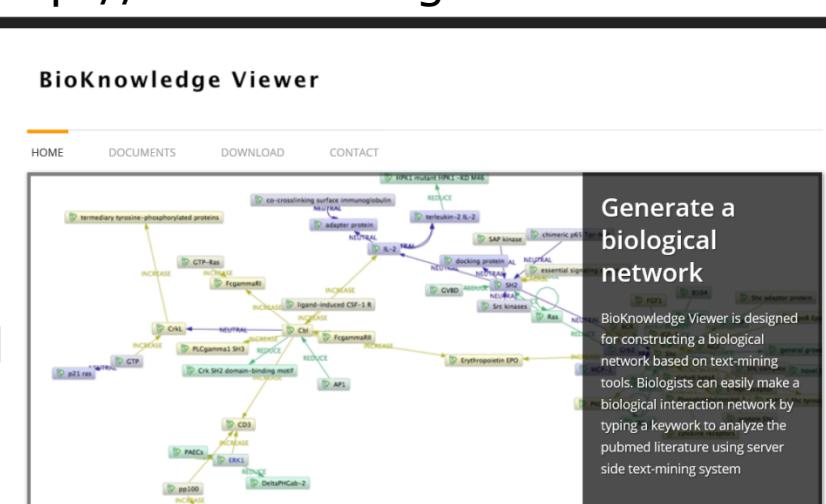


3. Activities Done After PRAGMA 26 (1/3)

Overview of BioKnowledge viewer

- Text-mining system for constructing biological networks
- Making a biological interaction map for user's query
- Providing an interactive navigation interface with using the graph database (Neo4J)

<http://bioknowledgeviewer.kisti.re.kr>



The screenshot shows a complex biological interaction network graph. Nodes represent various biological entities like proteins (e.g., p53, EGFR, CD45, PI3K, ERK1/2, SAP kinase, Erythropoietin EPO) and pathways (e.g., RAS, MAPK, PI3K-Akt). Edges represent interactions with labels such as 'INCREASE', 'REDUCE', 'NEUTRAL', and 'ACTIVATION'. A sidebar on the right contains the text: "Generate a biological network" and "BioKnowledge Viewer is designed for constructing a biological network based on text-mining tools. Biologists can easily make a biological interaction network by typing a keyword to analyze the pubmed literature using server side text-mining system". Below the graph, a caption reads: "BioKnowledge Viewer which can generate a biological interaction network provides a useful way which is biologists can easily construct a biological network using text-mining system with manual curation process."

Features	Powerful text-mining on server-side	Manage the networks with Neo4J	Curate and expand the user's networks easily
BioKnowledge Viewer has useful feature for constructing a biological network.	We provide server-side analysis service that can analyze the pubmed data. BioKnowledge Viewer employed Metamap and ABNER as a biological tagger so that biological entity including gene, protein and other objects can be identified.	BioKnowledge Viewer has been implemented with Neo4J which is a graph database. User can manage the biological network in user's PC with Neo4J and navigate the network on BioKnowledge Viewer.	User can check the text-mining results on BioKnowledge Viewer and cure the data. If you want to construct huge biological network, you can analyze several keyword and merge the network on it.

3. Activities Done After PRAGMA 26 (2/3)

➤ Meeting for Collaboration between EDISON and BioKnowledge Viewer

- ✓ Participants: Dr. Sukjong You (KISTI), Dr. Ruth Lee (KISTI) and related 4 researchers
- ✓ Discussions:
 - Identify the integration between EDISON_Chem and BioKnowledge Viewer
 - Manuals of BioKnowledge Viewer will be prepared and released.
 - BioKnowledge Viewer Service on EDISON Portal will be serviced

3. Activities Done After PRAGMA 26 (3/3)

☞ BioKnowledge Viewer is Linked to EDISON Chem Portal Service

- BioKnowledge Viewer is a data mining tool that enables a holistic navigation of the biological phenomenon that a researcher desires by visualizing biological interaction information through data mining and using NCBI Pubmed information.
- Researcher are able to download real-time Pubmed information on various areas of interest by entering simple keywords, as well as extract detailed information on biological phenomenon using research papers' abstracts.
- The results of the data mining can be viewed in network-form graphs, which allow various controlling mechanisms to be grasped at a glance; in addition, integrated signal transmission networks desired by researchers can be created and managed.

<http://chem.edison.re.kr>

The screenshot shows the EDISON_Chem portal homepage. It features a main banner with the text "Molecular Modeling using Multiscale Simulations (MMS)" and "Multiscale Systems". Below the banner, there's a section titled "Length Scales" with a 3D molecular model. To the right, there are several smaller molecular structures and a "Quick" sidebar with links to "Molster", "Surfaces", and "Networks". At the bottom, there's a "System Resource Statistics" table and a "Try BioKnowledgeViewer!" button, which is circled in red.

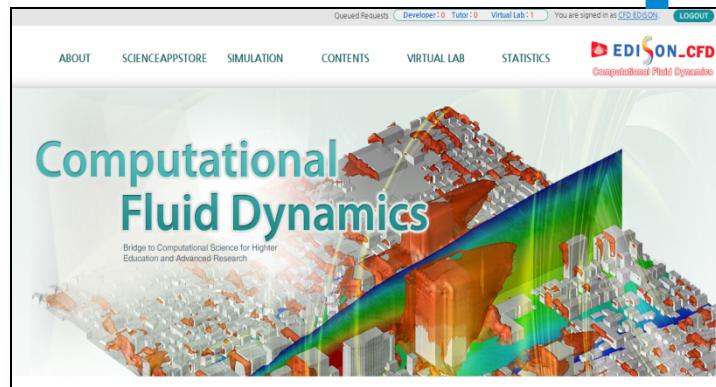
The screenshot shows the BioKnowledge Viewer homepage. It features a large "Manage your networks" section with a complex network graph. Below it, a text box says: "BioKnowledge Viewer which can generate a biological interaction network provides a useful way which is biologists can easily construct a biological network using text-mining system with manual curation process." To the left, there's a "Features" section with a list of benefits, and to the right, sections for "Powerful text-mining on server-side", "Manage the networks with Neo4j", "Curate and expand the user's networks easily", "Navigation of the biological network", and "Share your projects with your co-workers".

<http://bioknowledgeviewer.kisti.re.kr>

4. Activities Done After PRAGMA 26 (1/3)

➤ Overall Architecture of Deploying EDISON_CFD with PRAGMA Resources

EDISON Web Portal for Computational Fluid Dynamics (CFD)
(<http://cfd.edison-project.org>)



EDISON Platform
OpenAPIs

- User Authentication/Authorization
- On-demand Virtual Resource Provisioning
- Simulation/Job Lifecycle Management
- File Repository Management (per user)

Heterogeneous Computing Resources & Job Management Framework
(IceBreaker)

User Management

Resource Management

Job Management

File Repository Management

spring

openstack

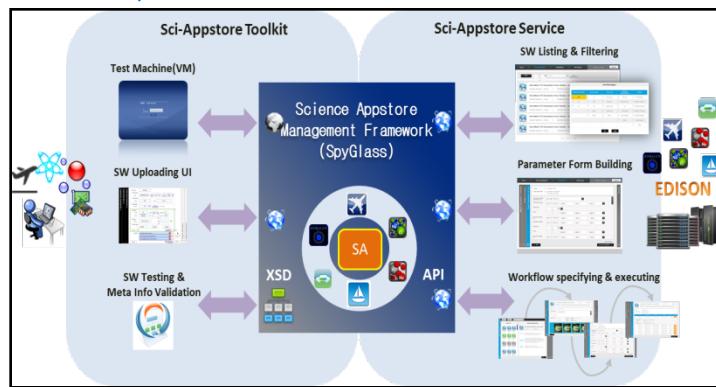
OpenNebula.org

SAGA

A Simple API for Grid Applications

EDISON Platform
OpenAPIs

Simulation SW metadata (work flow, parameters, etc.)



Science AppStore Framework (**SpyGlass**) for CFD

Zone US

San Diego Supercomputing Center
Rocks-203
Maui / OpenPBS



- Virtual Cluster (32 cores) on Fiji
- 500GB Shared Storage
- 4GB memory per node
- MPICH-1/Intel MKL

Zone KR

EDISON (EDISON-CFD)
Maui / OpenPBS



PLSI (kisti.sinbaram)
IBM LoadLeveler

KISTI-4 (Tachyon)
Oracle Grid Engine



4. Activities Done After PRAGMA 26 (2/3)

➤ EDISON_CFD Functional Flow

1 Simulation S/W Metadata

- category
- name, developers, version
- pre-/post- tools
- input deck format
- parameters
- source code zip
- etc.

S/W

Testing & Feedback



Dev. Env.

Science AppStore Framework (SpyGlass)

Science AppStore Toolkit

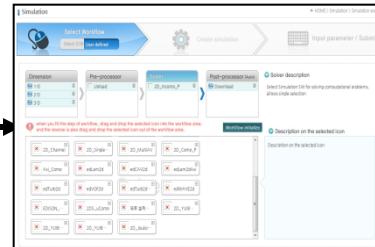


Science AppStore Service

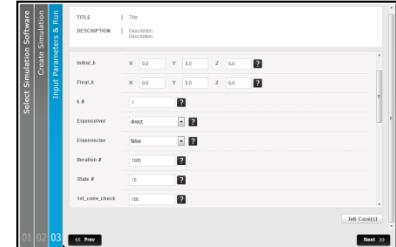
2 Publishing Simulation S/W

S/W

4 Simulation Workflow Execution



3 SW Query/Results



5 Job Submit/ Monitoring



Heterogenous Computing Resources & Job Management Framework (IceBreaker)

Virtual Machine (VM) Management

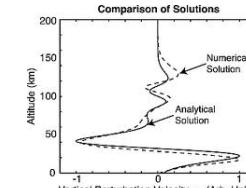


Job Management

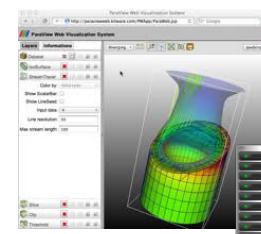
6 Running Simulation S/W



Download



1-D Plot

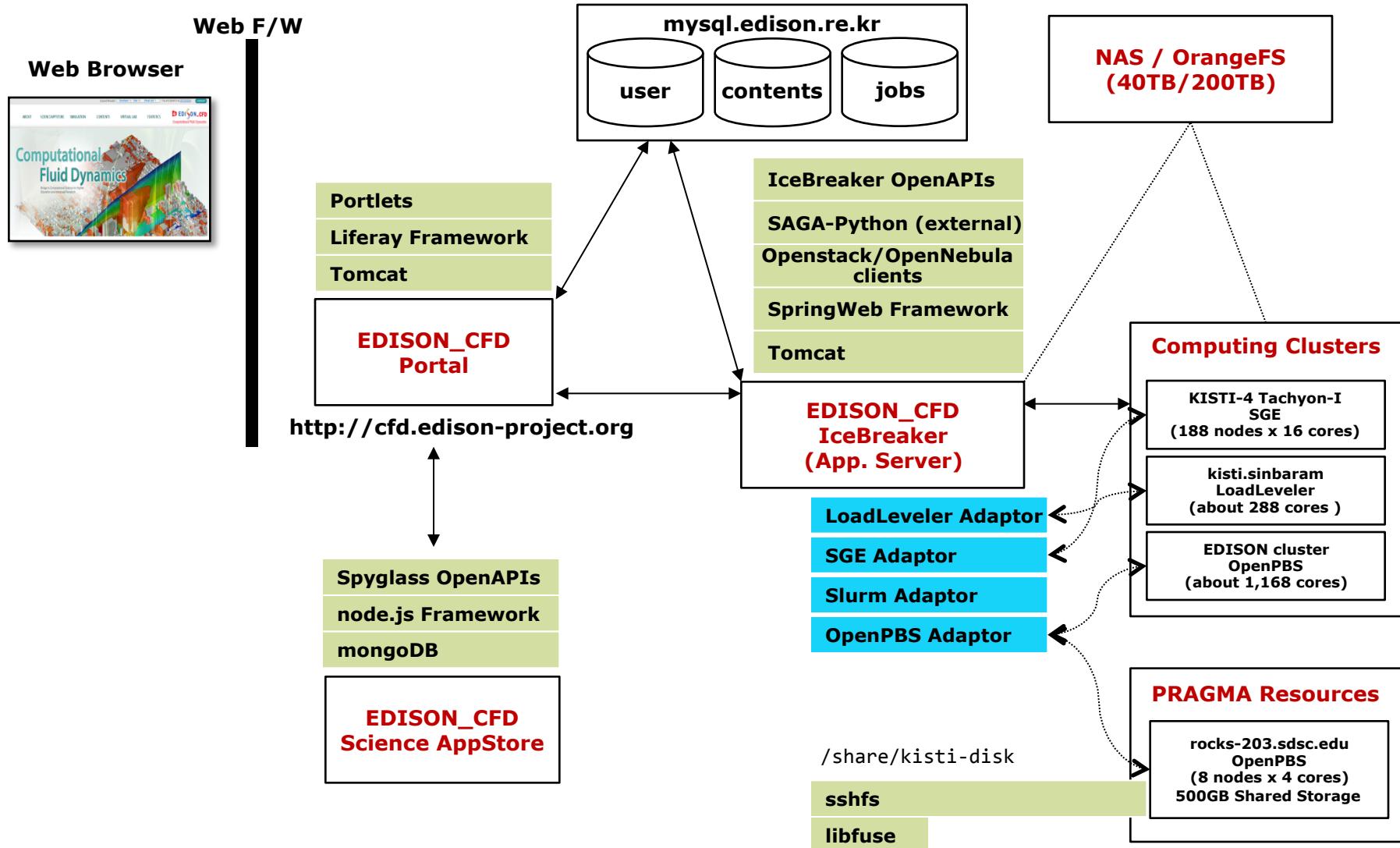


Remote Vis. (ParaviewWeb)



4. Activities Done After PRAGMA 26 (3/3)

➤ EDISON_CFD System Configuration



5. Activities Done After PRAGMA 26 (1/2)

Initiating collaboration between KISTI, Korea & ICST, Vietnam



❖ Background

- Peter and Ruth was invited to ICCSE2014@Ho Chi Minh City (Aug. 21-23, 2014)
- Consulted with Dr. Thanh N. Truong, head of ICST(Institute of Computational Science and Technology), Vietnam, to pursue business cooperation between the two organizations to establish a cyber education and research environment in Vietnam just as the EDISON and perform talent cultivation ODA(Official Development Assistance) programs based on computational science-related business cooperation and UST(University of Science & Technology, Korea) program.

❖ Goal

- To build a starting point to expand the EDISON project in ODA recipient states in South East Asia and beyond

❖ Cooperation Outline

- Build a cyber research and educational environment via ODA projects (EDISON@Vietnam) and Vietnamese EDISON communities
- Share simulation programs and contents developed by the EDISON project to attract Vietnamese users
- Provide training programs to Vietnamese researchers (UST masters/doctoral courses) through the UST program and support mutual visiting research and exchanges.
- Pursue joint studies in computational science based on supercomputing and network to come up with quality performance.
- Arrange workshops and fulfil as a center of super computing technology development and computation science research and cooperation between the two states.

❖ Expected benefits

- Facilitate the ODA project based on EDISON findings and the strategic point of Viet Nam and expand EDISON users further into South East Asia and other ODA recipient states.
- Enhance national scientific technology competitiveness and external/internal recognition of the KISTI Supercomputing Center.

5. Activities Done After PRAGMA 26 (2/2)

Extension of Collaboration Project between KISTI & NCHC

- ❖ Title : **Korea-Taiwan International Joint Research Project**
- ❖ Duration of Project : **July 2014 ~ July 2015 (1 Year, \$50,000)**
- ❖ **Mutual cooperation plan between KISTI, Korea and NCHC, Taiwan**
 - Jointly promote and apply simulation SWs for the purpose of education and research
 - Identify research issues in the CFD and Nanophysics sectors and promote joint research
 - Share latest research results to save development cost
 - Expand mutual system users to cultivate cyber-learning communities
 - Share computing resources, information, experience and ideas for the simulation-based cyber learning
 - Facilitate researcher-to-researcher exchanges



Korea Institute of
Science and Technology Information

6. Activities Done After PRAGMA 26 (3/3)

NARLabs

Commitment • Passion • Innovation

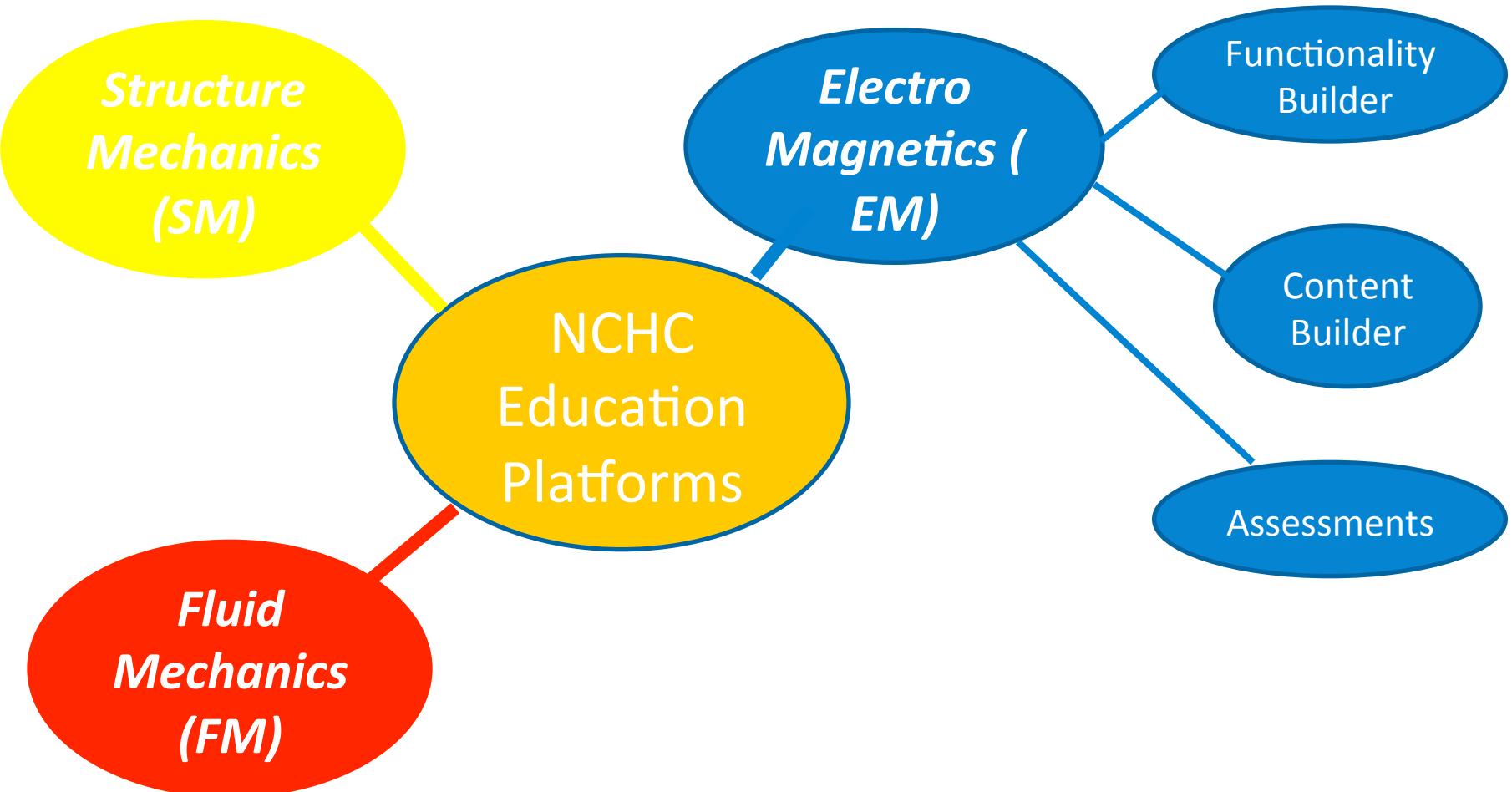
Future cyber-Learning on Engineering Education Through Simulation (FLEETS)

Heng-Chuan KAN, Ph.D.
NCHC, Taiwan

Goals

Commitment • Passion • Innovation

- ⇒ Reshape Learning Paradigm on Engineering Education
- ⇒ Create a Better Learning Platform/Environment for Engineering Students of High-Education
- ⇒ Reduce Gaps between Course Learning Materials and Industrial Needs in Engineering Applications



Characteristics of NCHC Education Platforms

NARLabs

Commitment • Passion • Innovation

- ➔ Innovative/Experimental Learning Platforms
- ➔ Provide Different Levels of Certificates
- ➔ Modularity of Teaching Contents
- ➔ Enhance Project-Based Learning
- ➔ New Approaches of Assessment System

7. Future Directions for Cyber-Learning



- Exploit natural sciences and engineering
- Expand applied areas for other area users
- Support ODA recipient states in its use

- Joint international research & global user increase
- Prioritize research simulation program support via user demand investigation

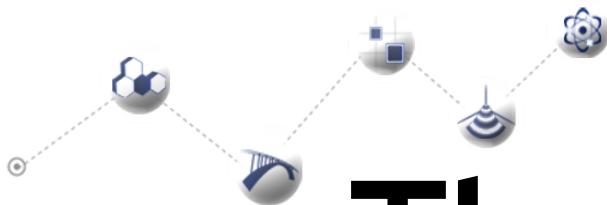
- Support business problem-solving process and re-educate employees
- Link businesses with smaller firms
- Find creative simulation SW-based EDISON user firms

- **Breakout Session I : 13:45~15:00, Oct. 16(Thur), 2014 @Cyberinfrastructure Building, Room 207A**
 - ✓ Discussions for exchanging ideas, status, best practices and etc
 - ✓ Open for any presentations on CL

- **Breakout Session II : 14:30~15:30, Oct. 17(Fri), 2014 @Cyberinfrastructure Building, Room 207A**
 - ✓ Discussions for future action and collaboration items among participants

Open for everyone.

Please come & join our Cyber-Learning WG!!!



Thank You!!!