

# Global ICT Missions and Japan-Austria collaboration

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NII Japan

# Hopeless World?

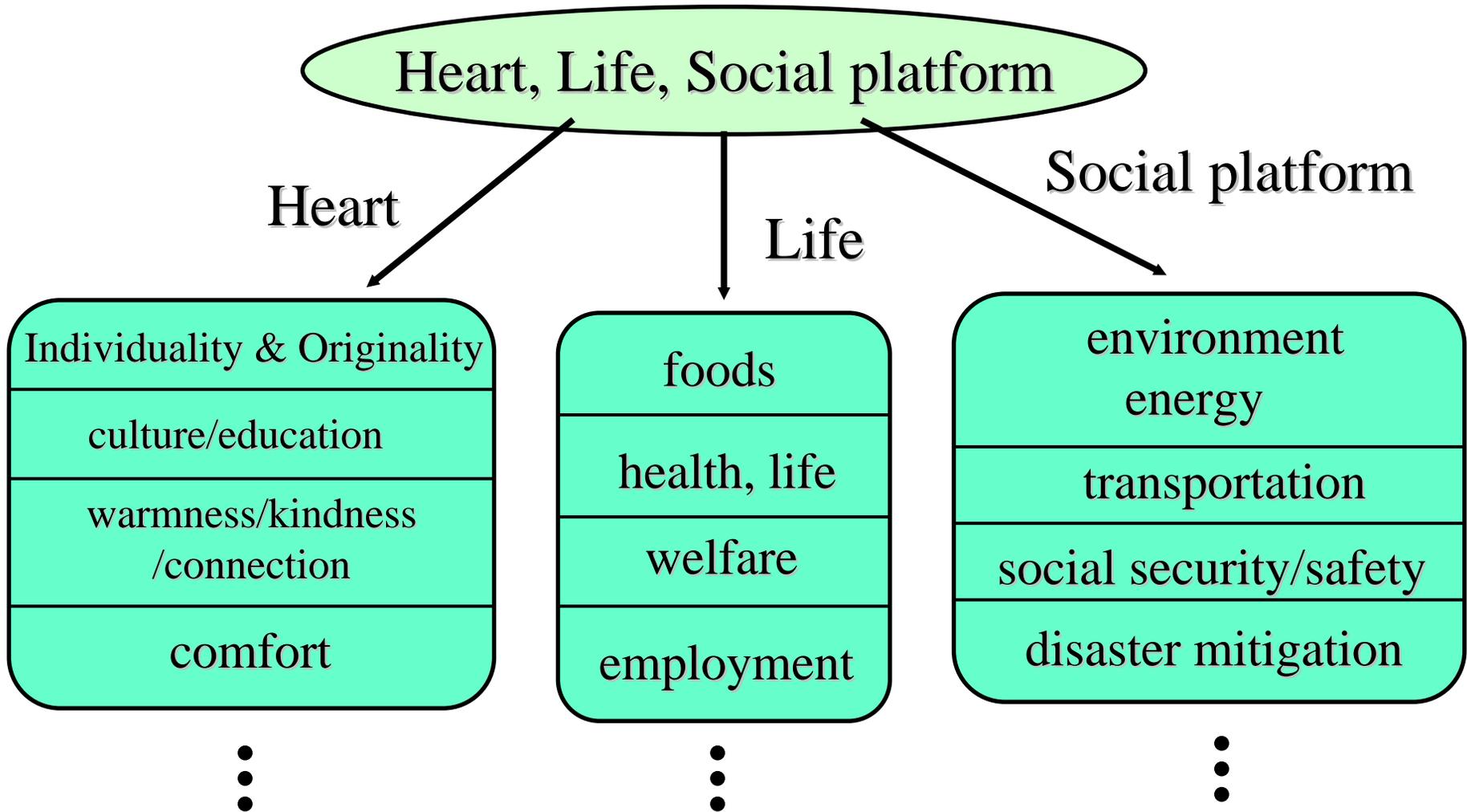
# Global ICT Missions



Create Real Values ;

[ To solve the global problems  
To Create new valuable services  
& systems for human & Society

# What's the real value? Targets in 2020~2050



# To realize these “ICT Missions”;

Importance of three ‘collaboration’s;

(1) Horizontal Collaboration  
within ICT Field

(2) Vertical Collaboration  
with another R&D Fields

(3) Global Collaboration

# Global Collaboration

Much tighter collaboration  
for contribution of every country / region  
**reflecting their originalities / features** of  
social systems, culture, research  
and experiences.

# Mutual Understanding !

# NII Organization and Activities

# Outline



National Institute of Informatics

## ■ Staff: (approx. numbers)

**290 Professors** (including 206 visiting prof.)

**240 Administration, Development staff,  
Project researchers, etc.**

**130 Graduate students**

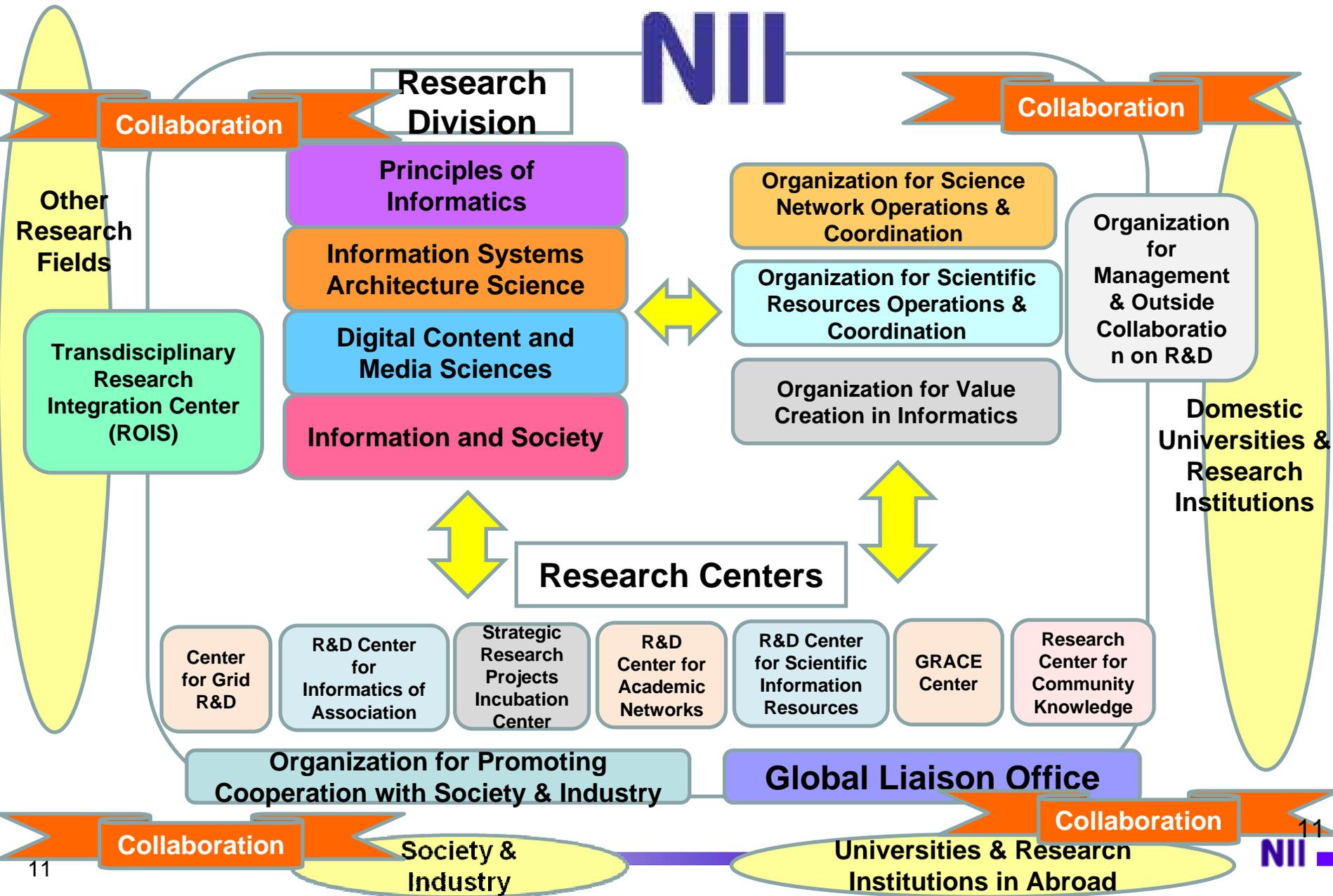
## ■ Budget:

**About 11.7 billion yen (\$ 140 million)**

# NII's Four Major Missions

- (1) **'Only one' Academic Research Institute** for 'Informatics' or 'IT' in Japan.
- (2) **National Center** of Japanese IT activities.
- (3) **Service operations** of academic information infrastructure (academic networks & digital contents).
- (4) **Education for graduate students** (Ex: The Graduate Univ. for Advanced Studies, Univ. of Tokyo).

# NII's R&D Systems



# NII's Research

# Current Major Research Topics in NII

## Principles of Informatics Research Field

- ◆ Mathematical Informatics
- ◆ Mathematical Logic
- ◆ Quantum Information
- ◆ Chemical – and Bio – Informatics
- ◆ Intelligent Informatics

## Information Systems Architecture Research Field

- ◆ Network Architecture
- ◆ Information Network
- ◆ Computer Architecture
- ◆ Software Infrastructure
- ◆ Software Engineering

# Current Major Research Topics in NII

## Digital Content and Media Sciences Research Field

- ◆ Foundations of Content Management
- ◆ Text and Language Media
- ◆ Pattern Media
- ◆ Human and Knowledge Media

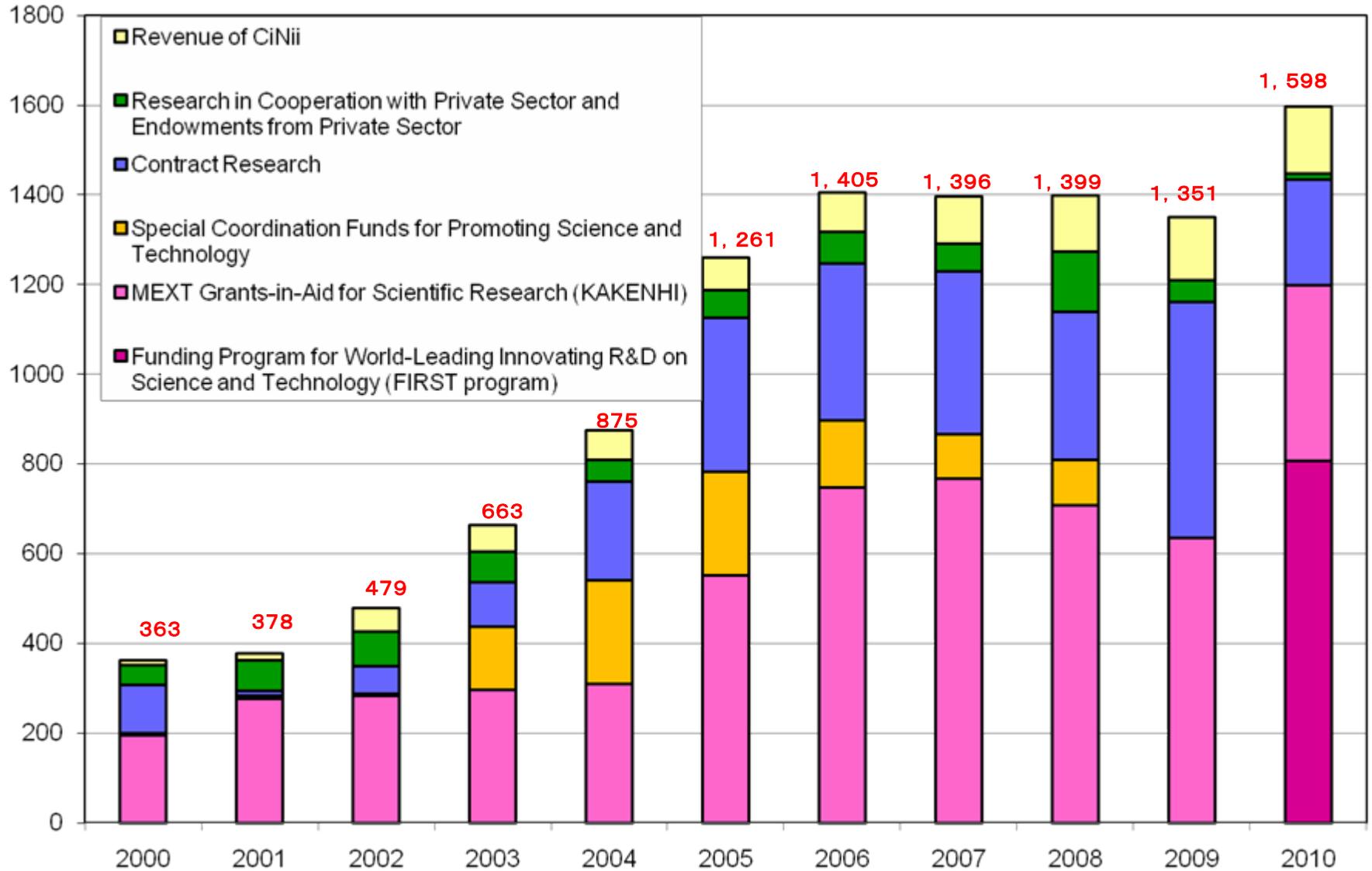
## Information and Society Research Field

- ◆ Information Use
- ◆ Science Information
- ◆ Information Public Policy

# Growth of Competitive Research Funds

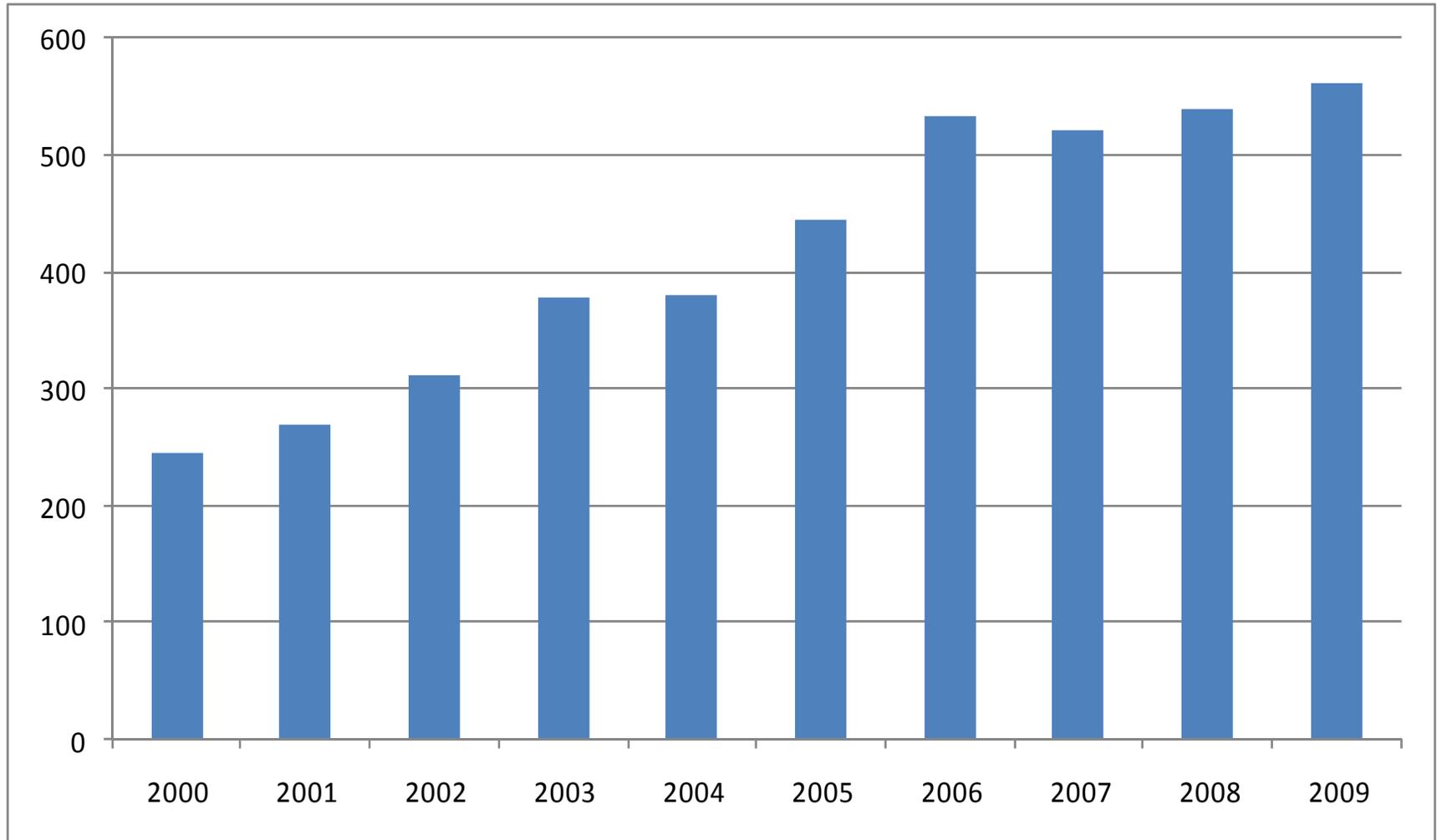
## As one evidence of NII's activeness

Unit: million yen



# NII's Research Articles & Papers

## As another evidence of NII's active research



**Journal Articles, Refereed International Conference Papers etc**

# Winning Awards of NII Researchers

As another evidence of NII's active research

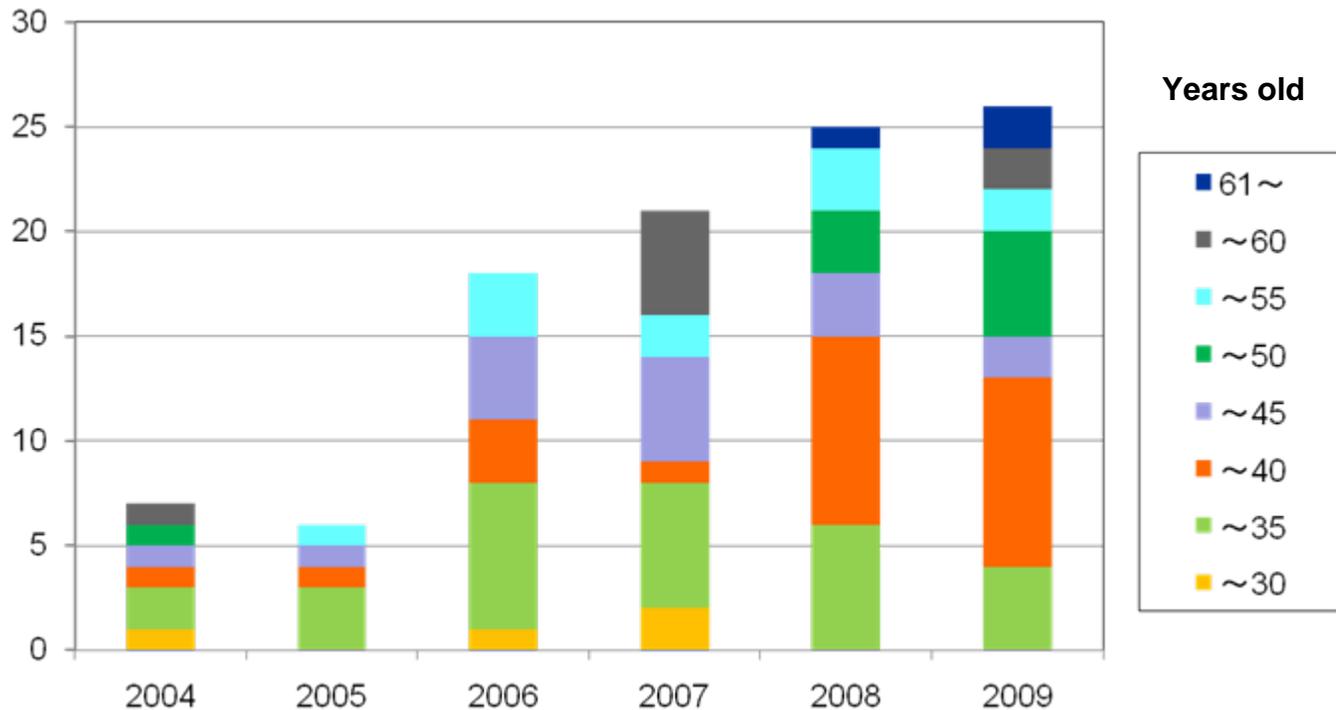
## Main Achievements of U-40 Researchers (Activities of Younger Researchers)

The Young Scientists' Prize (2006:2, 2007:2, 2009:1)

Inoue Science Research Award (1)

IBM Japan Science Award(1)

Best Paper Award of International Conferences(7) etc



# Key distribution in the longest (200km) fiber (NTT, NII, NIST)

Realized with the fastest (10 GHz) clock Quantum key distribution (QKD) system

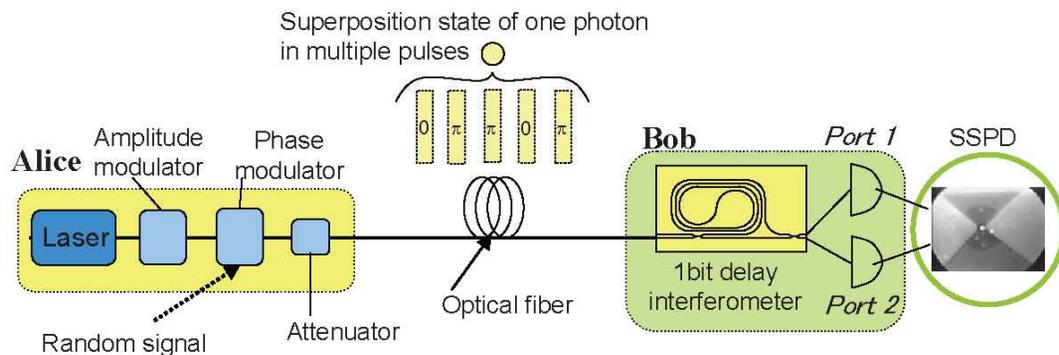


Fig.1: DPS-QKD system using SSPD

## Features

1. Original QKD protocol : **Differential phase shift (DPS-) QKD protocol** (Proposed by NTT-Stanford group)
  - Higher security than previous protocols
  - Simple and easy setup, allows fast operation
  - **World fastest 10 GHz clock QKD system**
2. NIST(USA) developed **Supercond. single photon detector (SSPD)**
  - Using super-current being blocked by single photon injection
  - Photon detector of **Low noise and high time resolution**

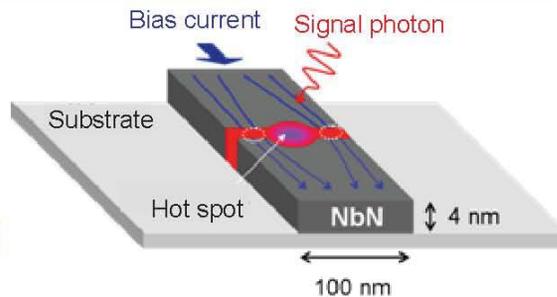


Fig.2: Principle of SSPD

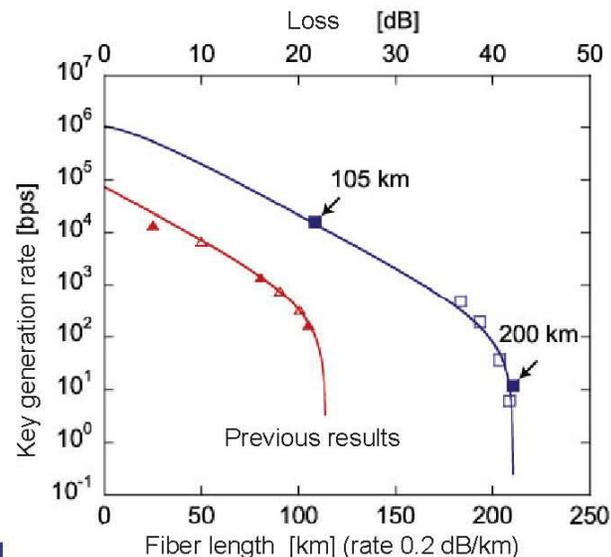


Fig.3: Key generation rate vs. fiber length/loss

**Realized 200 km fiber secure key distribution for the first time**  
 Previous record: 107 km (fiber), 144 km (space)

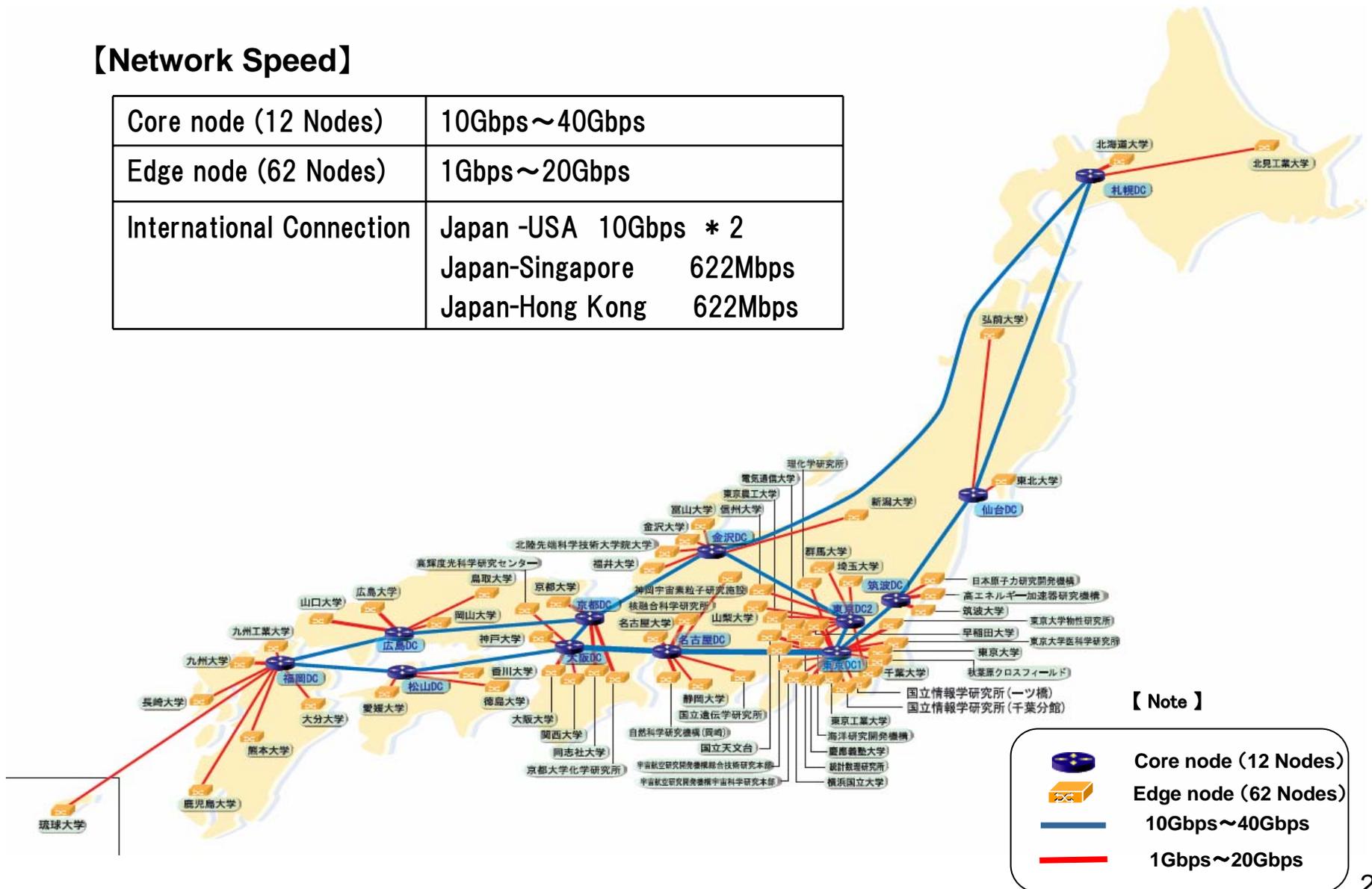
# Construction and Operation of Cyber Science Infrastructure Network & Contents

Collaborate Activities for All Academic Fields

# SINET3 Network Configuration

## 【Network Speed】

Core node (12 Nodes)	10Gbps~40Gbps
Edge node (62 Nodes)	1Gbps~20Gbps
International Connection	Japan -USA 10Gbps * 2 Japan-Singapore 622Mbps Japan-Hong Kong 622Mbps

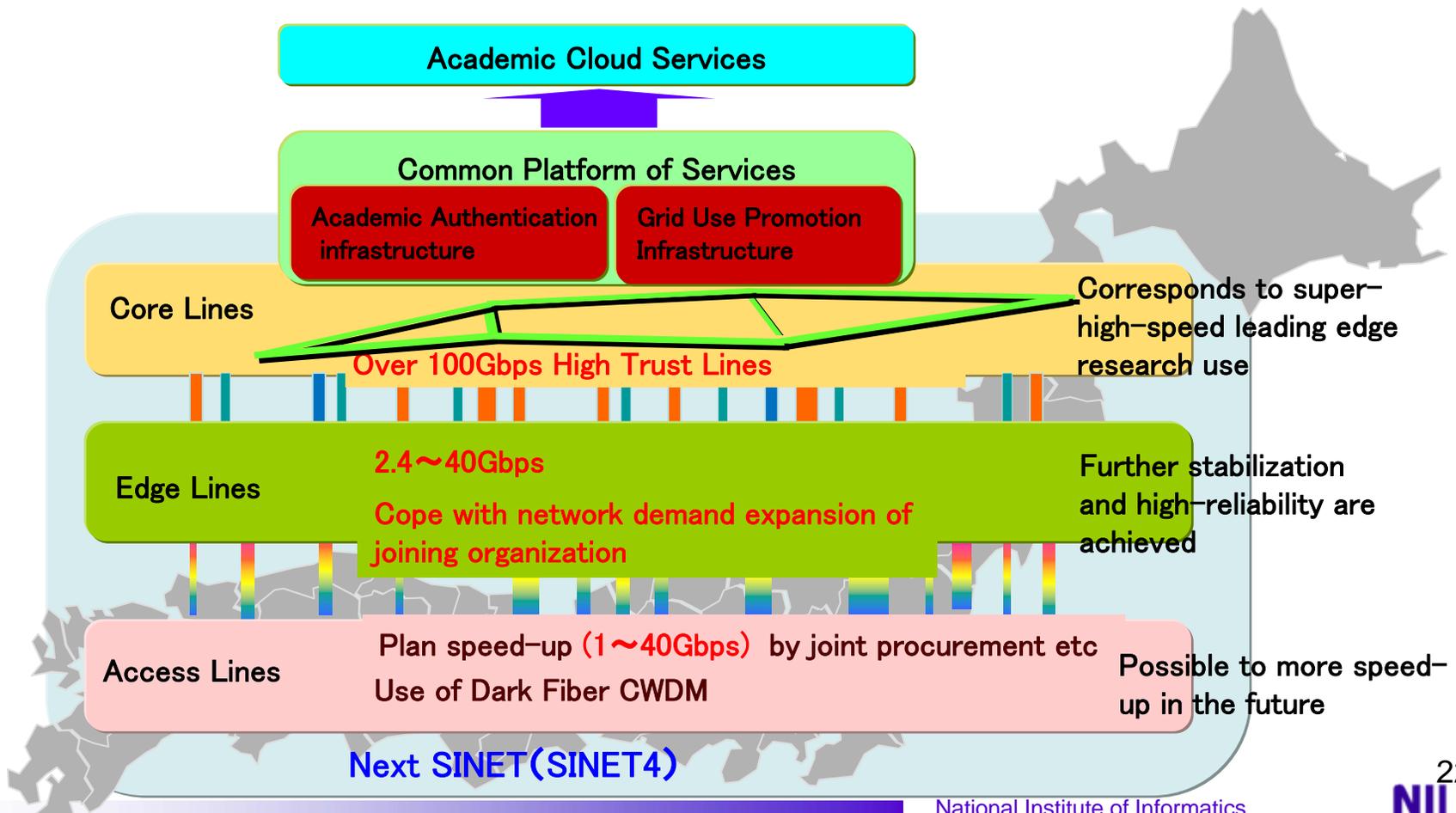


# International Connection of SINET3

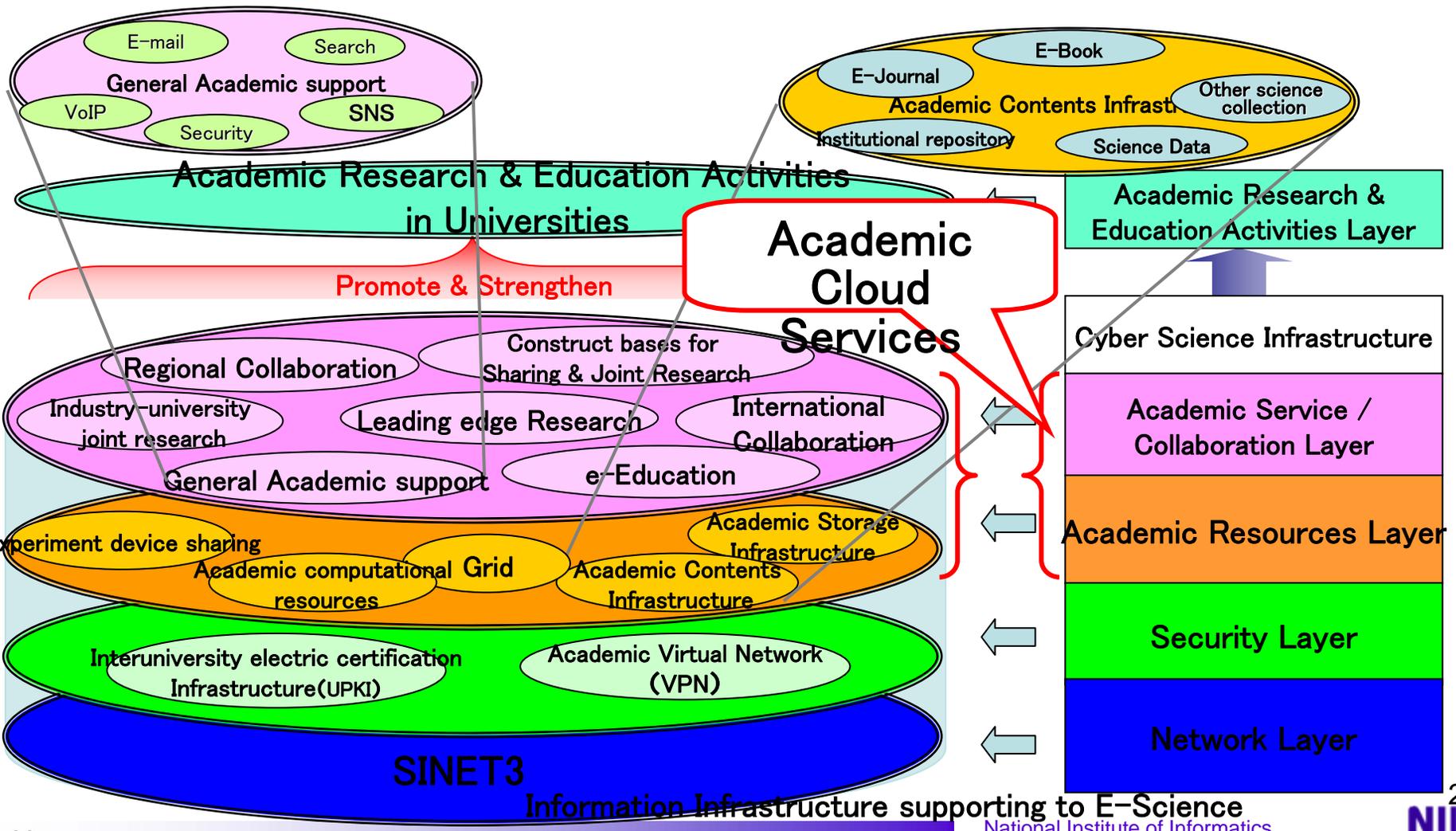
- SINET3 undertakes the responsibility for an Asia Backbone of International Academic Information Network
- Strengthened the stability with established the node for abroad on data center
  - North America: 10Gbps (New York) + 10Gbps (Los Angeles)
  - Asia: 622Mbps (Singapore) + 622Mbps (Hong kong)  
(Collaboration with TEIN3)

# Visions of SINET4

- ◆ High trust core lines of 100Gbps or more that can endure super-mass data transfer at near future
- ◆ Speed-up of edge lines coping with network demand expansion of joining organization (2.4~40Gbps)
- ◆ Economical speed-up of access lines by dark fiber + CWDM



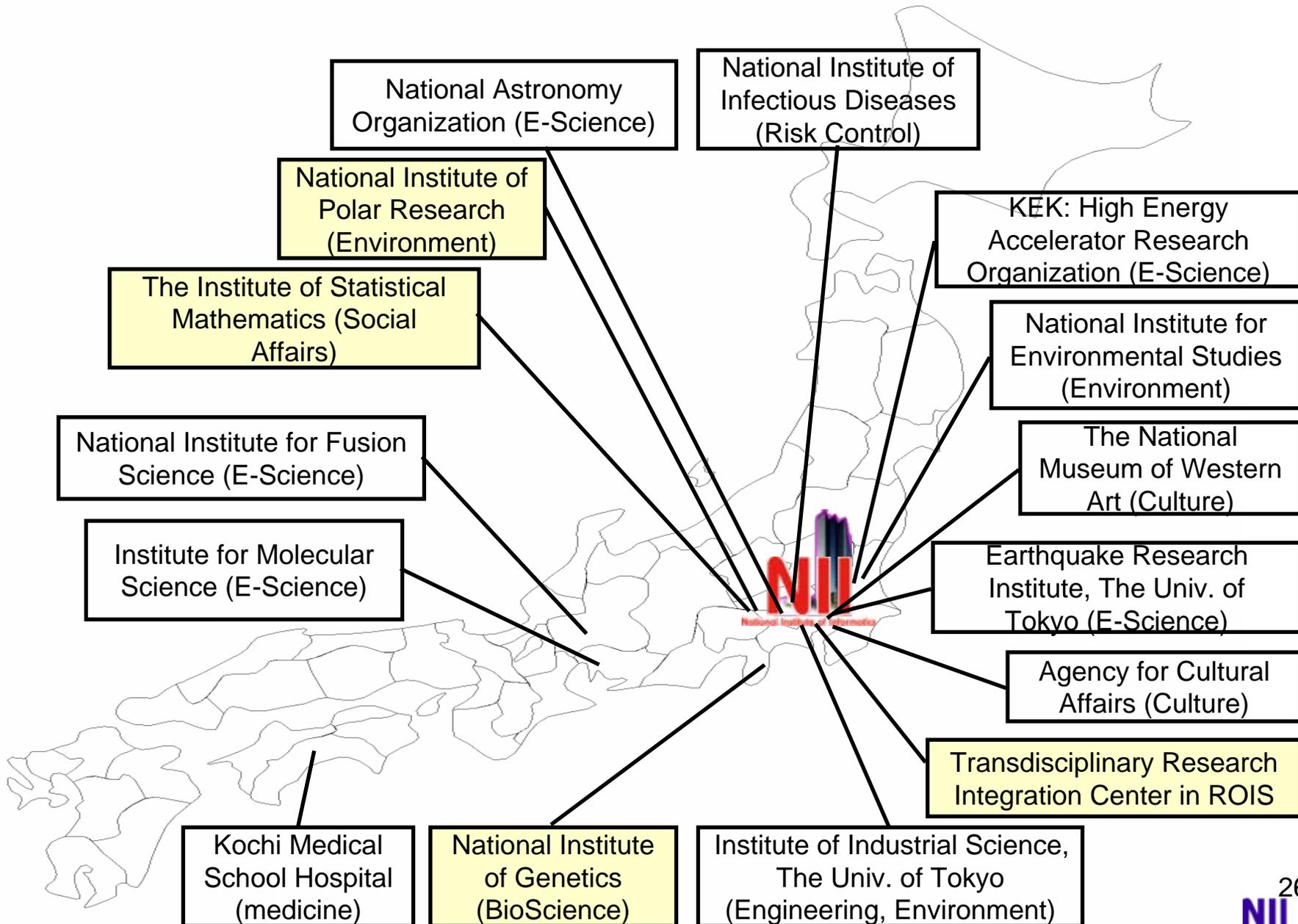
# The Advanced Academic Cloud services have a hold over the science, research and education in the future



# NII as a Platform of ICT Collaborative Research

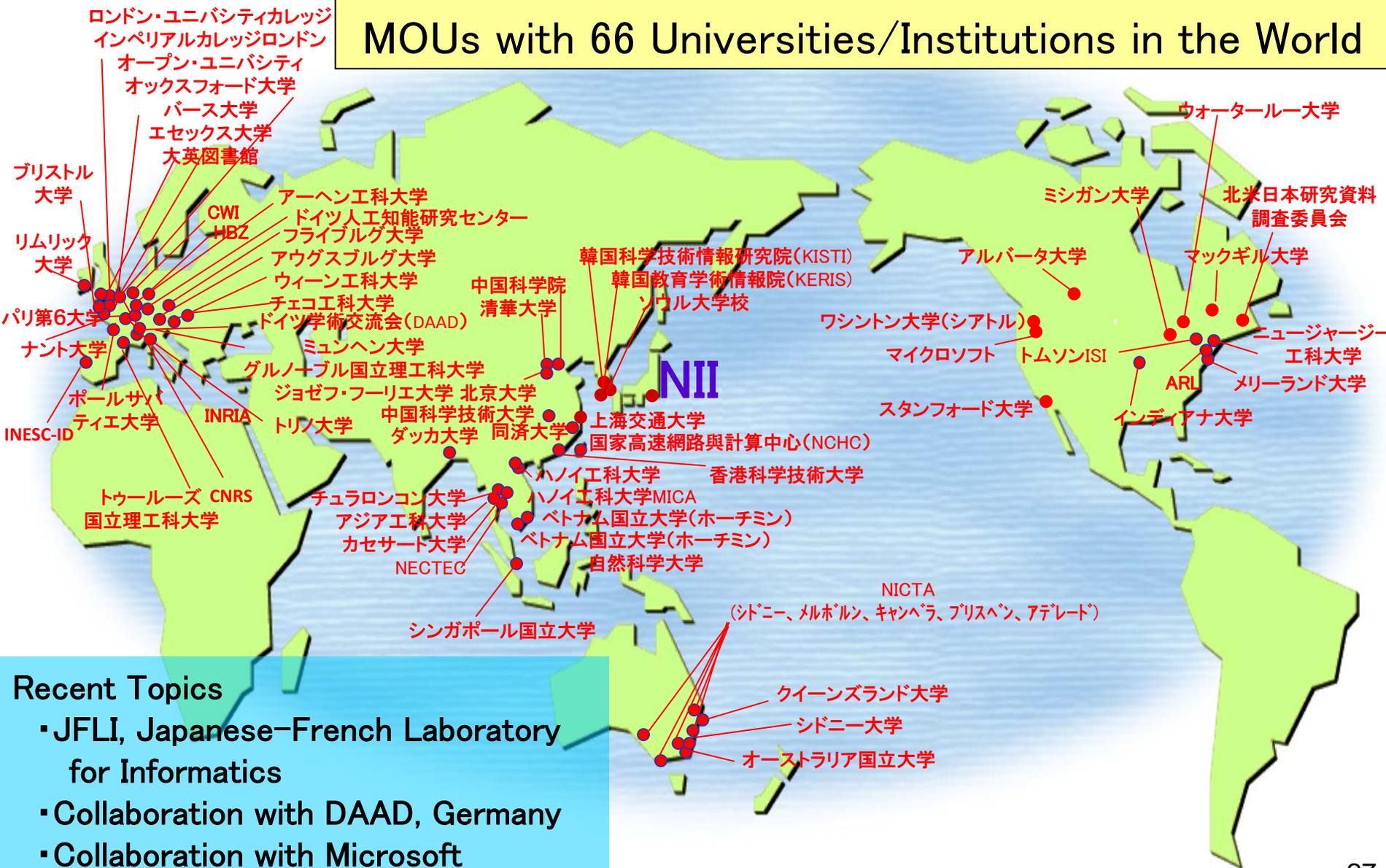


# Vertical Collaboration Network



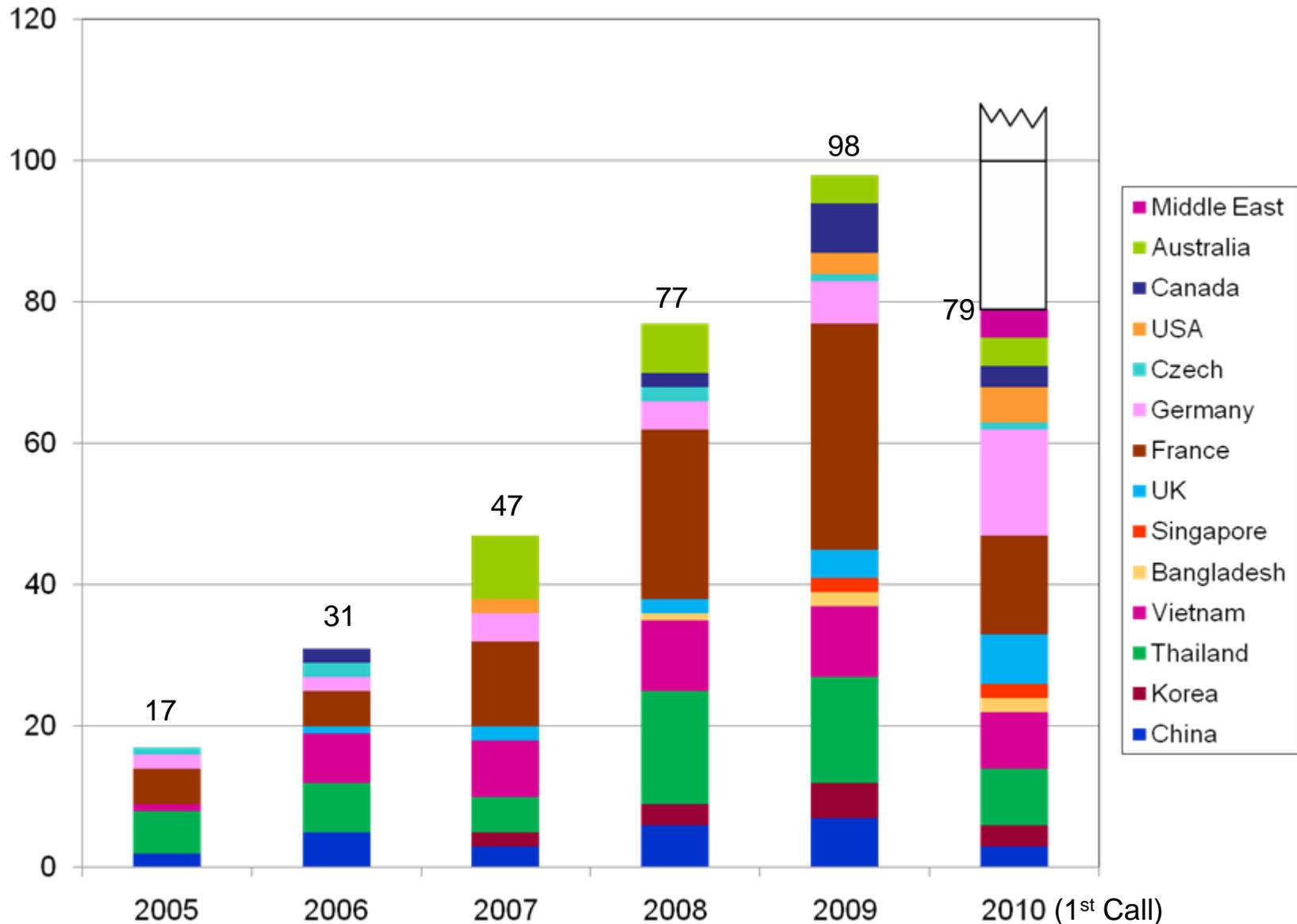
# Global collaboration of NII

MOUs with 66 Universities/Institutions in the World



- Recent Topics**
- JFLI, Japanese-French Laboratory for Informatics
  - Collaboration with DAAD, Germany
  - Collaboration with Microsoft Corporation etc

# NII International Internship Program



I believe;

This workshop can be really the great spring board of powered-up global (Japan and Austria) collaboration for ICT research for the society.

**Thank you!**