

# Cyber Science Infrastructure for Boosting e-Science in Japan

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**NII**

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# Cyber Science Infrastructure: background

- ❑ A new information infrastructure is needed for boosting today's advanced scientific research.
  - **Integrated information resources and system**
    - super computer and high-performance computing facilities,
    - software,
    - Scientific databases and digital contents such as e-journals
    - “Humans” and research processes themselves
  - **Shared Cyber-Infrastructure in USA and e-infrastructure in Europe**
- ❑ **Break-through of research methodology is required in various fields such as nano science, bio-science, etc.**
  - **the key to industry and academia cooperation:**

To promote 'Intellectual manufacturing' based on 'Science'

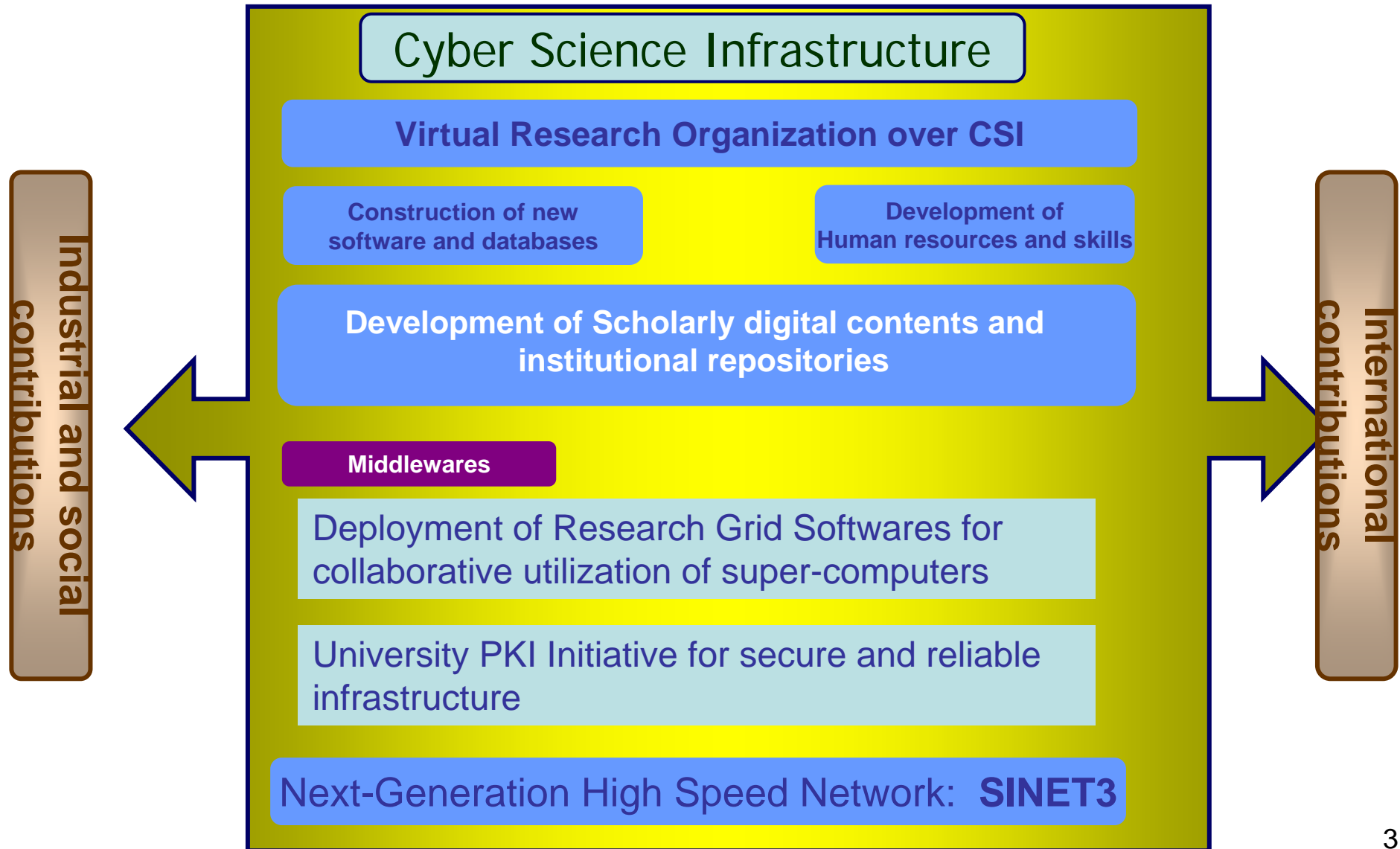


Advanced information infrastructure for research will be the key in international cooperation and competition in future science and industrial fields

A new comprehensive framework of information infrastructure in Japan

Cyber Science Infrastructure **CSI**

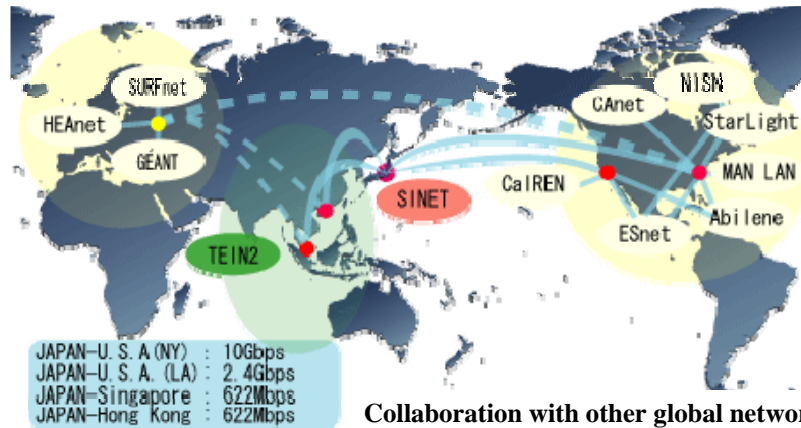
# CSI Architecture



## Three key measures for CSI implementation

- ❑ Network infrastructure deployment through SINET3, UPKI and Grid software development,
- ❑ Acquisition, compilation and dissemination of academic digital contents in cooperation with university libraries,
- ❑ E-Science promotion for creation of new scientific values.

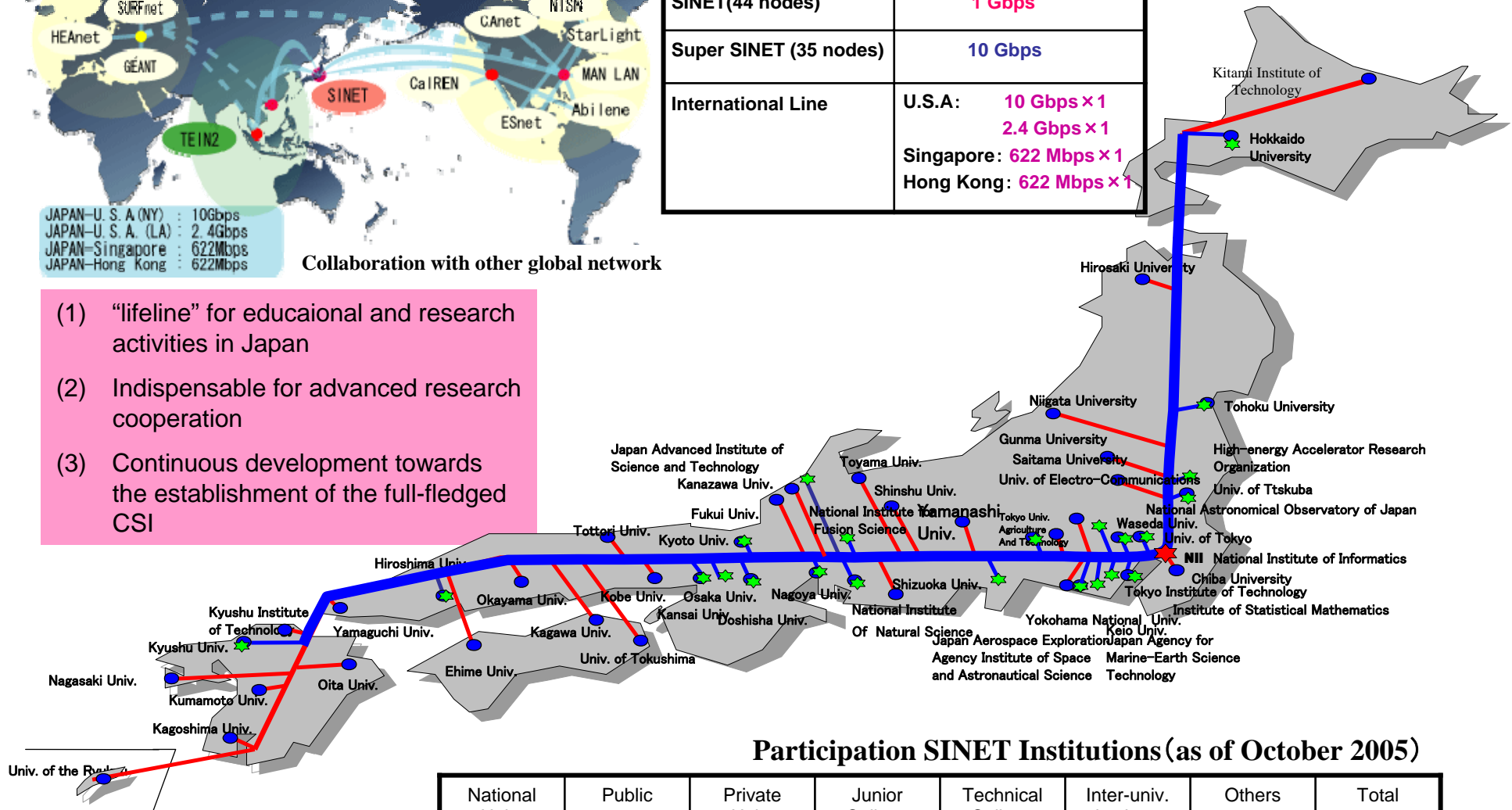
# Japanese Academic Information Network ( SINET/SuperSINET )



## Circuit Speed

SINET(44 nodes)	1 Gbps
Super SINET (35 nodes)	10 Gbps
International Line	U.S.A: 10 Gbps × 1 2.4 Gbps × 1 Singapore: 622 Mbps × 1 Hong Kong: 622 Mbps × 1

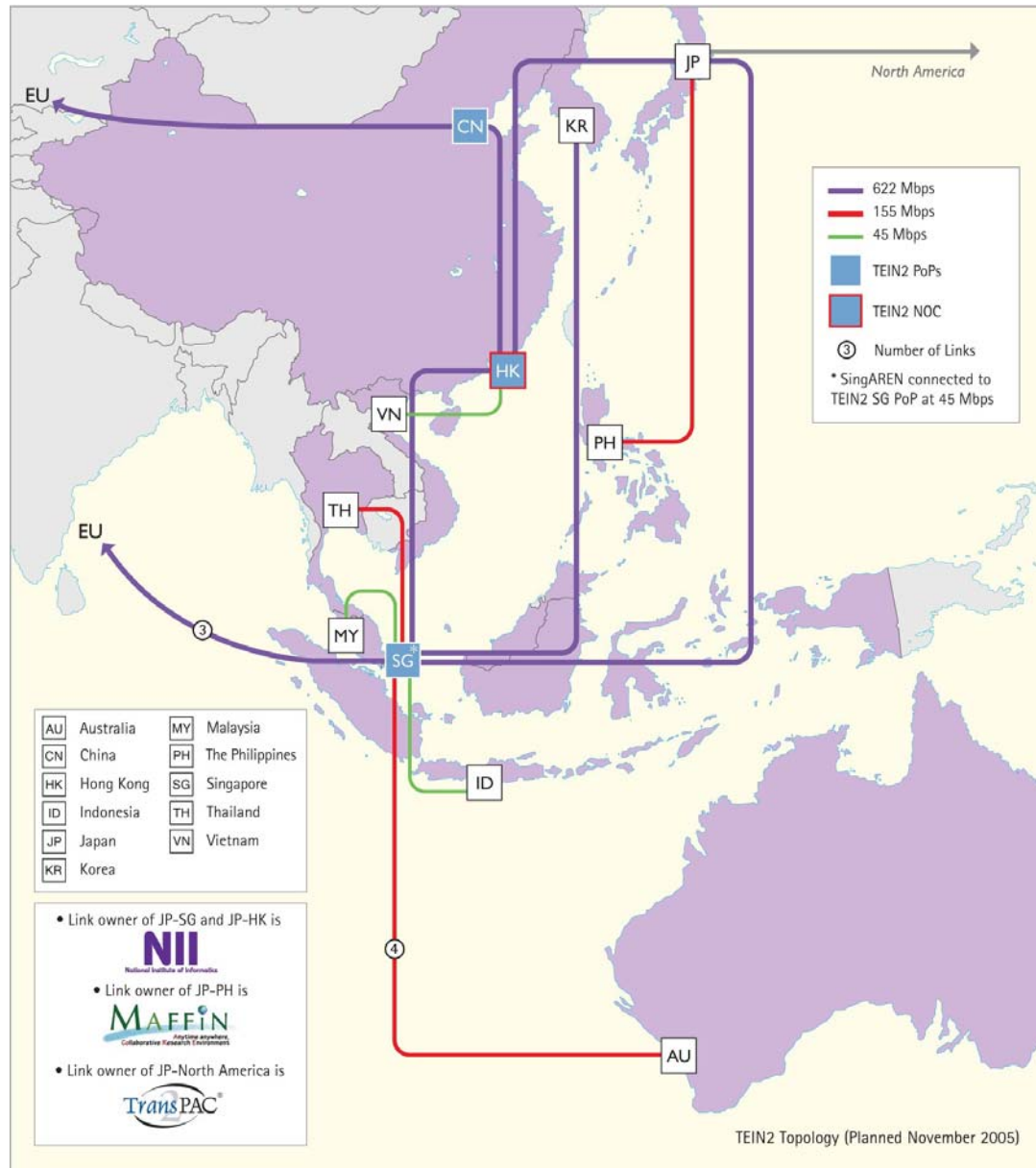
- (1) "lifeline" for educational and research activities in Japan
- (2) Indispensable for advanced research cooperation
- (3) Continuous development towards the establishment of the full-fledged CSI



National Univ.	Public Univ.	Private Univ.	Junior College	Technical College	Inter-univ. institute	Others	Total
82	48	266	78	42	14	184	713

# Academic Networking of SINET(Asia) and Partners

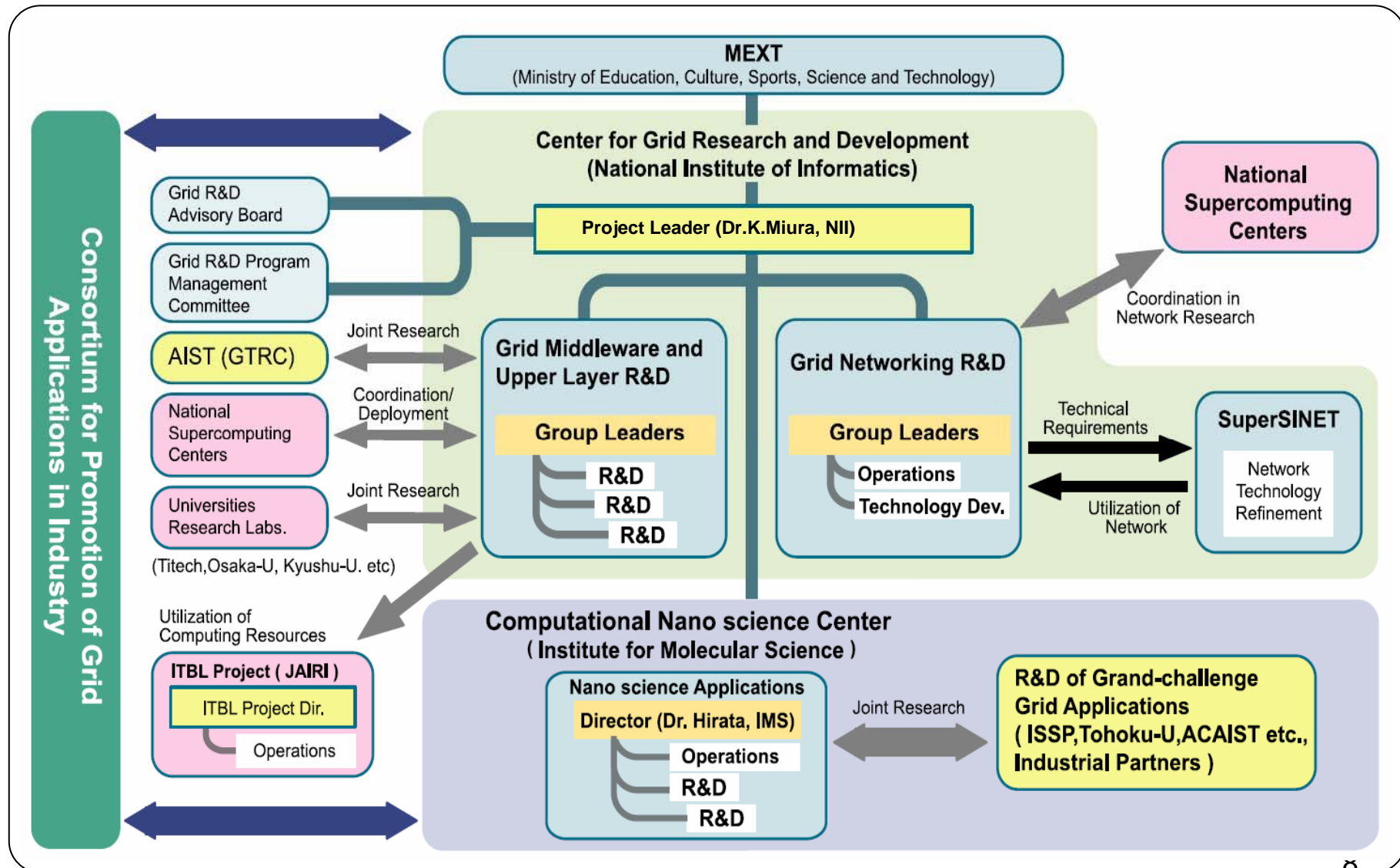
TEIN2



# Sample Research Activities on CSI

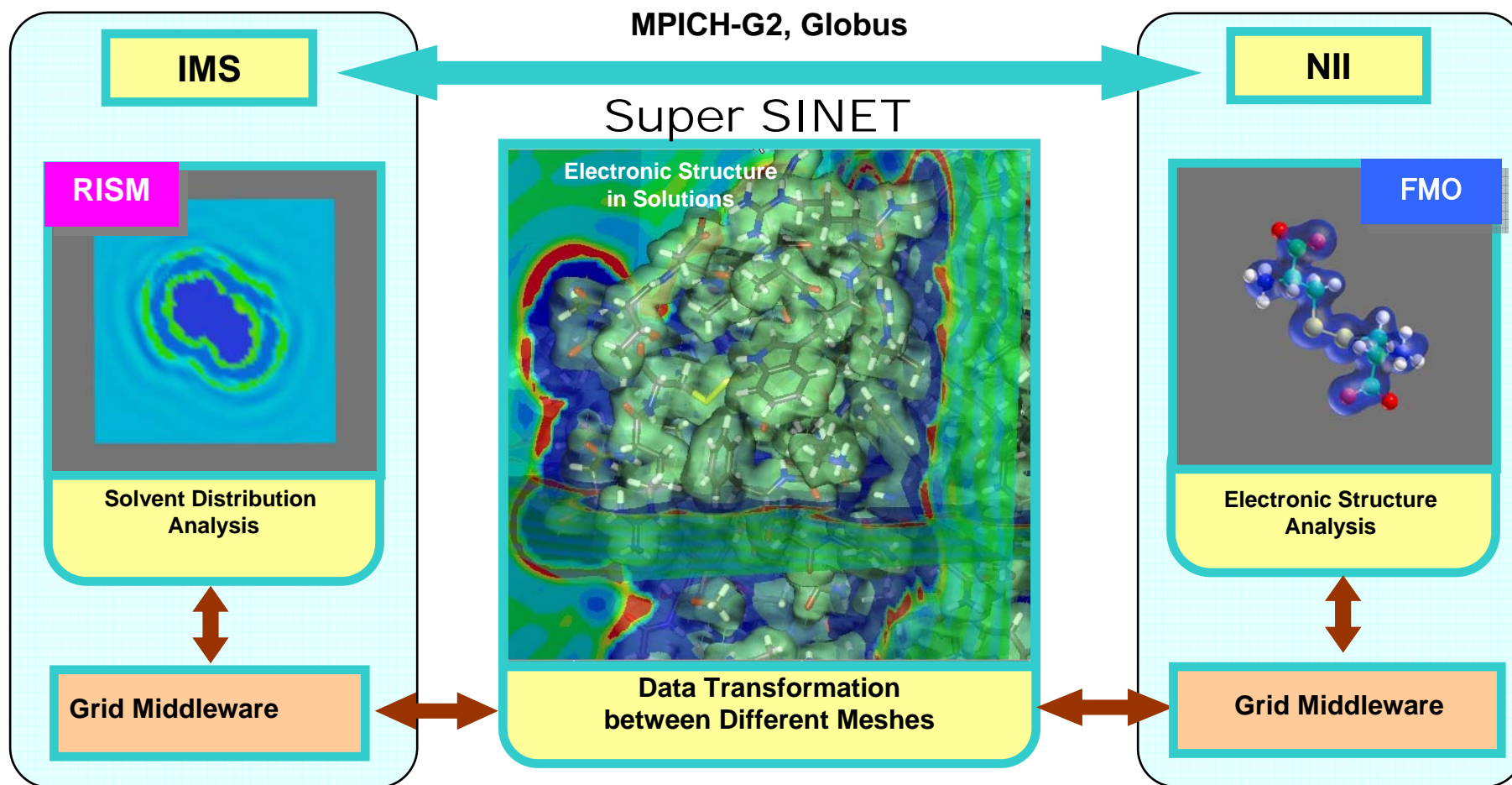
- Widely distributed data analysis system
  - High-energy Physics Institute and universities
- Multi-scale simulation system
  - Utilization of the “Earth Simulator” super-computer
- Large-scale design simulation system
  - For nano-technology researches
- Widely distributed database system
  - Genetics database sharing
- Remote analysis of observation data
  - VLBI in astronomy

# NAREGI: National Grid Initiative





# Adaptation of Nano-science Applications to Grid Environment



RISM

Reference Interaction Site Model

FMO

Fragment Molecular Orbital method

# University Public Key Infrastructure Initiative

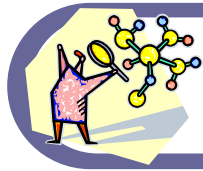
- To facilitate interoperability of CSI and Grid middleware among universities.
- To deploy a collaborative system for campus-wide and inter-university authentication and authorization systems, aiming at:
  - E-journal use over universities
  - Super-computer use with Grid software
- Financial support of the Ministry of Education from 2006

# Scholarly Digital Contents and NII

## Aiming at:

Stable dissemination, preservation and provision of information produced by academic communities

Precise and timely service of information that academic communities require.



## Academic communities

(researchers , universities, academic societies, etc)



supporting

## Cyber Science Infrastructure: CSI

Networking + Digital contents + Research Activities

Scholarly digital contents are common property among universities and NII

### NII-ELS

- E-journals of Japanese academic societies and university bulletin
- Retrospective digitization as an e-archive
- 1,915 titles including 2.7 million articles

### NII-REO

- Archive server for university library consortium
- "last resort" of scholarly e-journals
- 1,053 titles including 2.3 million articles, such as Springer and OUP

### Institutional Repositories

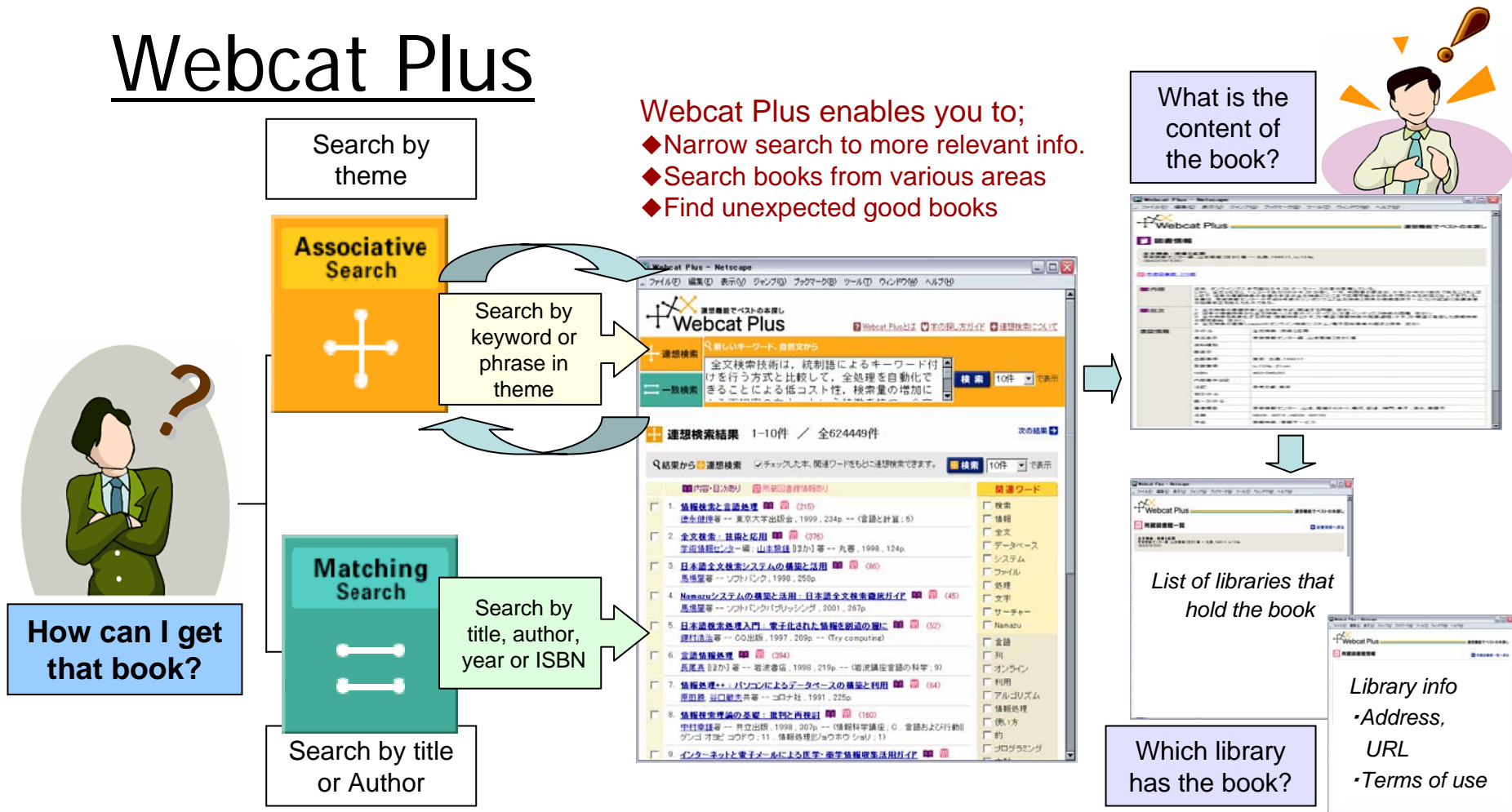
- Dissemination of university information and research results
- Linkage with REO and ELS
- Linkage to open access journals and green journals

NII

NII + Universities

# Scholarly Information - Search Service

## Webcat Plus



Registered data: about 12,000,000 (as of Oct. 2005)  
Page views: about 60million / year (FY 2004)



<http://webcatplus.nii.ac.jp/>

# Dissemination of Academic digital contents

CiNii (NII Article Information Navigator)

Large scale database  
for articles

【18,000 journals; 9.3 million papers】

- ◆ Japanese Academic Journals
- ◆ Research Bulletins
- ◆ Japanese Periodicals Index of NDL

Portal site of  
article information

<http://ci.nii.ac.jp/>

Full texts (PDF)

【1,900 journals; 2.7 million papers】

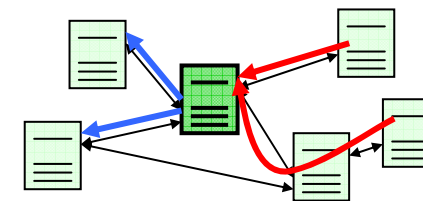


Links to

Collected information  
from books and journals

Citation links

【1,700 journals; 700,000 papers】



Indication of references cited

# Scholarly Information : Compilation/dissemination

NII started collaborative project for Institutional Repositories with 19 major universities in 2005, and 57 universities in 2006.

## 【 What is an Institutional Repository ?】

Accumulation and dissemination of electronic intellectual properties that academic institutes produce

- Scholarly / preprinted papers, theses
- Reports on Grant-in-Aid Scientific Research, technical papers
- Presentation slides used at an academic conferences, electronic materials for students



## 【in NII】

Support for collaboration of Institutional Repositories

- Automatic harvesting of information in Institutional Repository
- Storage in NII's meta-database
- Provision of integrated retrieval service

Support for creation of Institutional Repositories

Project with university libraries

