



# EDISON 2.0

Toward a Science Open Platform for Online HPC Simulations in Computational Science and Engineering



September 9th, 2016

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On behalf of All the members of EDISON Team



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**Demo**

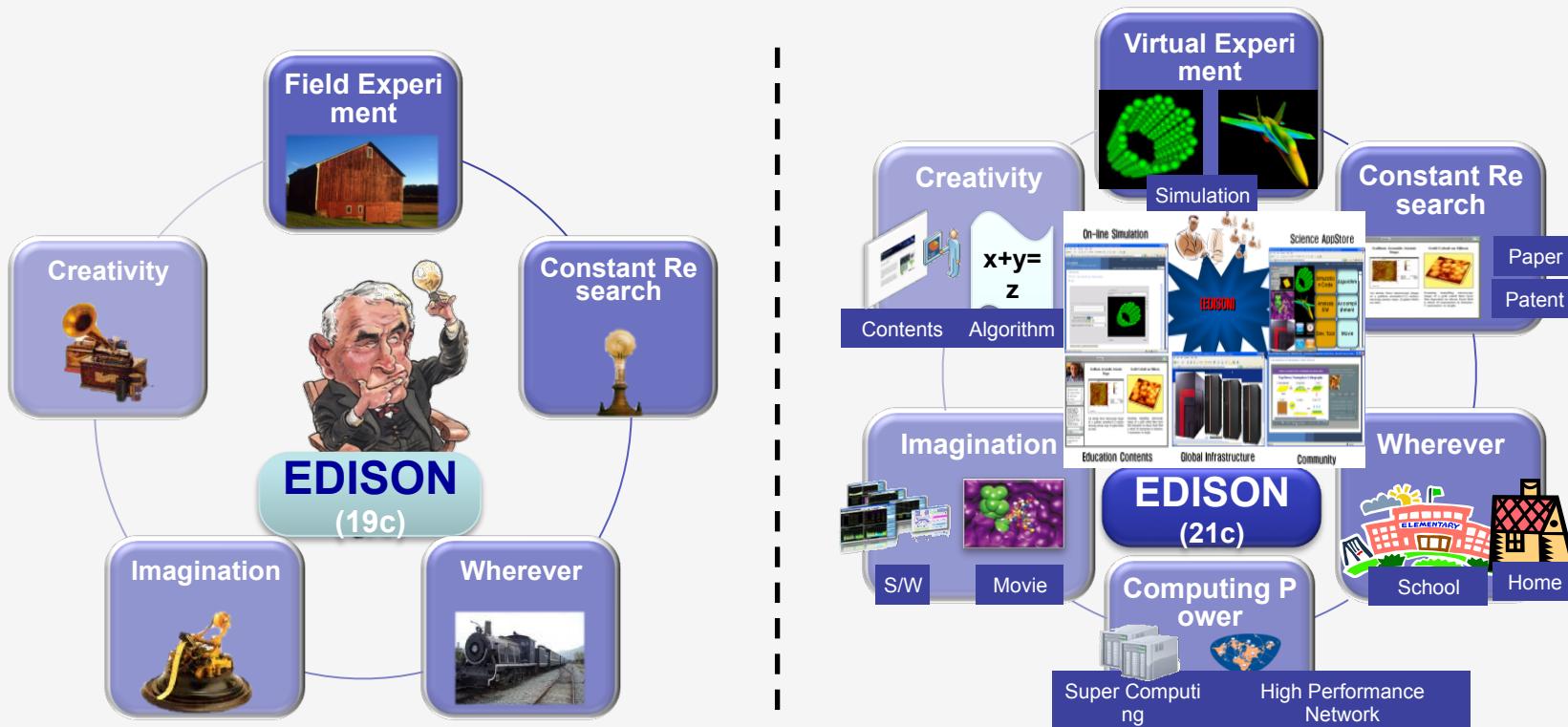
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**Future Work**

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# 1. General Introduction (1/3)

- EDISON (EDucation-research-industry Integration through Simulation  
On the Net)
  - Cyber-learning platform for research & education for computational scientists and engineers in Korea (and some other countries)



# 1. General Introduction (2/3)



## Objectives

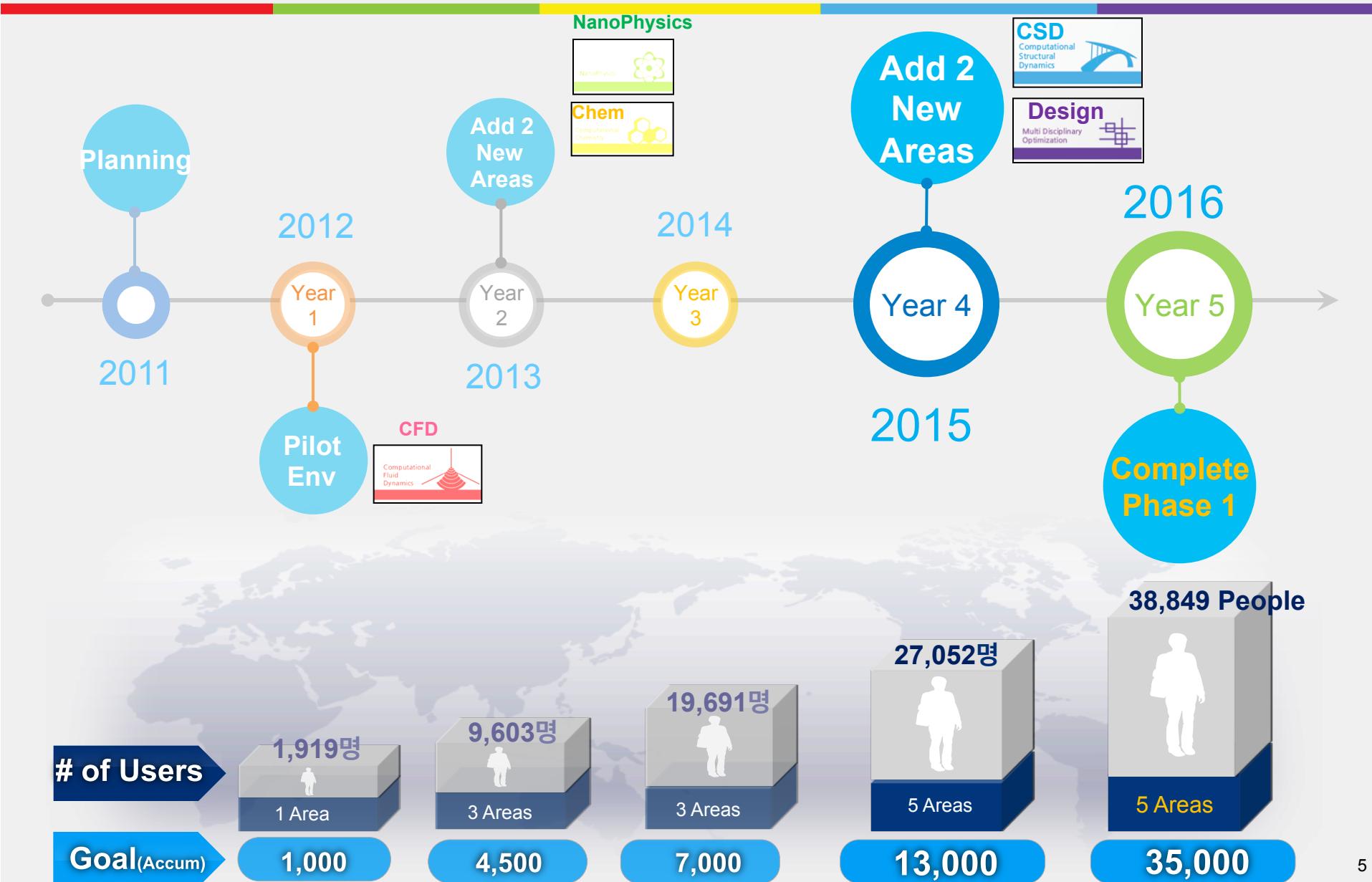
- ❖ Construction of 'virtuous circle' between schools and fields
- ❖ Localization of science/engineering simulation SWs

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- ❖ Development of EDISON open platform and portals for public service
- ❖ Establishment of research communities and connections to higher education
- ❖ Commercialization of well-featured domestic simulation SWs

- Funded by Ministry of Science, Technology, and Future Planning in Korea
  - Budget: about U\$4.5M a year (Ongoing project !!!)
- **Central center at KISTI:** developing web-based simulation-running platform technology and managing the platform backed by large-scale computation/storage resources for running simulation programs provided by specialized centers shown below, and
- **Several domain centers of academia:** dedicated to developing domain-specific simulation SW and currently about 350 available on the platform, utilize those Apps to their lectures

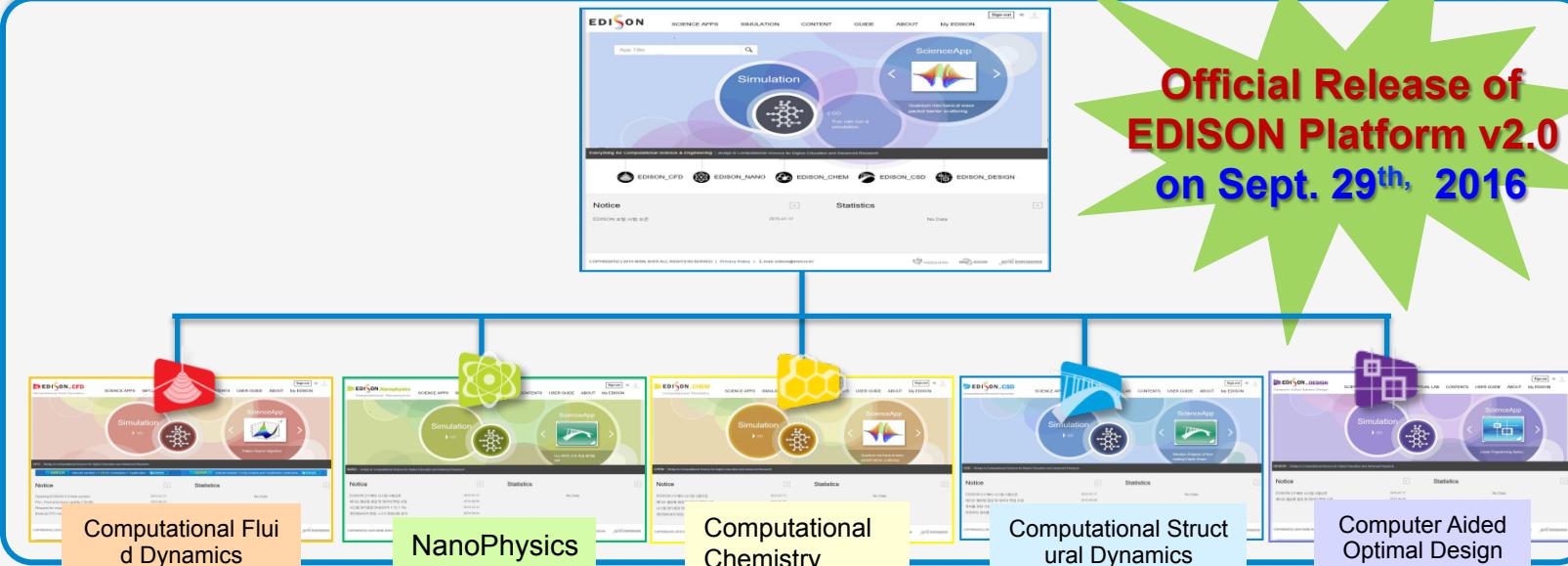
# 1. General Introduction (3/3)



## 2. Integrated EDISON Portal



Official Release of  
EDISON Platform v2.0  
on Sept. 29<sup>th</sup>, 2016



### EDISON Platform v2.0

Application Framework

EDISON Middleware

Infrastructure



HPC



Computing Cluster



GPU Cluster

### Application Framework



Science Appstore



Workflow System

Authentication Service



Statistic Service

### EDISON Middleware

#### Icebreaker

Simulation/Job Manager  
Physical Resource Manager  
Virtualized Resource Manager

#### Spyglass

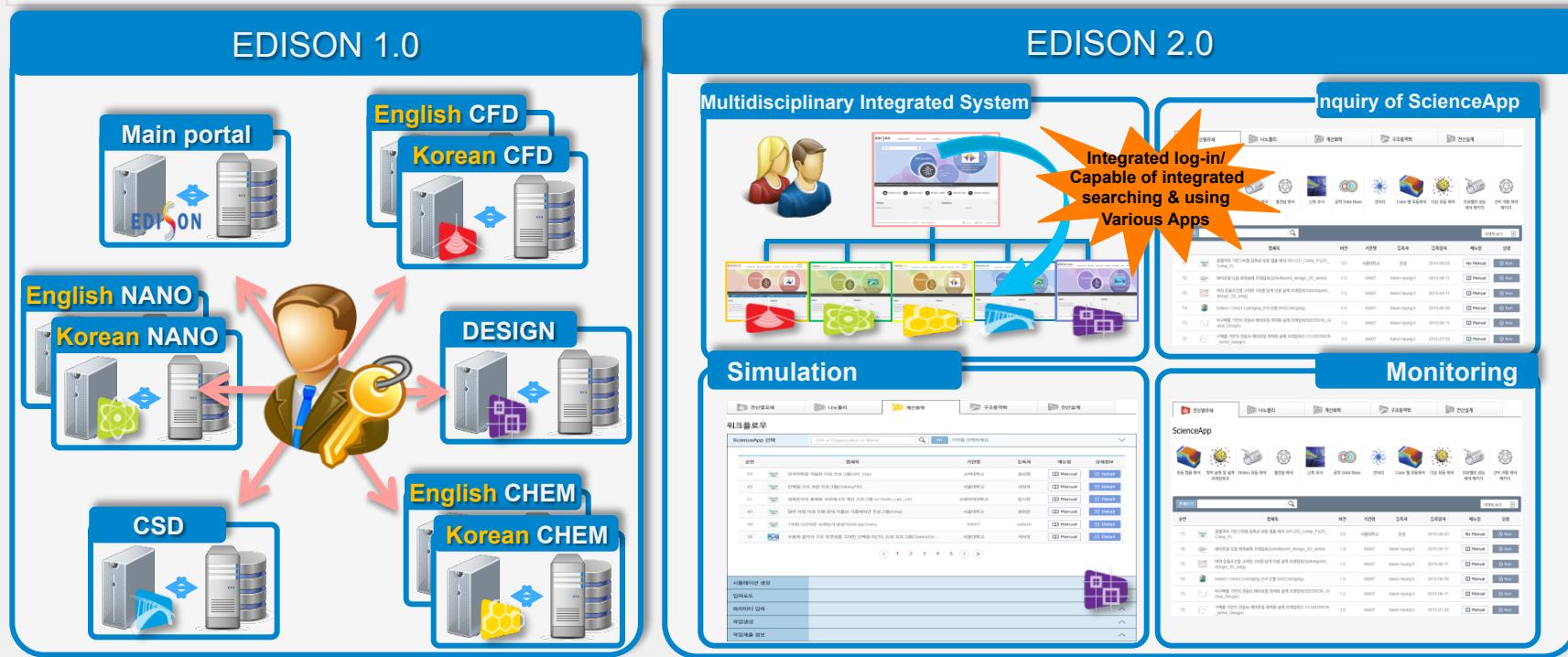
Solver/Tools Matadata  
Pre/Post Processor Data  
Schema Management

# 2.1 Features of Integrated EDISON Portal



## 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 5 current computational science engineering areas through the EDISON main portal**



## 2.2 Features of Integrated EDISON Portal



### 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

The figure displays two side-by-side screenshots of the EDISON platform interface, illustrating its evolution from version 1.0 to 2.0.

**EDISON 1.0 (Left):** This screenshot shows the "ScienceApp" management interface. It includes sections for "Basic Information" (기본정보) and "Creation Information" (생성정보). In the "Basic Information" section, there are fields for "Solver Name" (solver 명), "Version" (버전), and "Status" (등록여부). The "Creation Information" section contains fields for "solver 명" (solver name), "solver 타입" (solver type), and "solver 버전" (solver version). A "Developer" (개발자) section lists several names with dropdown menus for selecting their roles or details. At the bottom, there are buttons for "목록" (List), "저장" (Save), "삭제" (Delete), and "등록모달창" (Registration modal).

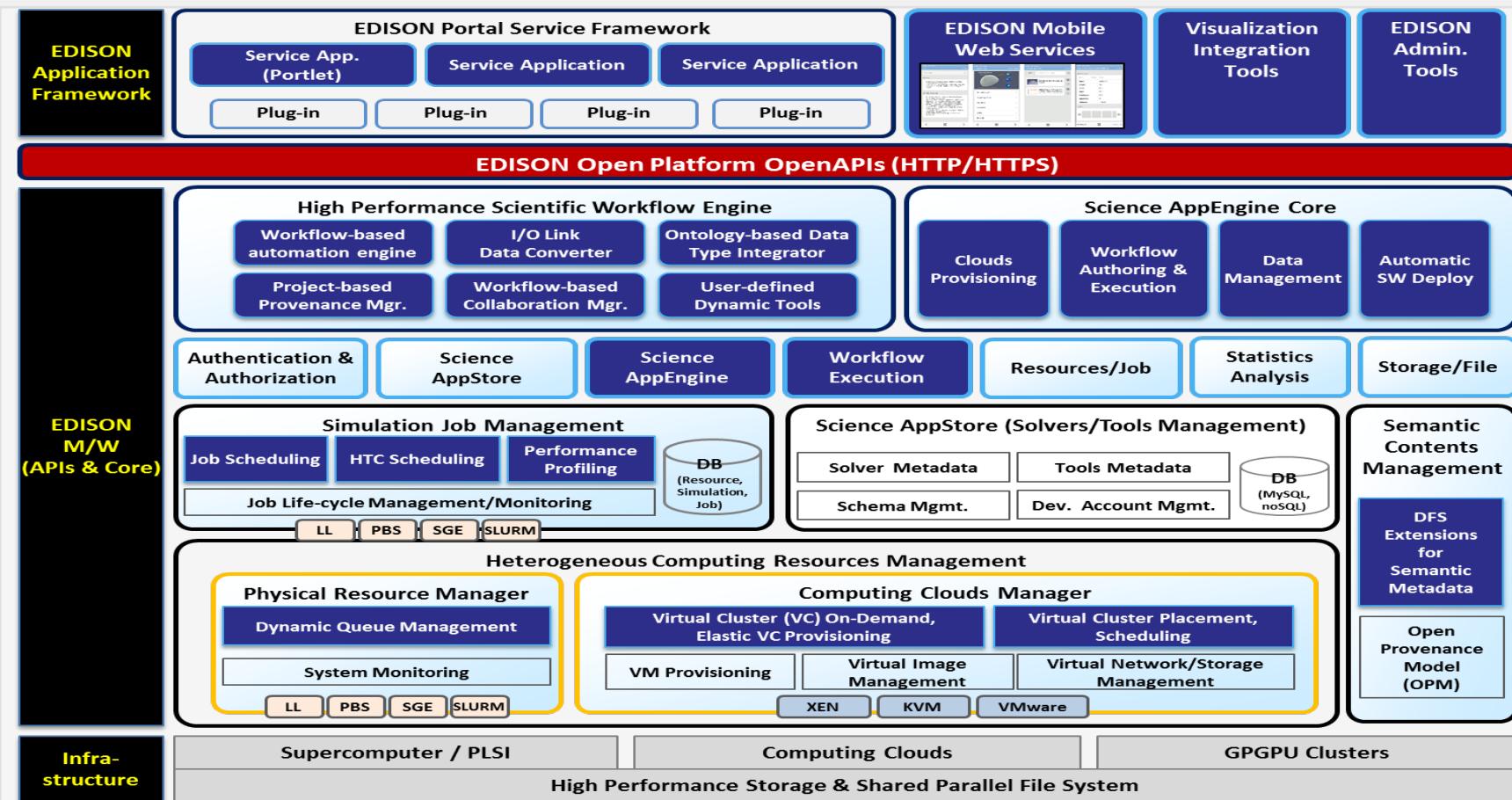
**EDISON 2.0 (Right):** This screenshot shows a more advanced and modular interface. It includes:

- Register ScienceApp:** A form for creating a new ScienceApp, requiring fields like "App Name" (앱이름), "App Type" (앱목적), "Owner" (소속), and "Developer" (개발자).
- Virtual lab:** A form for managing a virtual laboratory, including fields for "Class Name" (클래스명), "Period" (기간), "Supervisor" (수강 인원), and "Lab Manager" (클래스 관리자).
- Contents:** A section displaying course content, such as "Basic Theory of Grid Generation Method".
- Questionnaire:** A section for managing questionnaires, showing survey details and responses.

# 3. Architecture of EDISON Open Platform



- 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



# 4. Release of EDISON Open Platform v2.0



**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 access and management of tasks, building and EDISON user services infrastructure conjunction with the development of super computer and high-speed research network resources provided

**EDISON Scenario**

**EDISON Portal Site**

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

<GitHub repository>

## 5. Demonstration

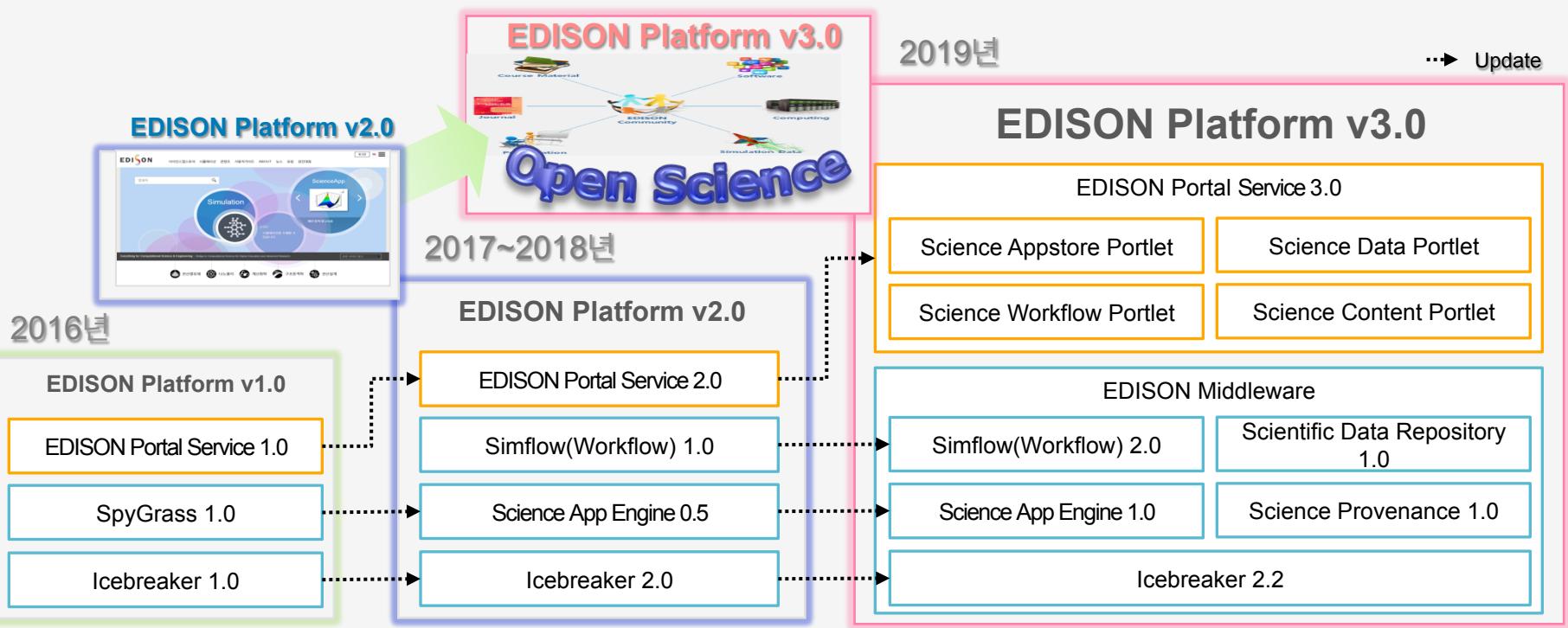
- Consists of three parts around major features of the platform
  - Part 1: How to become a member of EDISON
  - Part 2: How to browse a variety of science apps & learning materials
  - Part 3: How to run a simulation job using a chosen science app
  - Part 4: Show other functionalities

**<https://www.edison.re.kr>**

# 6. Future Work



- Plan to include various features in EDISON v3.0
  - Constructing a repository of science apps' source code
  - Collecting and providing simulation provenance data for performance enhancement and simulation efficiency
  - Supporting more complicated workflow scenarios including iterative loops using more than one simulation SWs





# Thank You!

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