## Office of Educational Cloud

The Office of Educational Cloud has been established for the purpose of promoting e-learning at the university and improving the quality of education through ICT. Its main work is operating the learning management system (LMS) for the entire university. Furthermore, in an aim to expand educational materials focused on videos that provide better educational benefits than text-based educational materials that have been used up until now, the Office is introducing systems such as an automatic lecture recording and remote lecture system while producing and distributing various multi-media contents. In addition, the Office operates TSUKUBA Open Course Ware (OCW) programs as a means to externally communicate the university's education and research activities. The Office of Educational Cloud serves as the cloud infrastructure that aggregates these various educational information systems at the university.

Specifically, the Office is engaged in the following projects:

1. Operating the learning management system for the entire university
2. Constructing an educational cloud system
3. Developing an automatic lecture recording and remote lecture system
4. Supporting the expansion of video educational materials through coordination between the video distribution server and LMS
5. Operating TSUKUBA OCW
6. Media services
   - Video production and editing services
   - Audio-video educational materials and reference materials production services
   - Audio-video contents and digital archiving services



Learning management system
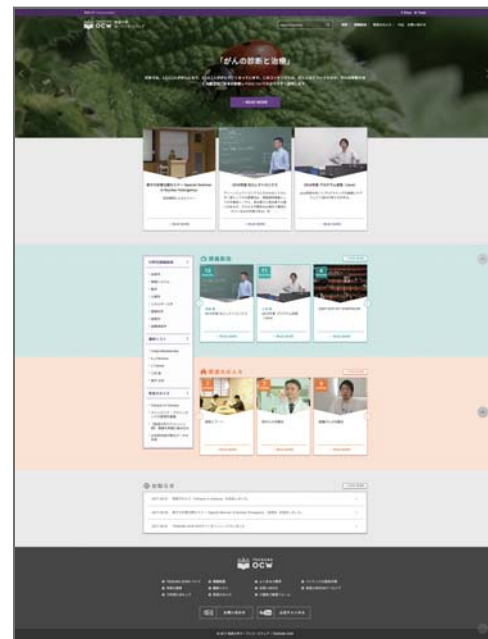


TSUKUBA OCW site



Room for lecture recording



Cloud servers



Filming equipment



Video and audio editing



Recording room



Studio

Academic Computing and Communications Center,
Organization for Information Infrastructure,
University of Tsukuba

1-1-1 Tennodai, Tsukuba-shi, Ibaraki, 305-8577 JAPAN
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Apr 1, 2020

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筑波大学
University of Tsukuba

# Academic Computing and Communications Center

## Organization for Information Infrastructure
## University of Tsukuba

2020



## Organization for Information Infrastructure

Organization for Information Infrastructure is responsible for the information infrastructure of all schools at University of Tsukuba. The role of the organization is to plan and perform the following functions for improving the quality and efficiency of education and research within the university.

The functions include:
1. Maintaining IT infrastructure for education, research, and management
2. Providing information services on the corresponding IT infrastructure
3. Ensuring information security and implementing security measures

Primary activities include:
1. Decision making on information strategies
2. Decision making on information environment infrastructure
3. Ensuring information security

The Organization for Information Infrastructure primarily consists of the Office for Information Infrastructure Planning, the Academic Computing and Communications Center, and the Division of Information Infrastructure Management.
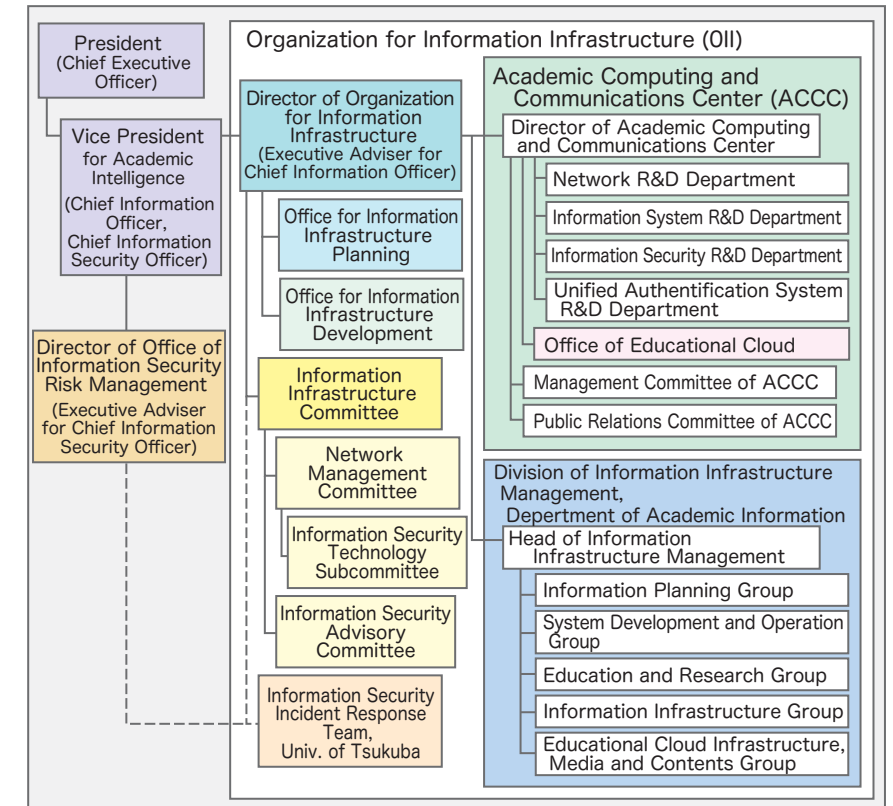


## Academic Computing and Communications Center



Academic Computing and Communications Center was established in 2004 by merging Educational Media Center and Science Information Processing Center, both of which had been in operation since the foundation of University of Tsukuba. In 2007, the center was restructured to be included in Organization for Information Infrastructure, which organization is in direct supervision to the university head office and the Vice President in charge of the information strategy of the university.

Academic Computing and Communications Center performs R&D relating to information environments and information services that utilize such environments, as well as maintenance, operation, and service provision for the information infrastructure. Its main activities include:

1. Formulating information infrastructure maintenance plans
2. Maintaining, operating, and providing services for the backbone information network
3. Maintaining, operating, and providing services for the Zengaku computer network
4. Providing various services based on information infrastructure
5. Promoting environmental sophistication to education, such as with e-learning
6. Ensuring information security

These activities and the related highly-advanced research and developments were promoted by an organization consisting of four R&D departments. In 2012, the Office of Educational Cloud was established to develop and to provide educational infrastructure, such as e-learning systems, and to promote media contents.

## Department No. ❶ Network Research and Development Department

Network R&D Department mainly performs the following activities and R&D related to activities in addition to operations and management of the backbone of the on-campus network.

(1) Operation and management of on-campus backbone network, and operational support of the off-campus research network

On-campus backbone network access points such as gigabit Ethernet and wireless LAN networks installed in common campus areas are operated and managed by the department. It also operates, supports and connects the on-campus network with SINET5.
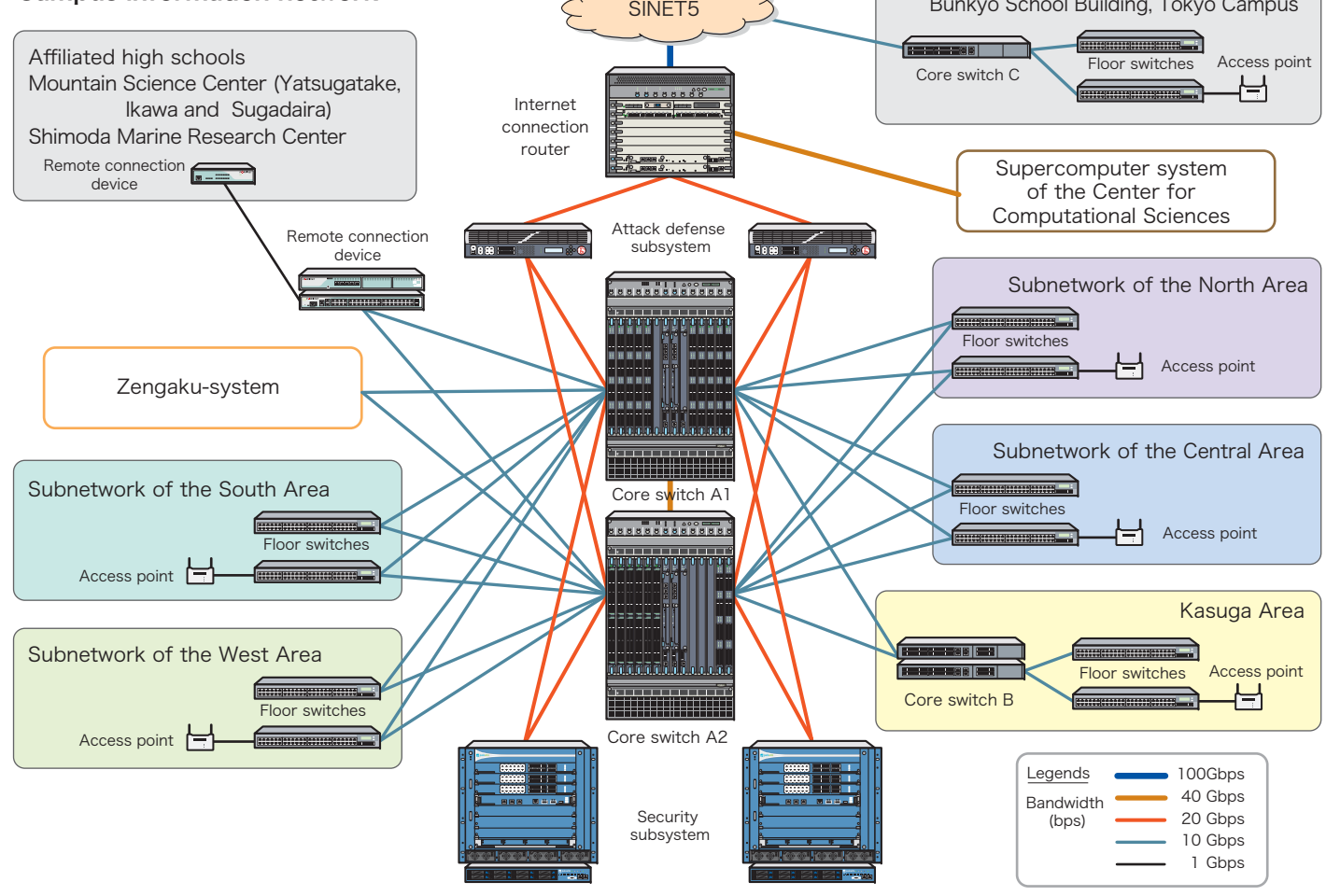
(2) Ensuring network security

Network security is enhanced such as by installing firewalls at on-campus and off-campus connection points and by controlling port accesses. This does not only prevent unauthorized access at both on/off-campus. Installation of anti-virus equipment prevents the infection and spread of viruses via e-mail.

(3) Research and development regarding the latest network and security technology

Research regarding the operation of new network protocols, system development that enables safe, secure, and flexible assignment of network resources, and research regarding safe and secure network operation using the logs of network devices are being conducted by the department.

### Campus information network



Affiliated high schools
Mountain Science Center (Yatsugatake, Ikawa and Sugadaira)
Shimoda Marine Research Center
Remote connection device

Remote connection device

Zengaku-system

Subnetwork of the South Area
Floor switches
Access point

Subnetwork of the West Area
Floor switches
Access point

SINET5

Internet connection router

Attack defense subsystem

Core switch A1

Core switch A2

Security subsystem

Bunkyo School Building, Tokyo Campus
Core switch C
Floor switches
Access point

Supercomputer system of the Center for Computational Sciences

Subnetwork of the North Area
Floor switches
Access point

Subnetwork of the Central Area
Floor switches
Access point

Kasuga Area
Core switch B
Floor switches
Access point

| Legends | | |
|---|---|---|
| Bandwidth (bps) | ━━━ | 100Gbps |
| | ━━━ | 40 Gbps |
| | ━━━ | 20 Gbps |
| | ━━━ | 10 Gbps |
| | ━━━ | 1 Gbps |

## Department No. ❷ Information System Research and Development Department

The Information System Research and Development Department supports both general and advanced information processing education and provides services to in-campus users through various computer systems.

In terms of R&D, it provides the technologies for increasing the convenience and safety of computing environments.

(1) Zengaku computer system

Zengaku Computer System provides all students and teachers with an information infrastructure including e-mail and web services. Renewed in March 2017, the system serves more than 1,000 computer terminals in on-campus satellite computer rooms. The computers, which dual boot between Windows and Linux, have various software installed. More details about the system are available on the following website:

https://www.u.tsukuba.ac.jp/





Zengaku computer system

Zengaku computer system
ACCC satellite room B206



| Central Area | | | | South Area | | | |
|---|---|---|---|---|---|---|---|
| 1 | 2D satellite | 121 | | 8 | ACCC satellite | 181 | |
| 2 | 2A satellite | 38 | | b | Arts and Physical Education Library satellite | 41 | ● |
| 3 | Bunsyu satellite | 28 | | **West Area** | | | |
| 4 | 3K satellite | 40 | | 9 | Medical satellite | 88 | |
| 5 | 3D satellite | 46 | | c | Medical Library satellite | 42 | ● |
| 6 | 1C satellite | 45 | | **Kasuga Area** | | | |
| 7 | 1D satellite | 81 | | 10 | Kasuga satellite | 175 | |
| a | Central Library satellite | 101 | ● | d | Library on Library and Information Science satellite | 17 | ● |
| **Tokyo Campus** | | | | ▢ | Number of computers | | |
| 11 | Tokyo satellite | 20 | | ● | Computers for the visually impaired available | | |
| e | Otsuka Library satellite | 11 | ● | | | | |

List of Zengaku-system satellites

(2) Rental servers

Management and services such as for e-mail and Web servers are provided upon request from in-campus organizations.

(3) Software licenses

We manage licenses contracted with some software companies so that a member of the university can use some software with no extra charge or can get special discount.



Rental servers

## Department No. ❸ Information Security Research and Development Department

With the recent deluge of information, information or "content" that passes through a network is being required to be appropriately handled, in addition to handling network. In order to support such information handling from the perspective of information security and information ethics, the Information Security R&D Department implements technical countermeasures that respond to the various incidents occurring in the campus network. This is implemented by collaboration with the other three departments of this center and the committees related to information security such as the Incident Response Office of the Organization for Information Infrastructure. The department also performs education planning and awareness education related to information security and information ethics for students and staff for the purpose of deterring the occurrence of incidents and to improve the morals such as in using network and handling of information. Furthermore, the department is involved in R&D of information security technology that enables information systems and services to be used safely.

Major department activities regarding education planning and awareness education on information security and information ethics implemented from the past are indicated below.
1) Producing and displaying posters that indicate "P2P Usage Prohibited on the University Network"
2) Displaying that P2P usage is prohibited on the login screen of the Zengaku-system
3) Holding seminars related to information ethics for teachers and students
4) Producing "Using Information Systems Safely and Securely," a pamphlet (in Japanese, English, and Chinese) concerning information ethics and distributing the pamphlet to all students and staff
5) Adopting "INFOSS Information Ethics" e-learning materials using manaba for new students entering colleges as part of the classes for the "Information" common subject and making sure the students conduct self study

## Department No. ❹ Unified Authentication System Research and Development Department



Unified authentication servers

Unified Authentication System Research and Development Department operates a unified authentication system, which enables a common password to be used for authentication in various on-campus computer systems. Changes to common passwords for the unified authentication system and views of registered information can be made from the unified authentication system website. Every year there are more and more computer systems which use the unified authentication system. The latest list can also be found on the website.



Unified authentication system
Local authentication server
Local authentication server
Single Sign-On System

Authenticate — Access Point Service
Authenticate — Zengaku-system
Authenticate — TWINS
Authenticate — e-Library system
Authenticate — Learning Management System (manaba)

Reflect
Link


Academic Computing & Communications Center (ACCC)