

# Simulation based **Cyber-Learning/Distance Education** **WG Update**

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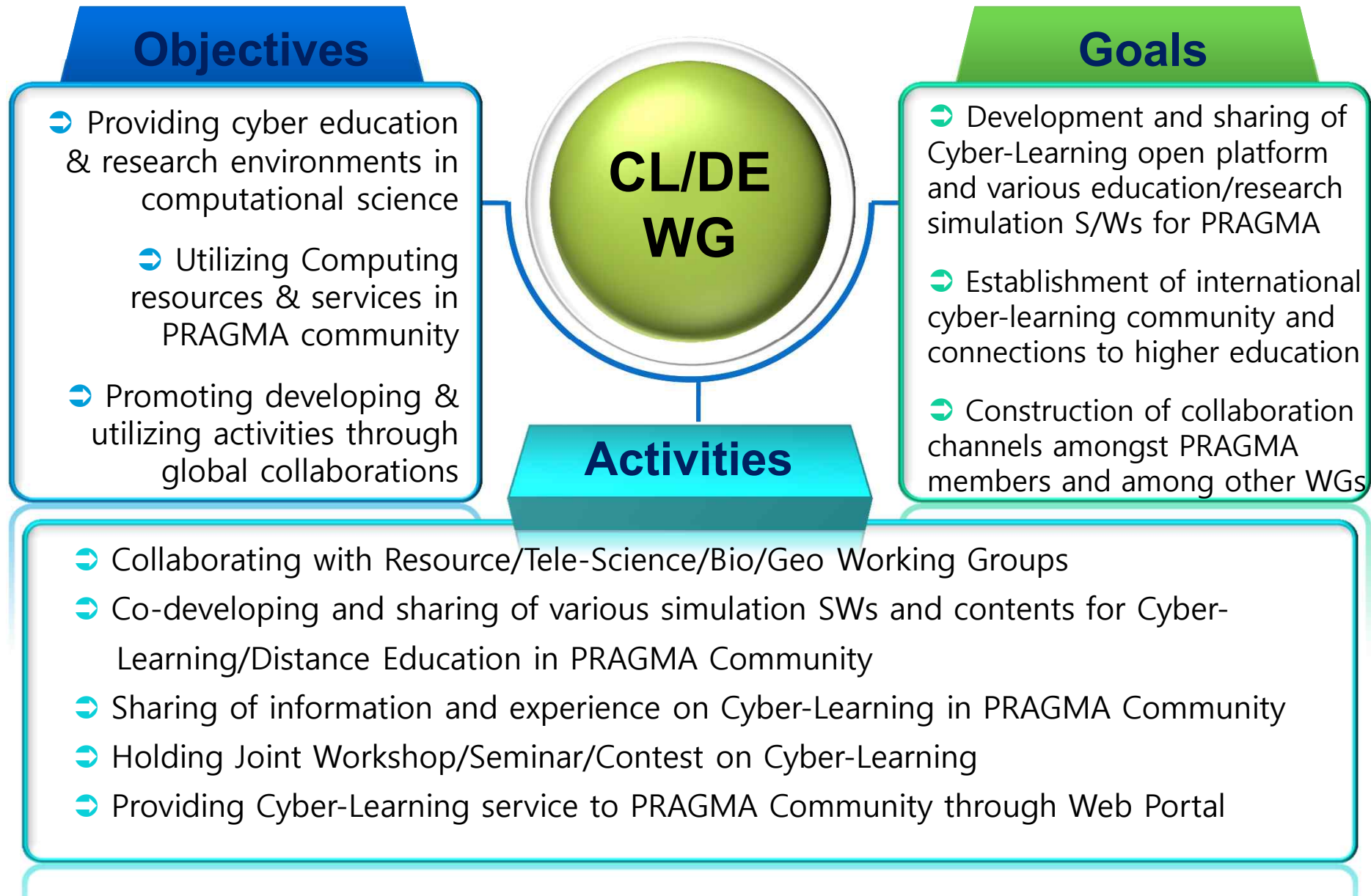
April 13, 2017

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



1. Overview of CL/Distance Education WG
2. Review of CL/DE WG @ PRAGMA31
3. Ongoing Issues and Activities on CL/DE WG
4. Meetings @ PRAGMA32

# 1.1 Cyber-Learning/Distance Education WG



## 1.2 Cyber-Learning/Distance Education WG

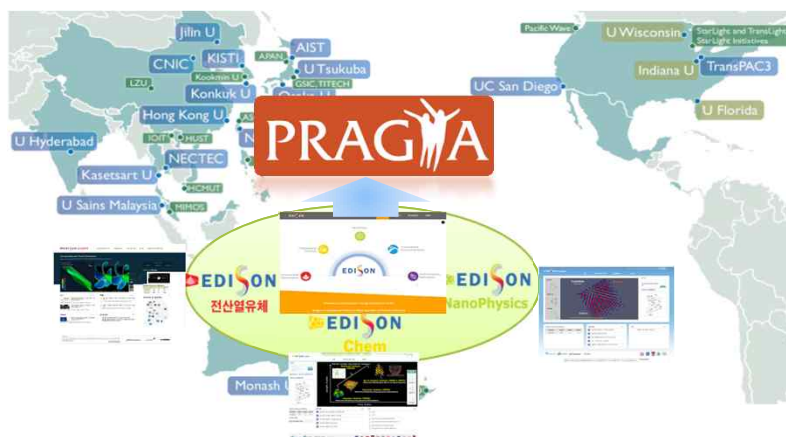
### Expanding Cyber-Learning/Distance Education Community in PRAGMA(Pacific Rim Applications and Grid Middleware Assembly)

#### ❖ Establishment of PRAGMA Cyber-Learning/Distance Education WG

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

#### ❖ Summary of Main Results

- **Promotion of CL/DE WG & Spreading CL/DE through EDISON to the PRAGMA community** (Taiwan, Vietnam, Thailand and Hong Kong)
- **Establishment of EDISON web portal** & deployment of EDISON CFD@NCHC
- **Held a workshop on Cyber-Learning at PRAGMA 26** (2014.4.9~11, Taiwan)



One simulation based cyber learning system is called EDISON, "Education research integration through simulation on the Net" (<http://www.edison.ku.ac.th>). Anyone can learn and understand a theory or system through computer simulation and can predict operations of the system through early changing parameters of the simulation model. It was created in July 2011 by KUST (Kasetsart University) and currently covers three areas: Computational Fluid Dynamics, Nano Physics, and Computational Chemistry. It also has participants at major universities in Korea and has acquired more than 10,000 users since its inception. The web portal for members is at [www.edison.ku.ac.th](http://www.edison.ku.ac.th) and computer simulation chemistry (<http://chem.edison.ku.ac.th>) were recently developed and introduced at PRAGMA 25.

PRAGMA LEADERSHIP: Lead: Ruth Lee (KUST), Co-leads: His-ching Lin (NCHC), Putchong Uthayopas (Kasetsart U).



## 2.0 To do list by PRAGMA 32 and afterward



- **Open EDISON portals for trial use to PRAGMA members**
  - ✓ EDISON portals: EDISON\_CFD, EDISON\_Chem & EDISON\_NanoPhysics
- **Hope to deploy EDISON platform 2.0 on top of the PRAGMA resources and upload **simulation solvers and contents** developed by one of PRAGMA community members who are willing to share and open them.... BUT, not many request so far....**
- **Other things to do and continuously consider ...**
  - ✓ How to get more people interested in simulation-based CL/DE WG from PRAGMA members?
  - ✓ How to and what to collaborate and integrate with other WGs?

## 2.1 Ongoing Activities Under PRAGMA (1/2)



### Int'l Collaboration between KISTI & NCHC Since 2013

#### ❖ **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

National Center for  
High-performance Computing

**NAR Labs**  
National Applied Research Laboratories



**Supercomputing Center**  
The center of National Science &  
Technology Information Infrastructure



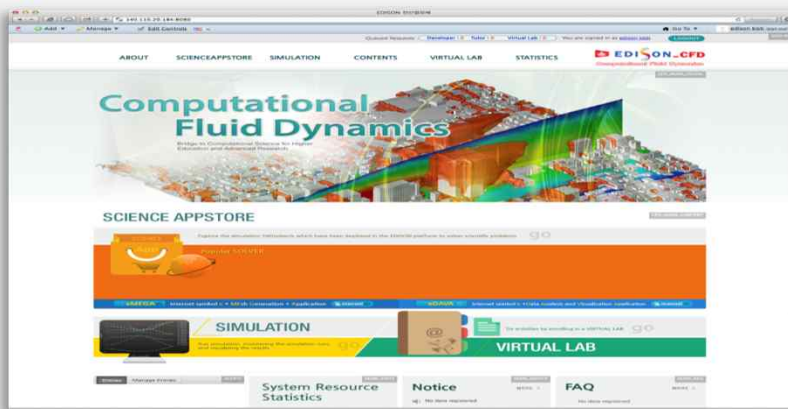
Korea Institute of  
Science and Technology Information



## 2.1 Ongoing Activities Under PRAGMA (2/2)

### Deployment of EDISON CFD Site at NCHC, Taiwan

- **Goal:** Boosting the CFD community in Taiwan relatively in a short time
- **Counterparts:** The EDISON team & Dr. H. KAN and Mr. Gary Wu@ NCHC
- **System specification**
  - **Hardware: 4-machine system setup**
    - 3 computing nodes, each with Intel(R) Xeon(R) CPU E5-2640v2@2.00GHz (8 cores, 16 threads) x 2, 48GB RAM, 838GB HDD by RAID5
    - One SSD-based Storage Server
  - **Software:** EDISON M/W (Job management/metadata framework) and application layers (Liferay-based portal) and one CFD Apps



EDISON CFD site at NCHC  
based on EDISON Platform 1.0



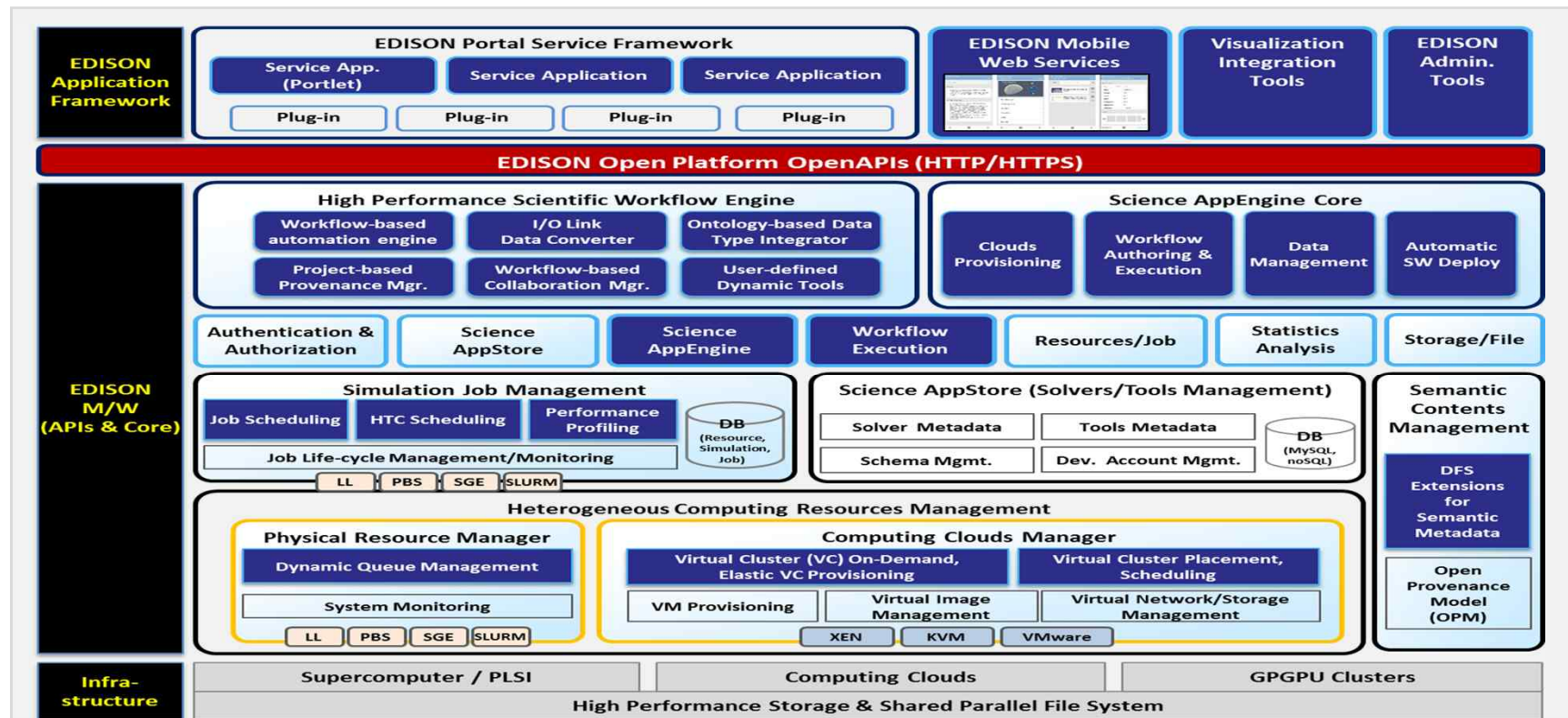
EDISON CFD site at NCHC  
based on EDISON Platform 2.0

## 2.2 Activities Done After PRAGMA31@KISTI (1/5)



### Core components of EDISON open platform 2.0 for CSE

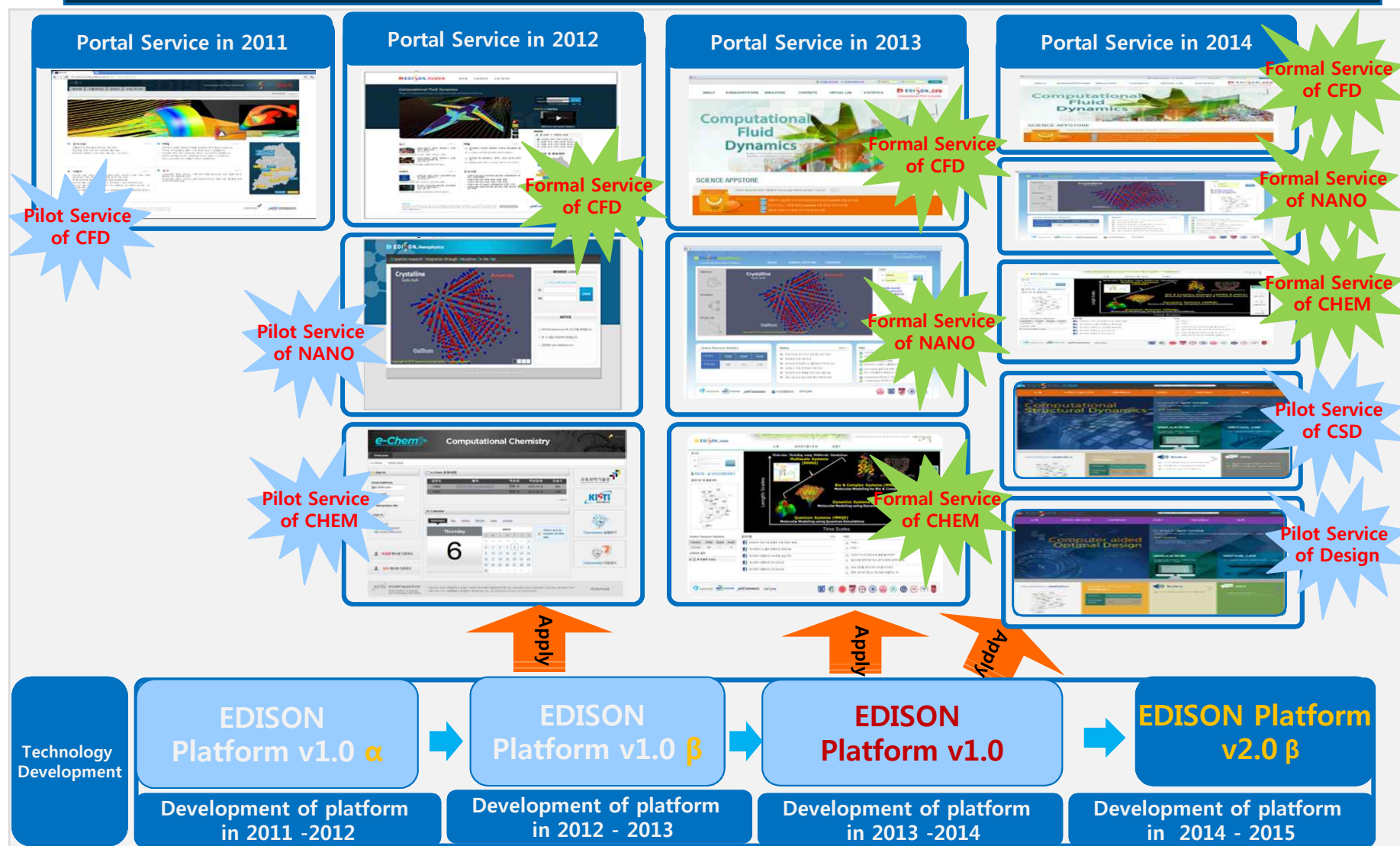
- Establish **web portal framework** & **web portal integrated environment** of EDISON to support multidisciplinary computational science and engineering
- Development of **core technologies** for open platform such as **Science AppEngine**, **optimization of workflow runtime engine** & **flexible provisioning of computing resources**





## 2.2 Activities Done After PRAGMA31@KISTI (2/5)

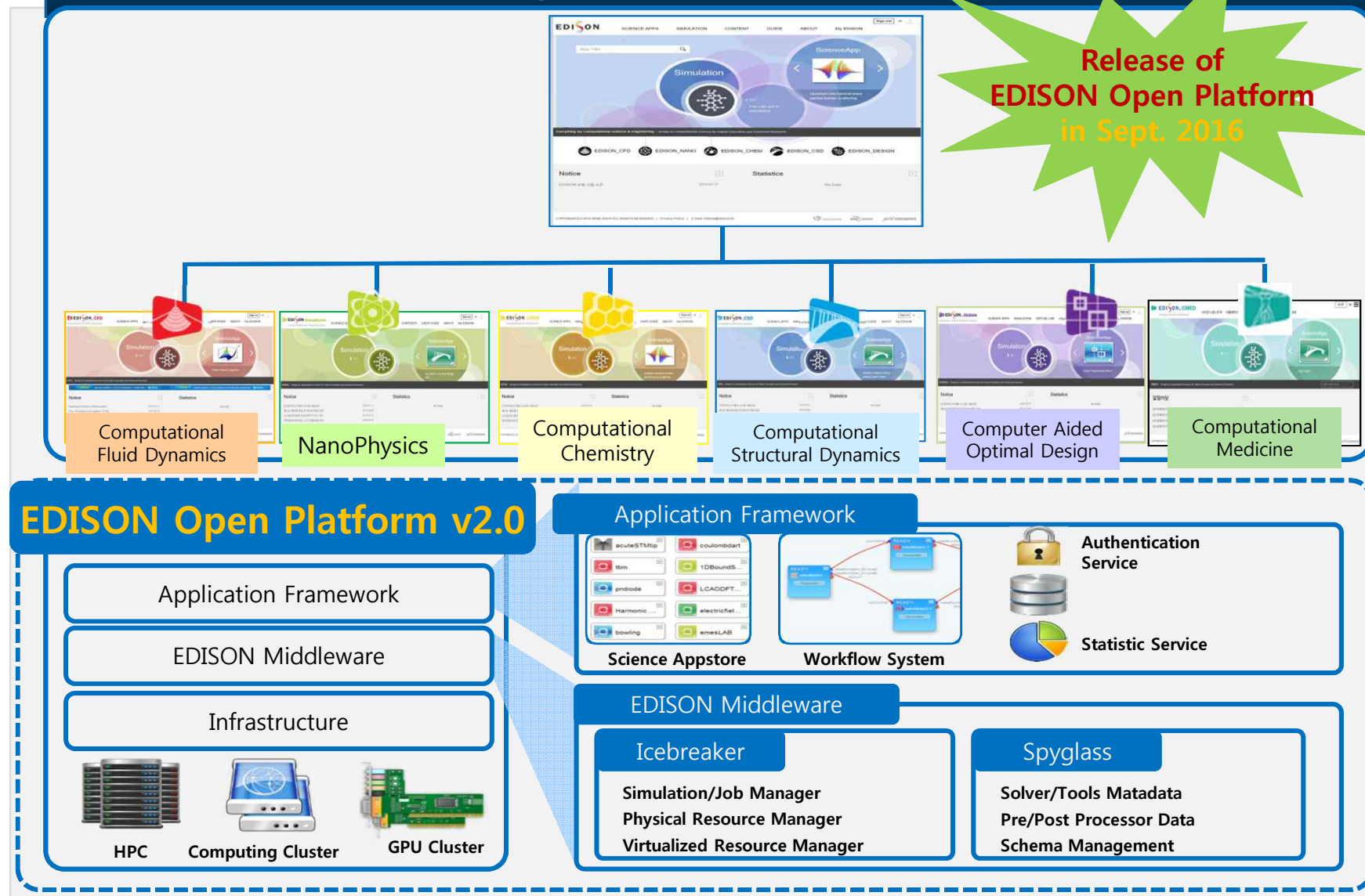
### History of EDISON Platform & Portals



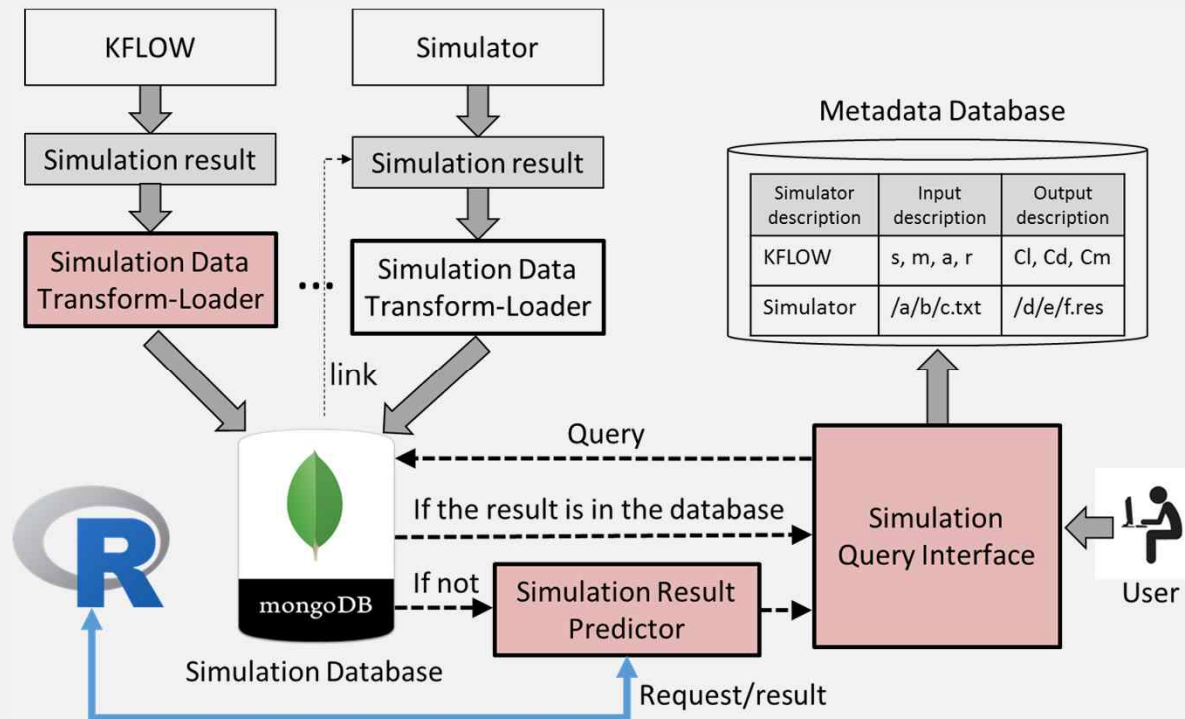
## 2.2 Activities Done After PRAGMA31@KISTI (3/5)

### Integrated EDISON Portal

Release of  
EDISON Open Platform  
in Sept. 2016



- Design of data-driven simulation service for EDISON
  - For overcoming repetitive simulation executions
- Expecting preliminary service launching early 2018



<Data-driven Simulation Service Architecture (for KFLOW + others)>

## 2.2 Activities Done After PRAGMA31@KISTI (5/5)

### Release of EDISON Open Platform v2.0

Downloadable here

**EDISON DOWNLOAD**

Construction of EDISON open platform: the construction / offering / support of integrated user of the Web portal service environment for simulation programs and content utilization of specialized field

**<EDISON Portal Framework>**

provision of development and infrastructure resources of the EDISON application middleware: user and management of tasks, building and EDISON user services infrastructure conjunction with the d the super computer and high-speed research network resources provided

**<EDISON Scenario>**

**EDISON** SCIENCE APPS SIMULATION CONTENT GUIDE ABOUT NEWS My EDISON Forum STATISTICS PROJECT

App Title

Simulation

ScienceApp

Preprocessor for Discrete Adjoint Solver

GO You can run a simulation

Everything for Computational Science & Engineering - Bridge to Computational Science for Higher Education and Advanced Research

EDISON\_CFD EDISON\_NANO EDISON\_CHEM EDISON\_CSD EDISON\_DESIGN

Notice

2016 EDISON Summer School (8/24, 8/31)  
[Urgent] EDISON User Password Resets  
[Notice] Required for the back-up of personal input/output files a...  
Web-based Visualization Toolkit ParaviewWeb Tutorial

System Resource Statistics

Site	Cluster	Total	Used	Avail
EDISON	EDISON-CFD	544	110	434
	EDISON-CHEM	224	3	221
	EDISON-NANO	208	1	207
	EDISON-CSD	96	0	96
	EDISON-DESIGN	96	2	94

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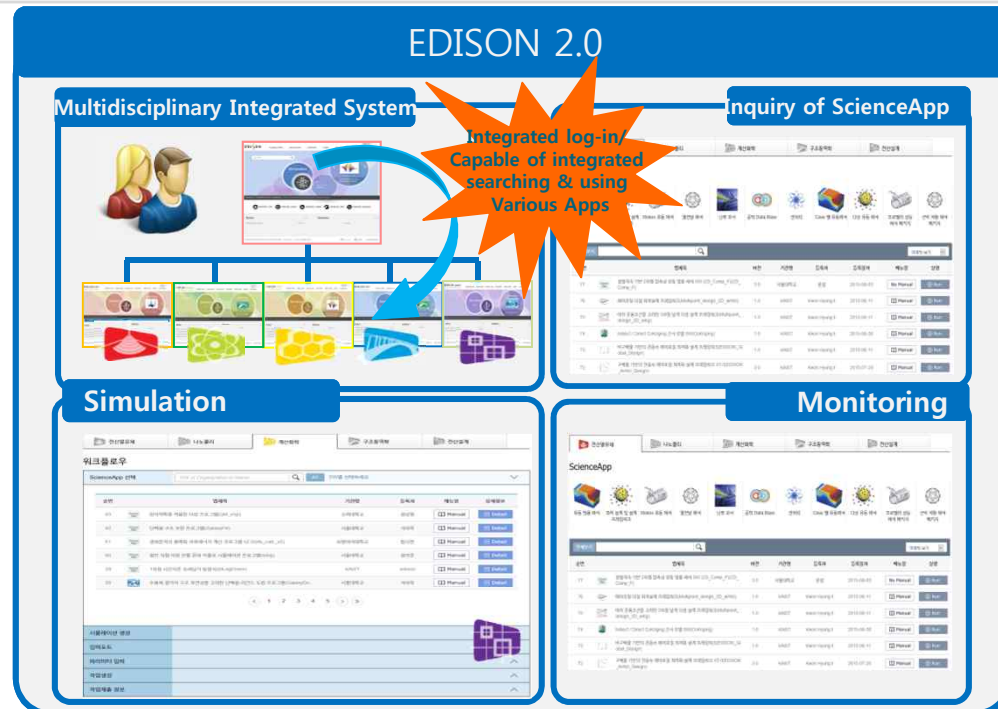
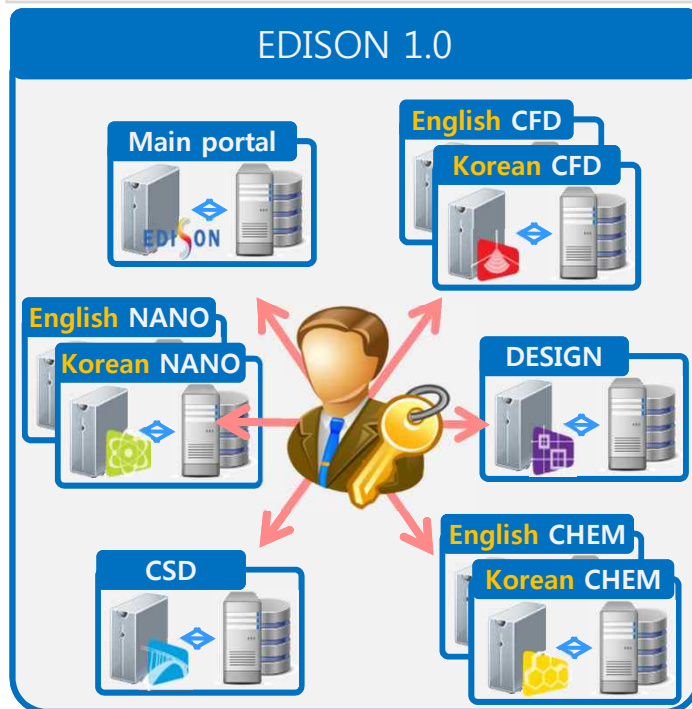
<GitHub repository>

<EDISON Portal Site>

## 2.3 Excellence of Integrated EDISON Portal (1/5)

### Possible to Multidisciplinary convergence study of CSE

- **Integrated log-in with ONE user ID**
  - Search, access & use various Apps of 5 areas of EDISON with one user ID
- **Integration of five ScienceApp databases for each domain field**
- **Search Apps & execute simulation jobs in 6 computational science engineering areas through the EDISON main portal**





## 2.3 Excellence of Integrated EDISON Portal (2/5)



### Multilingual support for Global users

- Capable of inputting all data input in Korean & English
  - Capable multilingual support including Chinese & Japanese (about 47 languages)
- Preparation the foundation for globalization on EDISON Platform and computational science & engineering ScienceApp

EDISON 1.0

SW관리

생성정보, 상세정보, 실행정보, 과제관리정보, 과제이력정보, 과제일일정보, 관리정보

기본정보

Solver타입	라그랑지 기저함수 전파구조개선 프로그램	버전	1.0	등록일자	
Solver명	KDFT	기관	KAIST	성격	동적유형

생성정보

solver명 \* KDFT solver버전 \* 1.0

solver타입 \* 라그랑지 기저함수 전파구조개선 프로그램

소속기관 \* KAIST

개발자

종류	이름
최저	
중간	
최고	
중간	
최고	
중간	
최고	

등록, 저장, 삭제, 등록요청

EDISON 2.0

Register ScienceApp

생성정보

앱이름 \* 2D\_YUIBRANS\_1

앱제목 \* 가상경계기법 기반 복잡형상 난류 유동

소속 \* 연세대학교

개발자

Virtual lab

클래스명

기간

수강 인원

클래스 관리자 (이디드 조희)

Questionnaire

설문조사 관리

설문조사 등록

설문조사 목록

설문조사 제목

설문조사 내용

설문조사 등록

설문조사 삭제

설문조사 수정

설문조사 등록

설문조사 삭제

설문조사 수정

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콘텐츠유형

참고자료

제목

파일

Basic Theory of Grid Generation Method

파일명

Basic Theory of Grid Generation Method.pdf

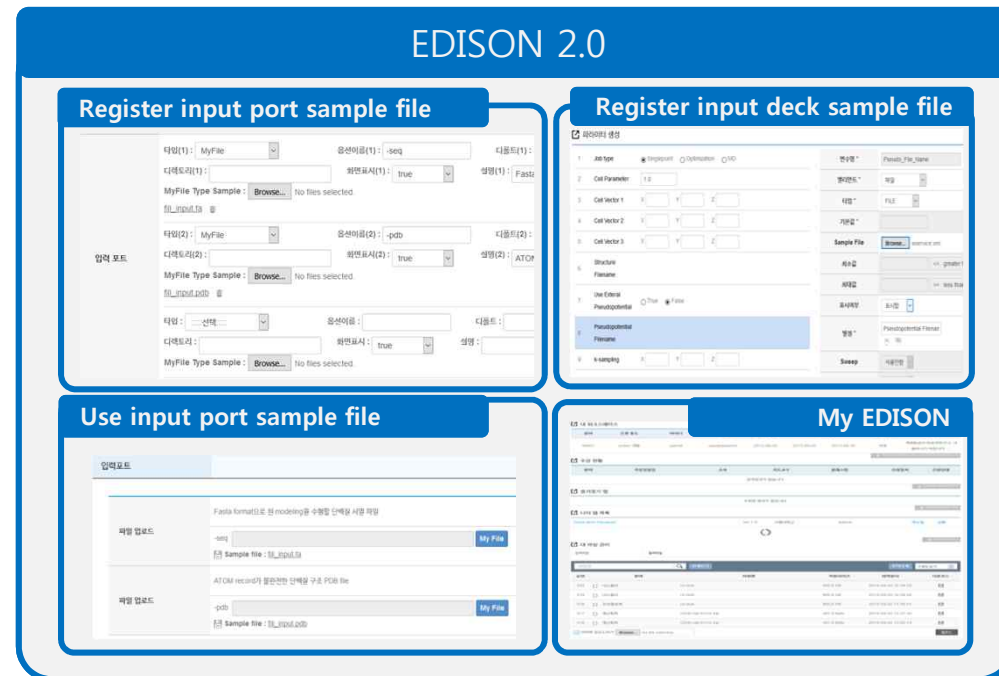
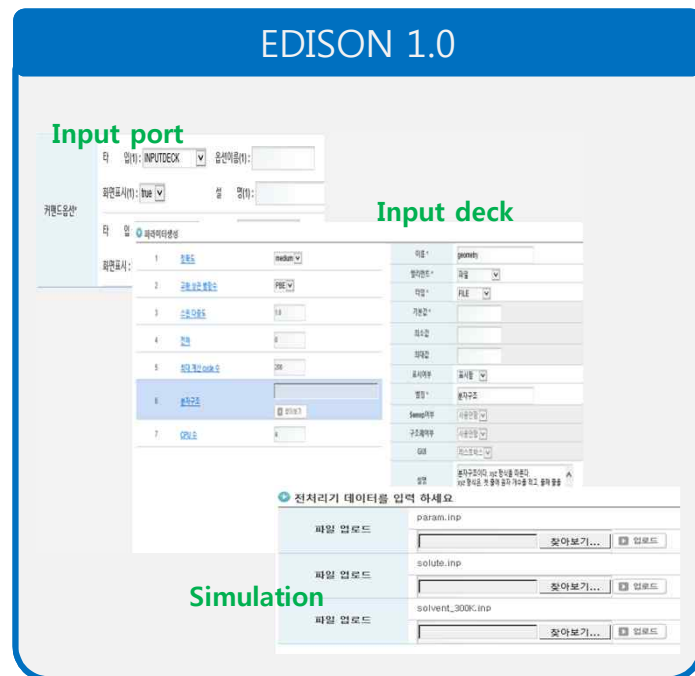
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## 2.3 Excellence of Integrated EDISON Portal (3/5)

### Provide user-friendly manuals & various execution samples

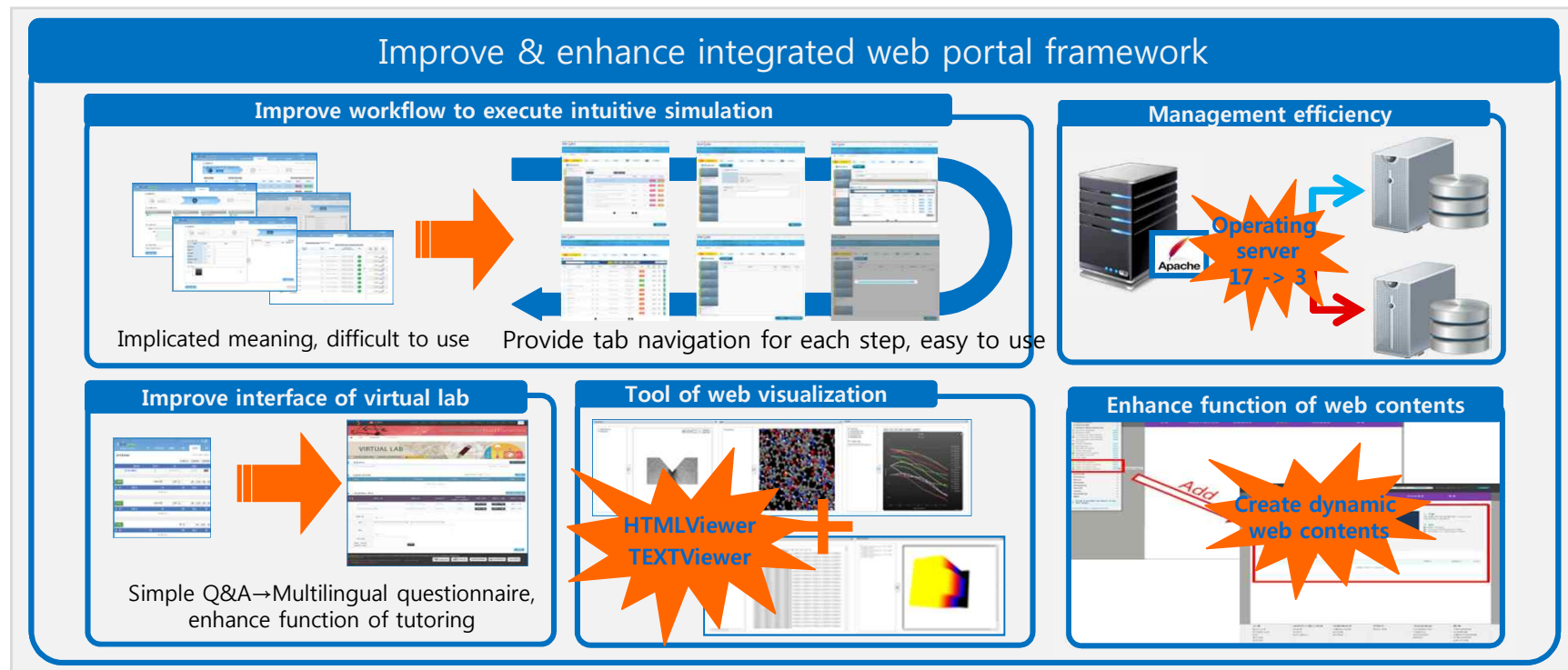
- **Apply user requirement** : Total 357 (314 cases solved & improved, 10 cases under progress, 33 cases under process by application center)
- **Provide various sample files for easy execution of ScienceApp**
  - Beginner can execute ScienceApp with one click
- **Provide the user guidance for EDISON portal & enhance personalization**
  - Provide one-click tutorial and detailed manual
  - Capable of easy grasping of using log and enhancing management function by providing My EDISON



## 2.3 Excellence of Integrated EDISON Portal (4/5)

### Enhancement of integrated web portal framework for various CSE fields

- **Improve web portal framework by applying user requirements**
  - Provide the intuitive & easy user interface on simulation workflow & virtual lab that are difficult to use
  - Improve the performance of visualizing tool of web(improve the speed such as data loading and convergence graph drawing) and develop **HTMLViewer** & **TEXTViewer**
- **Strengthen the functions of management of portal, site & web contents**
  - Achieve efficiency of management by minimize operation servers from **17** to **3**
  - Realize duplication of servers to increase stability



### Domestic and International Recognitions



2013

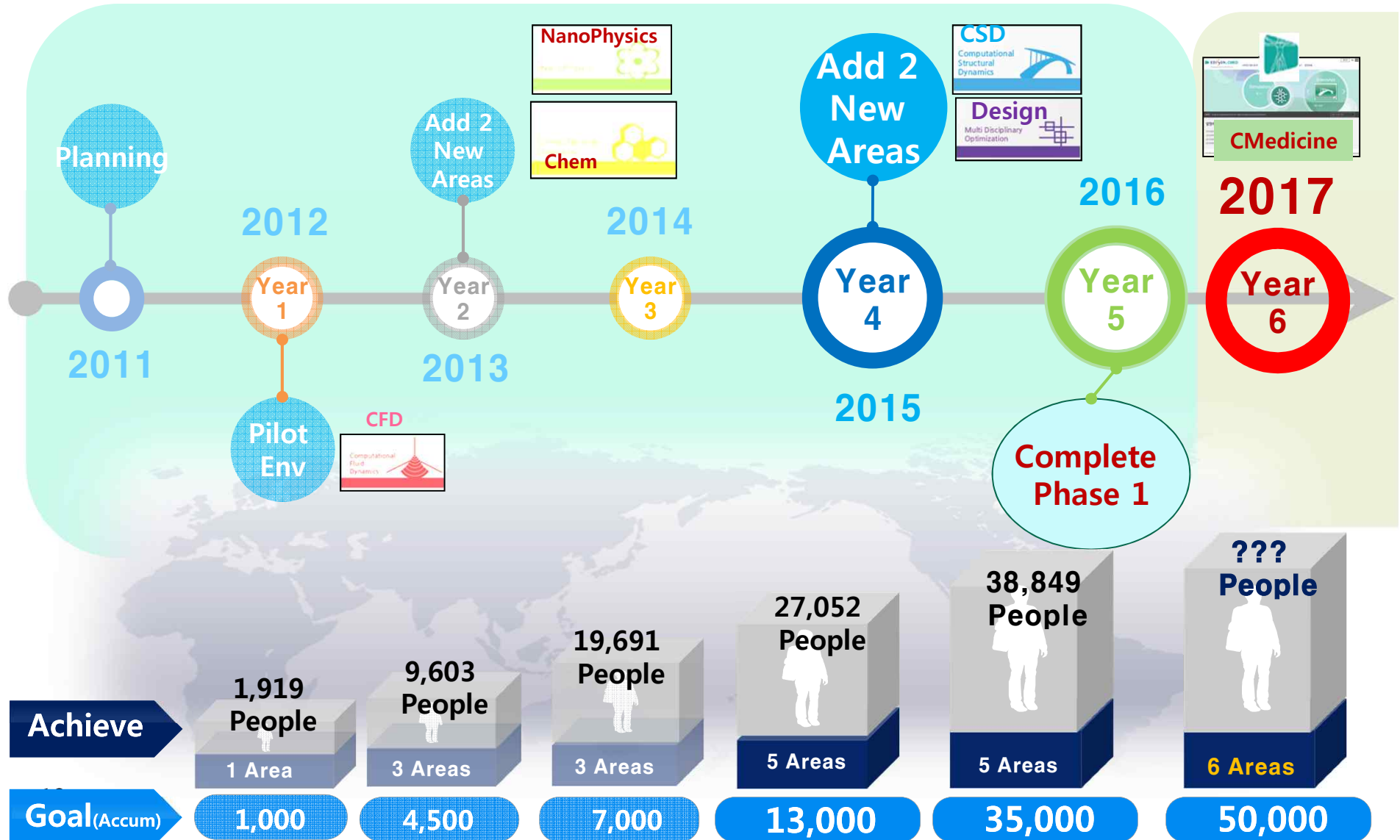


2014

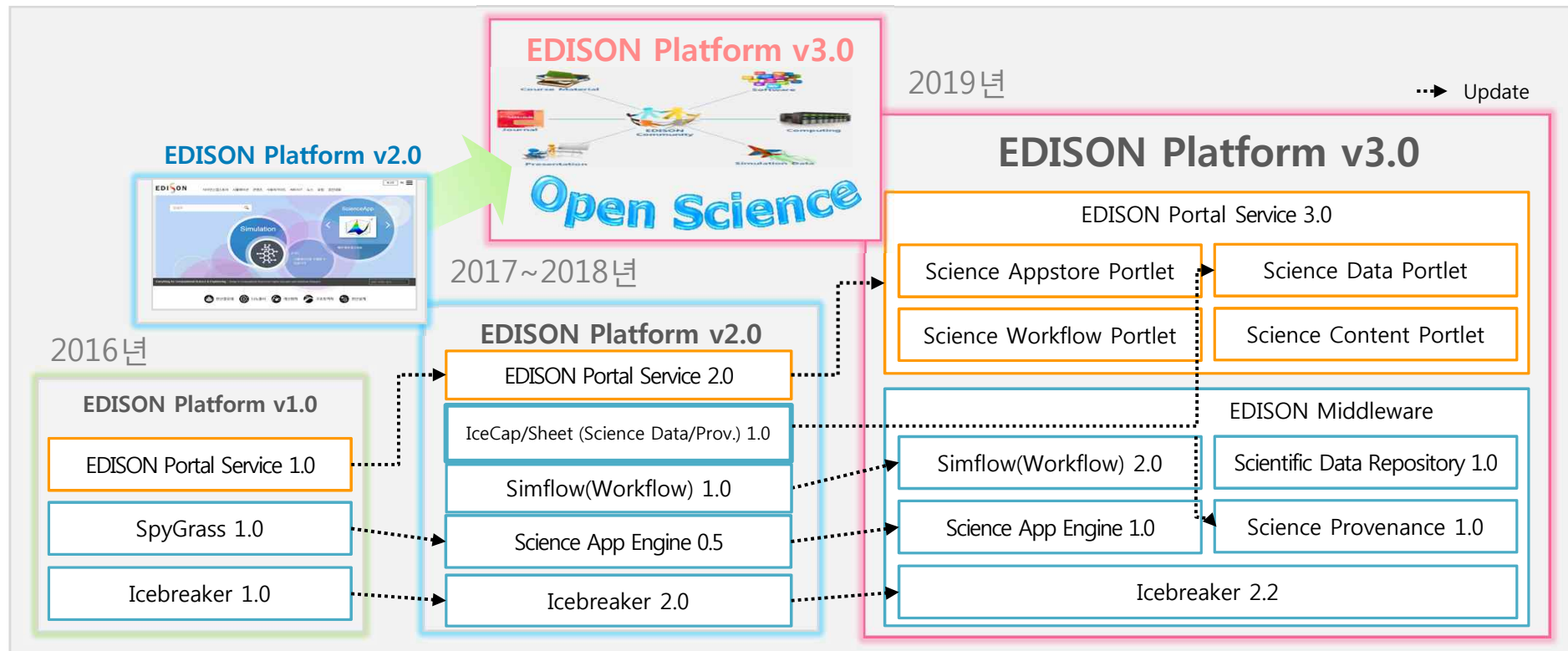


2016

## 2.4 Status of EDISON User Services for 6 Years



## 2.5 Plans of EDISON for the next Phase



### Release of Cloud based Image & Portlet based Liferay Marketplace



## 3.1 Ongoing Issues of CL/DE WG (1/2)



### ➤ **Initiating by sharing Distance Learning Materials such as video tutorials**

- ✓ Share expertise among PRAGMA members — e.g., how to deploy a virtual machine (VM) via Rocks, OpenNebula, Ezilla, etc.
- ✓ Could be shared outside of PRAGMA — e.g., Beth integrated existing online videos as part of her Big Data MOOC class in 2015
- ✓ PRAGMA content can often be ephemeral — this would be a good way to hold onto knowledge
- ✓ MOOCs? Beth taught a Big Data class

### ➤ **Automating installation to expand usage of EDISON software**

- ✓ What functionality does EDISON provide? Can we automate its installation — e.g., similar to Lifemapper installation automation work
- ✓ This could help increase interactions with other PRAGMA WGs — I.e., to create their own EDISON portals (e.g., nanophysics)



## 3.1 Ongoing Issues of CL/DE WG (2/2)



- **Online guidelines — seasoned developers helping less experienced developers**
  - ✓ Idea from Kar Long Chan (NAIST)
  - ✓ Inspired by gaming (e.g., warcraft)
- **Streamline access to resources for student experimentation**
  - ✓ Heru's students previously used FutureGrid and XSEDE
  - ✓ PRAGMA testbed should be a low-cost way to students to get access to resources for small-scale experimentation
- **Call for simulation solvers and education contents such as tutorials developed by one of PRAGMA community members who are willing to share and open them**
- **Other things to do and seriously consider ...**
  - ✓ How to get more people attend to CL/DE WG from PRAGMA members? → Possibly combining related WGs such as Resource WG, BioScience WG and CL/DE WG, and etc
  - ✓ How to and what to collaborate and integrate with other WGs?

## 4. Meetings for CL/DE WG@PRAGMA32



### ➤ Breakout Session I : 15:15~17:00, April 13(Thur), 2017 @ Hall(?)

- ✓ Discussions for exchanging ideas, status, best practices and etc
- ✓ Open for any presentations on CL/DE

### ➤ Breakout Session II : 10:30~12:30, April 14(Fri), 2017 @ Hall(?)

- ✓ Discussions for future action and collaboration items among participants

Open for everyone.  
Please come & join  
Cyber-Learning/Distance Education WG!!!

# Thank You!!!

