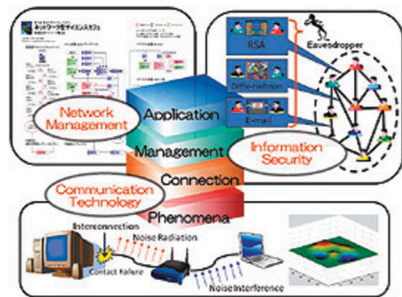## Research and Development Divisions

Information Network Systems
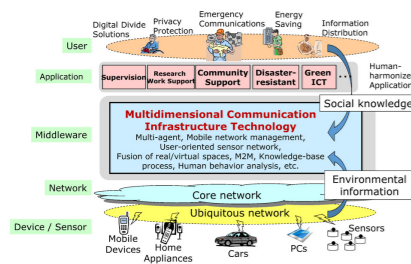Director: Prof. Hideaki Sone

Activities in the division are related to service of campus networking infrastructure and improvement of advanced information network environment.

Major research fields are EMC, electromagnetic information leakage, information security, network management, and development of education program for practical human resources in information security.

Supercomputing Systems
Director: Prof. Hiroyuki Takizawa

Through the operation of supercomputing systems, we focus our research on the design and development of next-generation supercomputing systems and their applications. Targeted areas range from key components of supercomputing systems, which include energy-aware system architectures and highly-productive programing environments, to performance optimization techniques for accelerating innovative supercomputing applications.

Joint-Research Division of High-Performance Computing (NEC)
Director: Prof. Hiroaki Kobayashi

This division was established in 2014 as a core center of Tohoku University-NEC cooperation on high-performance computing. As the knowledge and experiences in practical use are imperative for future-generation system design, the research topics include migration and optimizations of laboratory-developed science and engineering applications to the level of high performance on the supercomputing systems of Tohoku University. In addition, the faculty members of the division work with researchers and engineers outside Tohoku University, especially from the industry, invited as Visiting Professors, Visiting Associate Professors, and Visiting Researchers, and promote joint-research projects regarding next-generation supercomputing systems development.
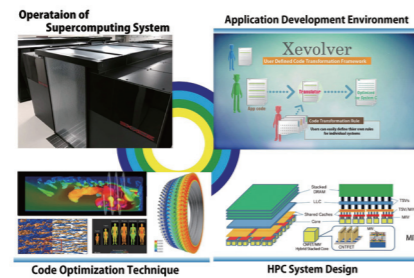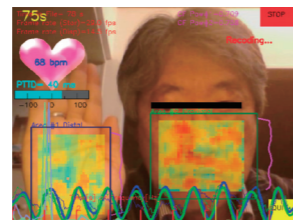
Communication Infrastructures
Director: Prof. Takuo Suganuma

This division is promoting the researches of provisioning the unified communication infrastructures for the University-wide systems, and the advanced utilization of them. Also, we are working on the R&D to establish the new communication environment where each entity in human community, society and natural environment performs high level mutual collaboration.

Advanced Information Technology
Director: Prof. Makoto Yoshizawa

Our laboratory has proposed cyber-health monitoring whose purpose is to accelerate innovations of intelligent health monitoring systems by applying synergetic effects of advanced information and communication technology. We aim at developing clinical application of virtual reality systems, assessment of digital contents using biological information, systems for estimating and controlling artificial circulatory dynamics, non-contact biological signal measurement, artificial intelligence for computer-aided diagnosis in medical image, intelligent measurement and control techniques for next-gen radiotherapy system, and high accuracy signal matching algorithms.

Non-contact biological signal measurement from video images

Cloud Service Infrastructure Laboratory
Director: Assoc. Prof. Hideaki Goto

The CSI laboratory aims at developing secure cloud and network infrastructures including the World-wide Campus Wireless Network based on the Identity Federation Platform of the Japan's Cyberscience Infrastructure.

Together with GakuNin the Academic Access Management Federation by the National Institute of Informatics in Japan, the laboratory is in charge of the R&D on convenient, secure, disruption/disaster-tolerant network roaming systems and related cloud services covering eduroam the world-wide research and education Wi-Fi roaming system.

2019/11

Cyberscience Center, Tohoku University
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Cyberscience Center, Tohoku University

Research Division on Information Network Systems
Research Division on Supercomputing Systems
Research Division on Communication Infrastructures
Research Division on Advanced Information Technology
Joint-Research Division of High-Performance Computing (NEC)
Cloud Service Infrastructure Laboratory

High-performance Computing Systems

Information Network Systems

www.cc.tohoku.ac.jp

Cyberscience Center was founded as a national supercomputer center hosted by Tohoku University in 1969. Since then, the Center has been installing high-end computing systems and providing them to researchers and students nation-wide. In addition to the role of a national inter-university joint usage / research center for high-performance computing, the Center is responsible for cyber-infrastructure of the University.

The mid-term plan 2016-2021 of the Center includes:
- Contribution to academic research, industry, local community, and culture by way of promotion and deployment of the world's most advanced information infrastructure, research for advancing application and next-generation information infrastructure, construction of creative research environment, and development of human resources for new leaders in the field.
- As a joint usage / research center, provision of large-scale HPC resources to nation-wide universities and other institutes, and promote the pursuit of research progress for future information infrastructure.

The faculty members also get involved in education of undergraduate and graduate students and research of the information and communication technologies as members of collaborative laboratories of School of Engineering, Graduate School of Information Sciences, and Biomedical Engineering of Tohoku University.

We would like to sincerely appreciate your continuous support and cooperation.

Takuo Suganuma
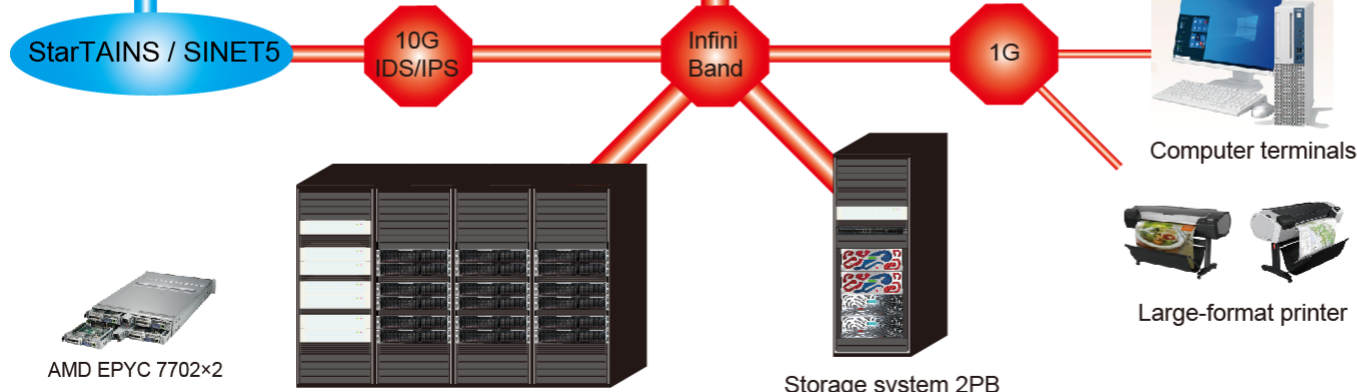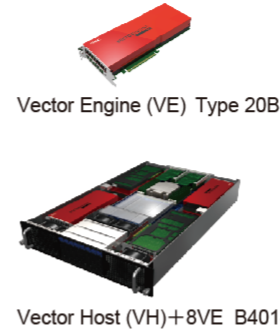Director of
Cyberscience Center

Supercomputer Systems

AOBA

Operation Start on October 1, 2020 !

HPCI-JHPCN

Vector Parallel System **SX-Aurora TSUBASA**
576VEs (72VHs), 1.48PFLOPS(DP), 45TB Memory, 895.68TB/s

Vector Engine (VE) Type 20B

Vector Host (VH)+8VE B401-8

StarTAINS / SINET5

10G IDS/IPS

Infini Band

1G

Computer terminals

Large-format printer

AMD EPYC 7702×2

Storage system 2PB

Scalar Parellel System **LX 406Rz-2**
68nodes, 278.5TFLOPS(DP), 17TB Memory, 27.2TB/s

Activities on Joint Usage / Research Center

Japan High Performance Computing and Networking plus Large-scale Data Analyzing and Information Systems (JHPCN) / High Performance Computing Infrastructure (HPCI)
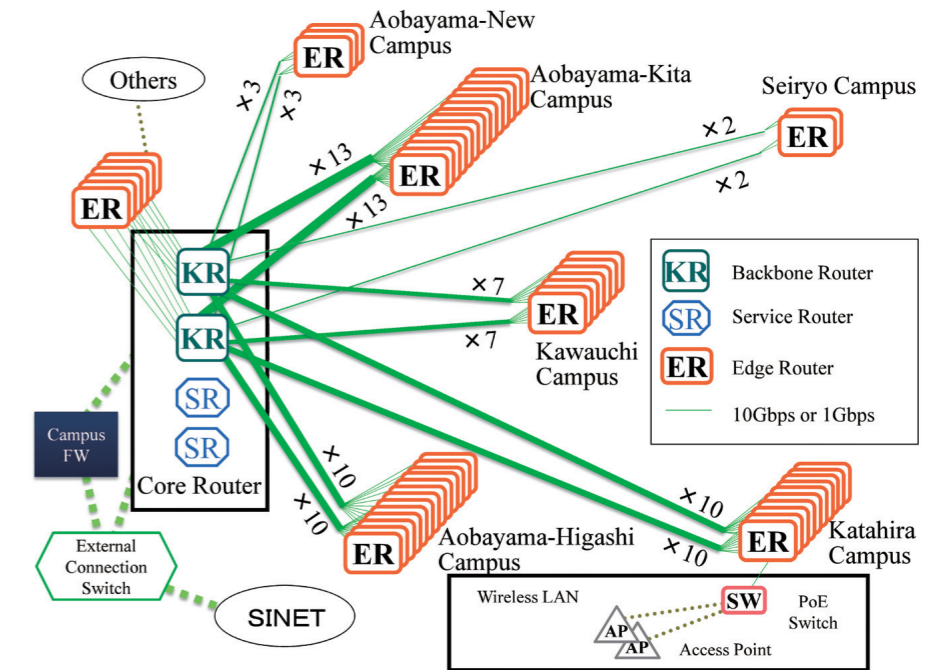
In 2010, JHPCN (Japan High Performance Computing and Networking plus Large-scale data Analyzing and Information Systems) has been organized by eight centers equipped with supercomputers. As a constituent center of JHPCN, we promote interdisciplinary joint researches toward grand challenge problems by using information infrastructures of JHPCN.

We get involved in deployment and operation of the High Performance Computing Infrastructure (HPCI) as a resource provider, which consists of K computer and other major supercomputers in Japan. HPCI make these super-computer resources available with the single sign-on.

The University of Tokyo
Information Technology Center

Tokyo Institute of Technology
Global Scientific Information
and Computing Center

Tohoku University
Cyberscience Center

Nagoya University
Information Technology Center

Hokkaido University
Information Initiative Center

JHPCN

Kyoto University
Academic Center for Computing
and Media Studies

Kyushu University
Research Institute for Information
Technology

Osaka University
Cybermedia Center

Information Network Systems

Tohoku University's TAINS (Tohoku University Academic/ All-round / Advanced Information Network System) has been in service since 1988 and was the first large-scale campus-wide network in Japan. Its successor since 2009 is StarTAINS which links the center to all major buildings in the widely-spread six campuses.

Others

Aobayama-New Campus

ER   ×3   ×3

Aobayama-Kita Campus

Seiryo Campus

ER

×2   ×2

ER   ×13
×13

ER

×7   ×7

Kawauchi Campus

KR
KR

SR
SR

Core Router

Campus FW

External Connection Switch

SINET

×10
×10

×10
×10

Aobayama-Higashi Campus

ER

Katahira Campus

ER

KR	Backbone Router
SR	Service Router
ER	Edge Router
	10Gbps or 1Gbps

Wireless LAN

AP
AP

Access Point

SW   PoE Switch

Promotion of Information infrastructure in Tohoku University

The Cyberscience Center, which is playing a core roll in the Information Synergy Organization, contributes to development and operation of the campus-wide information infrastructure such as information network system, various network service, common information system and information security system, and coordinates any plans on designing and deploying the university-wide information infrastructure. We also contribute to running the Tohoku Open Internet Community, TOPIC.
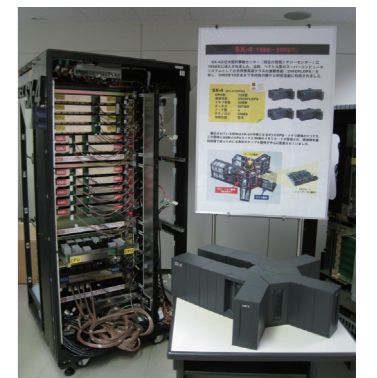
Publicity

Publicity and User Support

We publish a periodical named SENAC with news and articles related to high performance computing and net-working.

We provide consulting services, training classes, and workshops to use our resources effectively and efficiently.

Exhibition Room

The exhibition room of Cyberscience Center was set up to inform the public widely about the history of computer technology development. This room exhibits the parts, units and cabinets of historical computers including the units of a parametron computer jointly developed by Tohoku University and NEC in 1958. In 2010, this room has been authorized as a part of the Satellite Museum of the Historical Computers by Information Processing Society of Japan (IPSJ).

SX-4 (1998-2002)