

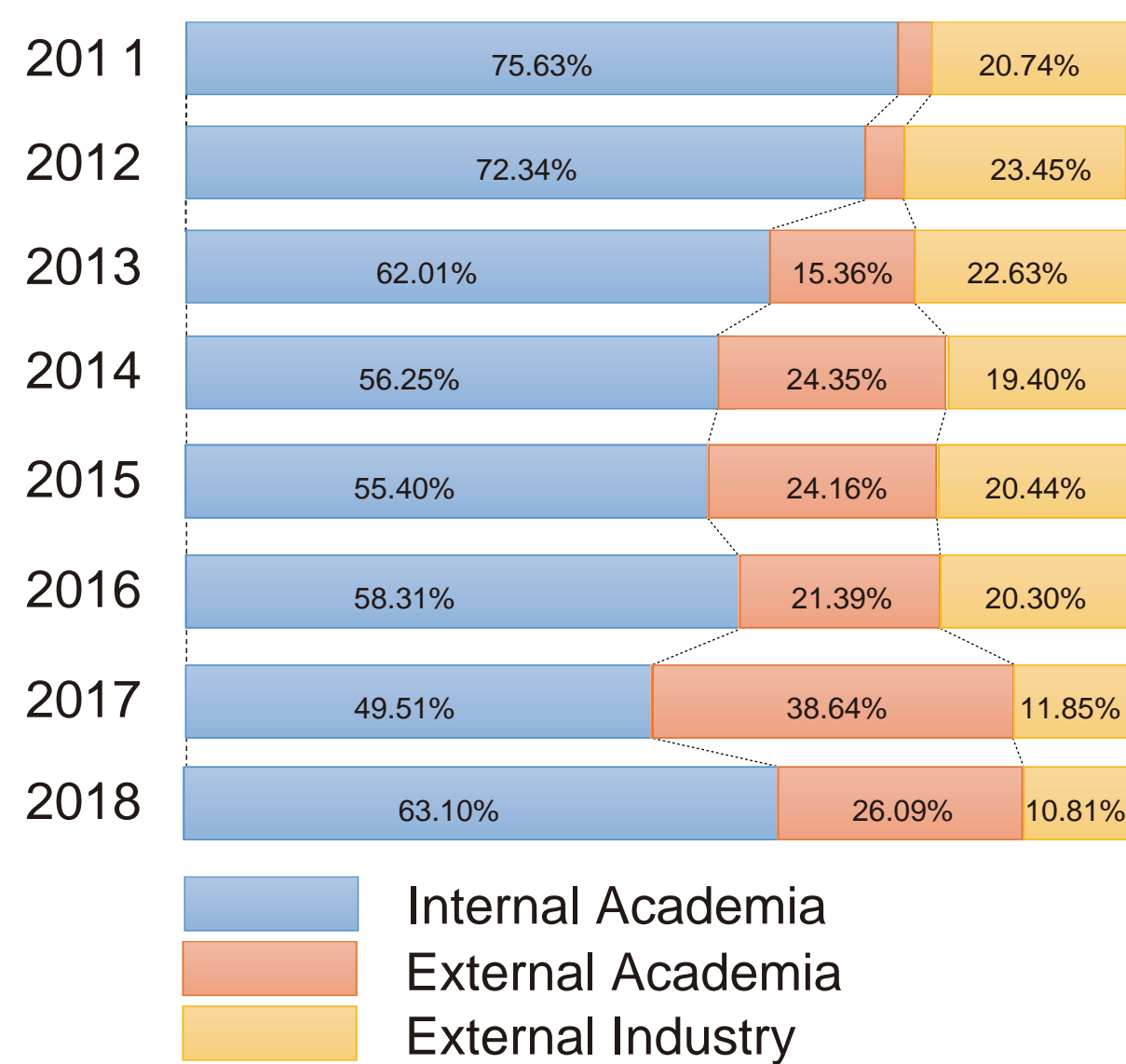


# Joint Usage of TSUBAME3.0 Partnership Resource Allocations

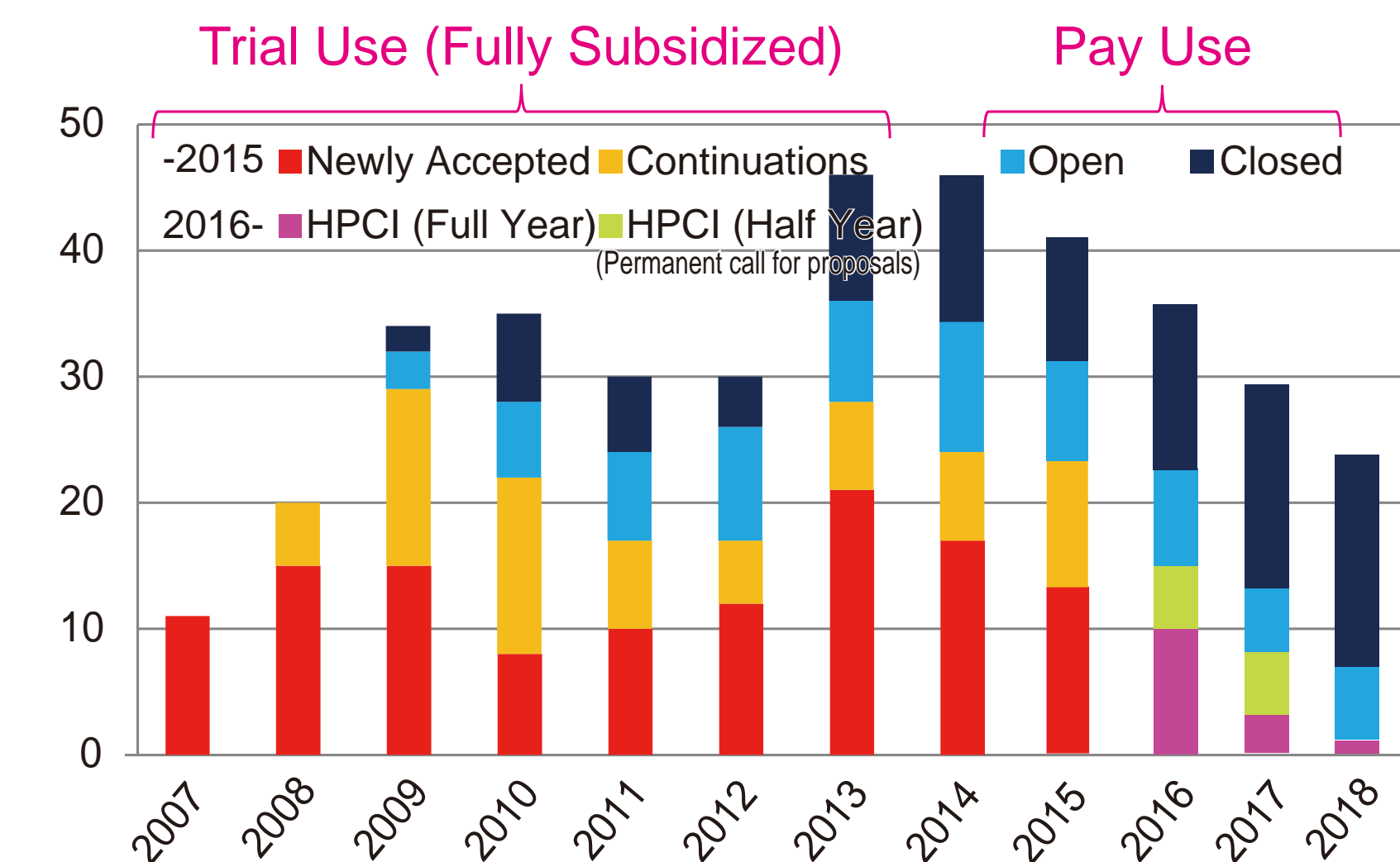
## TSUBAME Industrial Use -Statistical Information-

TSUBAME is open to academia and industries. Industrial use started in FY2007.

### TSUBAME Usage Profile



### The Number of Industrial Projects



### How to Use TSUBAME?

User Types	Programs	Remarks Column
Tokyo Tech Students and Professors		All Students have TSUBAME accounts.
Non-Tokyo Tech Users	Partnership Resource Allocations HPCI/JHPCN	Academic and Industrial Use
Industrial Users	Project for Creation of Research Platforms and Sharing of Advanced Research Infrastructure (- 2015) HPCI/JHPCN (2016 -)	Academic and Industrial Use Supported by MEXT
Foreign Researchers	International Collaboration	Industrial Use Supported by MEXT
Collaborators with Tokyo Tech Professors	Research Collaboration based on Research Fund or Industrial Contracts	

### TSUBAME Services

Menu	Publicity	Price	Remarks
Trial Use	Open	Free	Supported by MEXT
Pay Use	Open	\$1.02/NodeH	
	Closed	\$2.04/NodeH	

Exchange rate is calculated with \$1 = ¥108.

Intellectual properties are reserved completely by the users and are not required to be shared with Tokyo Tech. "NodeH" is the unit for pricing. 1 NodeH is equivalent to 1 node for 1 hour.

For example, if you pay \$102, you can use 100 nodes for 1 hour, or 1 node for 100 hours. Each node has 2 Intel Xeon processors (28 cores) and 4 NVIDIA Tesla P100 GPUs, with 256GB Memory. "Publicity: Open" requires company name, division, purpose to use and the report of result to be published. "Publicity: Closed" only requires company name to be published.

## Detailed analyses of target scattering and propagation structure for onboard radar by FDTD method

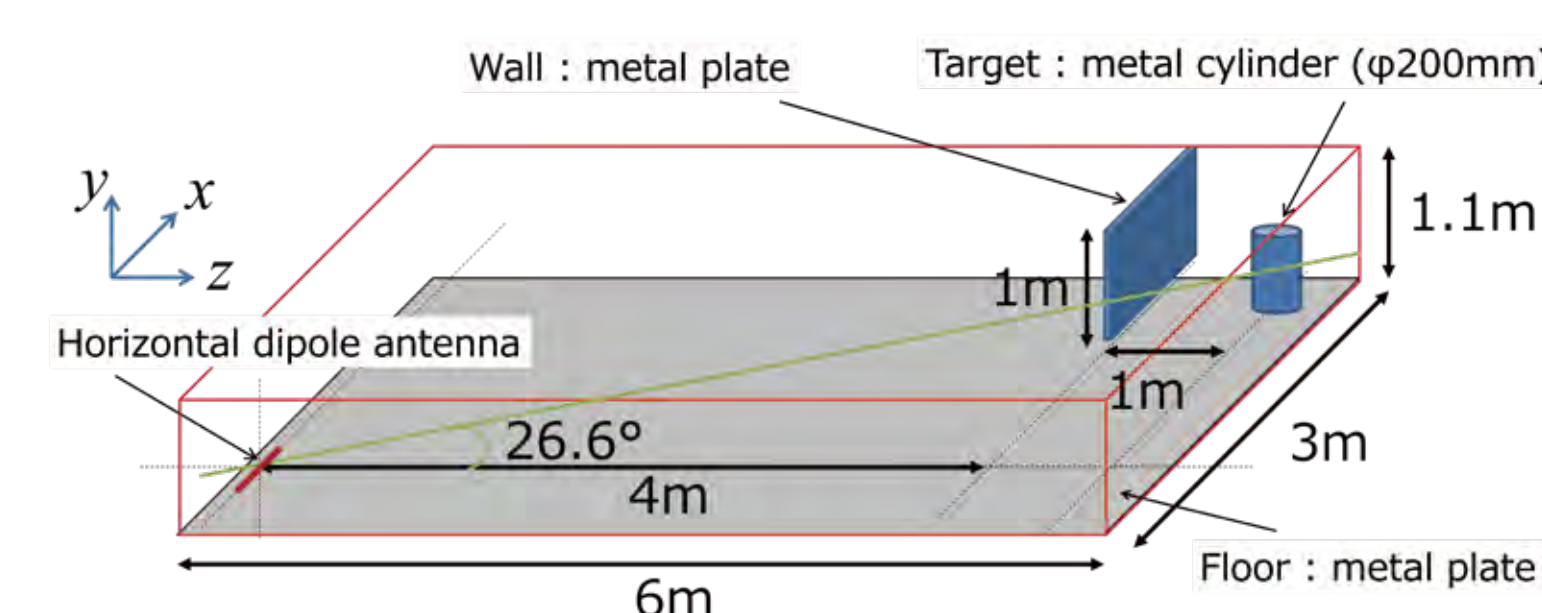
Okugi Tomokazu, Yamada Hideyuki, Yamamoto Masashi, Yamamoto Yasunori (Mazda Motor Corporation)

TSUBAME3.0, a multi-GPU supercomputer now enables you to execute radio wave propagation analyses by FDTD method for a broad spatial area within realistic calculation time, which was impossible before. The study aims to explore possibilities of utilizing radio wave diffraction for detecting pedestrians behind a wall, a vehicle or something through analyzing propagation phenomena around pedestrians and an object hiding them. The simulation analyses were conducted with a 24GHz quasi-millimeter wave radar and a target that is a low reflecting cylinder ( $\phi 200\text{mm}$ ) equivalent to a pedestrian. A wall was settled to hide the target from the antenna.

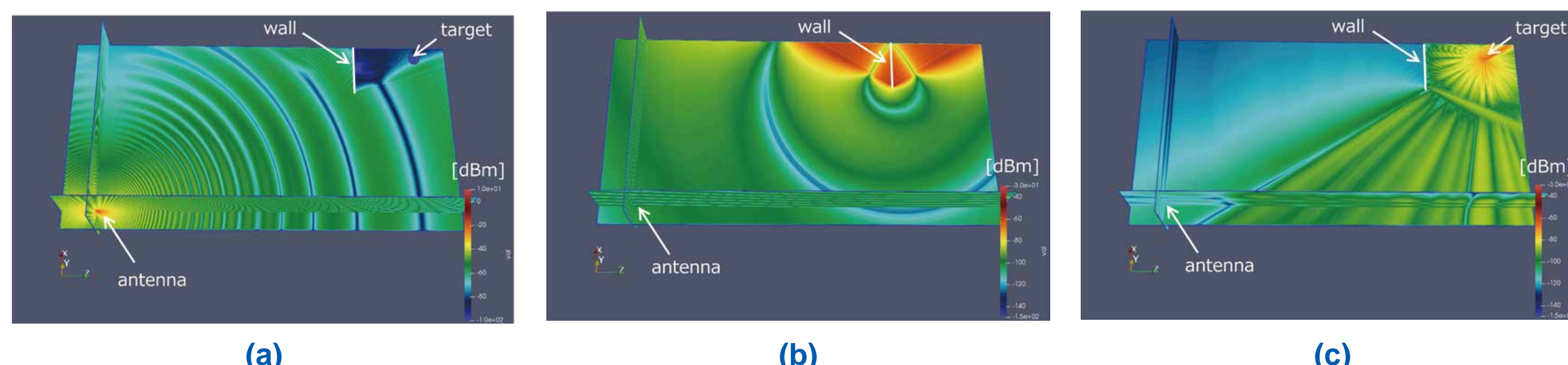
It was observed that after radio waves transmitted from the radar antenna were diffracted by the wall, they reflected several times between the wall and the target and then returned to the antenna. That means the radar antenna could receive the radio waves returning from the target behind the wall. It was found that the diffracted waves could be promising for detecting pedestrians behind a wall, a vehicle or something.

### Calculation conditions

Frequency	24 [GHz]
Cell size	0.001249 [m] ( $\approx 1/10\lambda$ )
Scheme	FDTD(2,4)
CFL	0.13632
Time step	$5.68 \times 10^{-13}$ [s]
Radiation Source	1/2λ dipole antenna, Continuous Sin Wave
Radiation Power	7.75 [dBm]
Total number of time steps	20000
Absorber	PML 32 layers, $R_0=1.0 \times 10^{-32}$ , $M=4$



Simulation model for analyses of radio wave scattering and propagation around target hidden from antenna.



Results of 24GHz radar propagation power simulation. (a) Total electromagnetic field, (b) Electromagnetic field scattered by wall, (c) Electromagnetic field scattered by target.

## HPCI Confederation

### High Performance Computing Infrastructure

- National grid infrastructure for HPC research

### Resources

- 11 supercomputers in Japan, including TSUBAME3.0
- 90PB global shared storage to share data

### Services

- One-stop sign up to all resources
- Single sign on to all resources using Shibboleth & GSI

### Status

- 19 projects use TSUBAME3.0 for the HPCI project on FY2019

## JHPCN

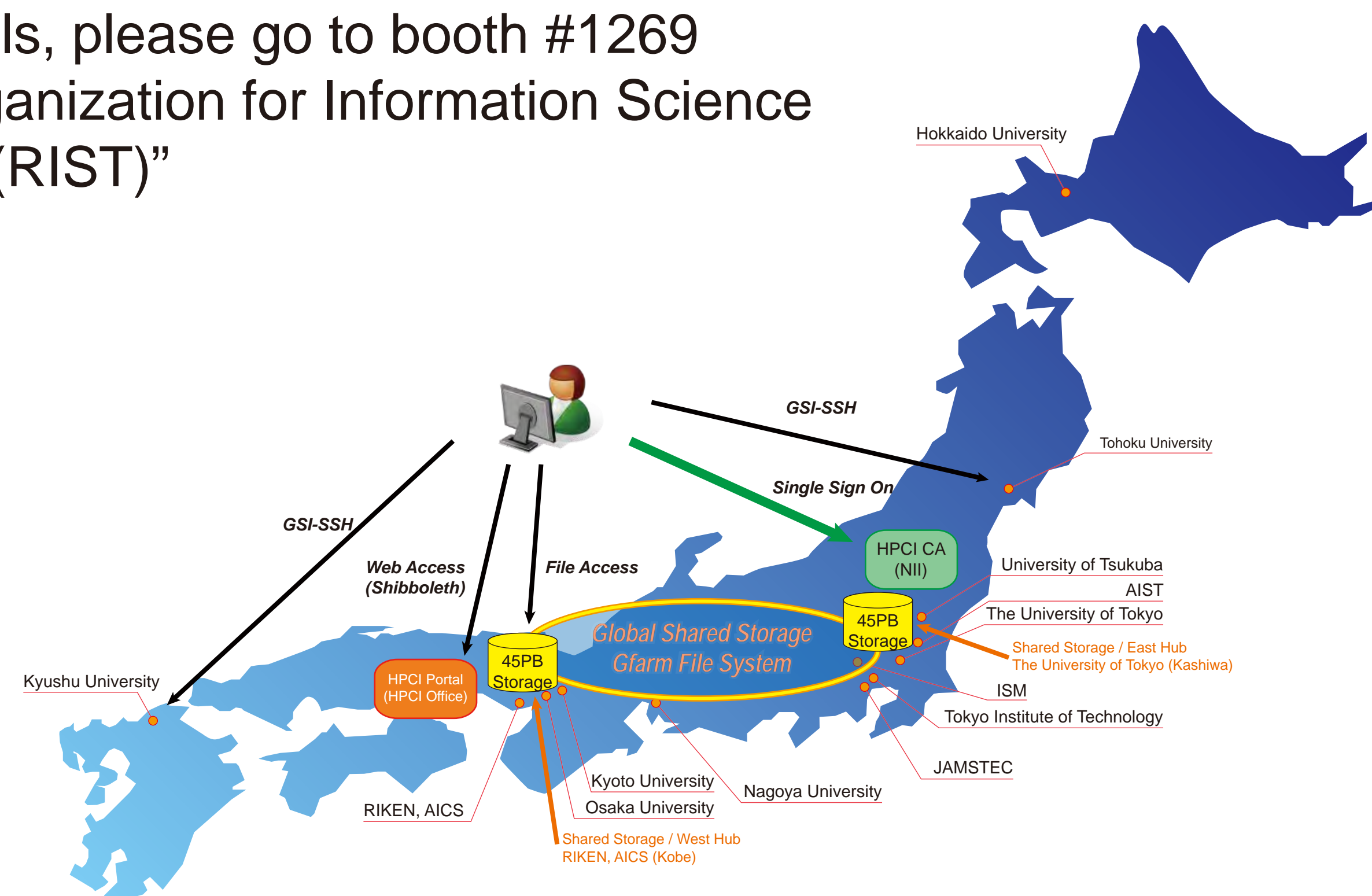
### Joint Usage/Research Center for Interdisciplinary Large-scale Information Infrastructures

The Network-Type Research Center aims to contribute to the advancement and permanent development of the academic and research infrastructure of Japan

### Resources Provider

8 supercomputer centers in Japan, including TSUBAME3.0

For more details, please go to booth #1269  
"Research Organization for Information Science & Technology (RIST)"



### Call for Proposals of Joint Research Projects

Approximately 60 research projects in each year, including international & Industry joint research projects

### Status

14 projects use TSUBAME3.0, and total 58 projects are adopted as JHPCN projects on FY2019