

14. Division of Information and Communication Systems

The Department of Information and Communication System (ICS) was founded in 2014 in order to develop and maintain the information and network systems of NIFS efficiently. All of the information system experts in NIFS belong to the ICS. There are five TASK groups which correspond to the classifications in NIFS. The Network Operation task group manages and maintains the communication systems in NIFS, such as the E-mail system including security issues. The Experimental Data System task group performs operation and development of data acquisition systems for the LHD experiment. The institution's Information Systems task group carries out the maintenance and development of the management systems for collaboration research and its outputs. The Atomic and Molecule Database task group maintains the atom and molecule database which is open to researchers around the world. The integrated ID management and authentication system task group manages integrated ID and authentication systems.

The ICS works as follows: the request for the maintenance, improvement, and development of the information and communication system from each section has is submitted to the ICS. The deputy division directors of ICS check all the requests, establish the priority among them, and assign them to the appropriate Task Group. Because all the experts belong to the Technical Service Section of ICS, each Task Group Leader asks the Section Leader to allot the required number of experts for a prescribed period of time so as to finish the job.

In NIFS, three research projects run across the research divisions. It can be said that the ICS is another “project” which lies across all the divisions in the institute for keeping the information and communication systems stable, secure, and up-to-date.

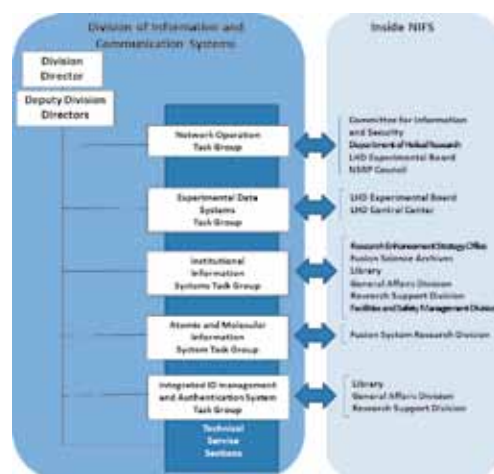


Fig. 1 Structure of Division for Information and Communication Systems

Information Network Task Group

The information network is a foundation for research activity. The Information Network Task Group operates the advanced NIFS campus information network named “NIFS-LAN,” which contributes to the development of nuclear fusion research, with strong security systems.

Notable activities in FY 2017 by the Information Network Task Group:

- The Access line that connects the NIFS campus network and the SINET node has been upgraded from a single 10 GbE line to four 10GbE lines. A storage system for the virtual foundation system of the Research Information Cluster has been upgraded. UTP cables in the Administrative and Welfare Building have been replaced with category-6 cables to ensure the GbE connections.

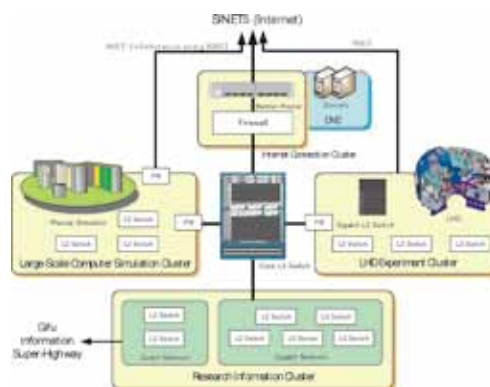


Fig. 2 Block diagram of the NIFS campus information network, which consists of three autonomous clusters that have their own purposes and usages.

- Isolation racks have been installed for the network equipment and servers of the LHD Experiment Cluster. Before the LHD experiment campaign, the security condition of each PC was checked in order to keep the safety network free of malware.
- Security incidents were treated with a malware detection system and lectures were held regarding the information network and its security. URL filtering has been activated on the firewall to avoid malicious connections. An informational system audit held by NINS was also accomplished.

Experimental and Institutional Information Systems Task Groups

The objective of these Task Groups (TGs) is to promote the research activities in both the LHD experiment and the NIFS institutional aspects by providing better computational services for research and official work.

Regarding the experimental information systems (EIS), a number of LHD subsystems were successfully operating until August 2017, the end of the 19th LHD campaign. This was the longest period with the largest number (> 13 000) of plasma experiments ever. Accordingly, the acquired data amount of 382 TB was also the largest record in LHD, even though the number of data acquisition nodes had been decreased by more than 15 % (105 → 88). The accumulated amount of archived data are 1.29 PB, exceeding 1 PB for the first time.

One of the most innovative achievements in the institutional information systems (IIS) was the functional extension of the conference organizer assisting system (Icarus), which has enabled organizers to provide the online proceedings to the participants' mobile terminals according to the conference timetable in real time. The new function has been used at the 26th International Toki Conference (ITC-26) successfully and obtained a high evaluation from not only the participants but also the organizers. Not only for research collaboration purposes, the IIS has extended its online services to some institutional administrative affairs and public services, such as sports ground lending. Since October 2017, the NIFS collaboration database system (Nicollas) has been renewed as the NINS open use system (NOUS) in which most of the Nicollas codes have been ported with the original functionalities.

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Fig. 3 Conference program view of the Icarus mobile service: Every participant can check not only the presentation abstracts according to the timetable, but also other conference logistics information.