TÍTULO: Formas de crear un espacio informativo único para estudiantes y académicos mediante tecnologías modernas de información en la Universidad Nacional de Aviación.

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RESUMEN: El artículo está dedicado a la cuestión de formar un entorno de información único para investigadores y estudiantes de educación superior, y propone el uso de servicios modernos en la nube para racionalizar y centralizar el espacio de información de la universidad. El uso de servicios modernos no solo establecerá una interacción efectiva durante el proceso de aprendizaje, sino que también reducirá el costo de mantenimiento y soporte de la tecnología de la información en la Universidad Nacional de Aviación en su conjunto. Esto plantea el problema de la preservación de todo el software y los sistemas existentes actualmente que se prueban en la universidad y para integrarlos en un solo entorno.

PALABRAS CLAVES: universidad de tecnología de la información, nube, espacio de información único, entorno de información científica y educativa de la universidad, competencia en información.

TITLE: Ways of creating a single informational space for students and scholars by means of modern information technologies in National Aviation University.

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ABSTRACT: The article is devoted to the issue of forming a single information environment of researchers and students in higher education, and proposed use of modern cloud services to streamline and centralize information space of the university. Using modern services will not only establish effective interaction during the learning process, but also reduce the cost of maintenance and support of information technology at the National Aviation University as a whole. This raises the problem of preservation of all currently existing software and systems that are tried and tested in the university and to integrate them into a single environment.

KEY WORDS: information technology university, cloud, single information space, scientific and educational information environment of the university, information competence.

INTRODUCTION.

Nowadays, progress of information technologies could be easily seen across many industries and sectors, education is not an exception. This problem is particularly topical for leading universities of the country, such as National Aviation University (NAU). Today, it hosts about 30 thousand of students and more than 5 thousand of employees. Employees and students are constantly faced with the growing variety of information resources that are needed for learning and research.

An increase in the number of resources increases the amount and complexity of the search, collection, processing and analysis of information. Just now, the funds of NAU library have accounted hundreds of thousands of documents, full-text electronic publications, databases, therefore search and order of literature are becoming increasingly complex operations for students and scholars.

Electronic documents search systems, electronic ordering systems, virtual bibliographic references and other applications [1-7] come to the aid, but another arising problem is the lack of fast and effective communication as well as possibility of collaborative work with documents. One of the solutions to problems mentioned above is restructuring of the IT environment and the introduction of cloud services to streamline and centralize the university's information space [8]. It allows establishment of effective interaction in educational process as well as reduction of the IT maintenance cost in a whole. At the same time, it is crucial to retain all existing software and systems and integrate them into a single environment [8].

DEVELOPMENT.

Current state of information support.

Currently, NAU has an imminent need in creation of centralized and well-organized informational environment distributed across all structural units of an educational institution. The obstacles to efficient work in this distributed environment are the lack of a unified user directory and its cross-validation, the lack of accounts for most employees in a unified e-mail system, and therefore, in the corporate address book [9,10]. Moreover, the university has no means of collaborative documents work, and systems of document circulation in different departments are different as well. All this complicates management and administration of network and applications with shared access. Hardware, due to duplication of functions, is also used inefficiently.

The task of the Information and Computing Center is to provide students and professors with effective means of communication and collaboration. Existing infrastructure is not sufficient for reaching those goals. Therefore, few software and hardware means that could handle such a task are to be considered. The solution must be perfectly integrated with the existing infrastructure and require no high-skilled personnel to support.

Few factors must be considered during realization of the task:

- Initiatives of leading world companies (for example, Microsoft) developed for the educational segment (cheap licenses for universities, free usage of cloud services etc.).

- The economic component (minimizing the cost of software licenses used in university for the PC maintenance, existing workflows of working with documents and the cost of hardware resources (computers, servers) acquiring, information kiosks that will provide access).

- Degree of products' popularity (penetration).

- Degree of user convenience.

- Level and quality of the service provided.

- Opportunity and prospects for further development of the software product.

- Availability and quality of decision-making documentation.

- Availability and quality of technical support, auxiliary resources.

Solution of environment creation problem.

There are several options for solution of the problem. To create a modern informational and educational environment, deployment of two communication environments - a closed environment for NAU staff and opened - for students (Fig. 1) is proposed. Access to the resources of both environments is regulated by means of IDS (Employee ID or Student ID) – unified identification system of NAU. The ID can be used as an ID number of the employee's access card or student ticket number [6,9].

In a closed environment designed for employees there are information systems necessary for the functioning of the NAU and the databases of these systems must operate – the document management system DeloPro, the accounting system 1C, the tax reporting system MEDOC, the library system UFD library, system for search of legislative acts - League-Law, Auditorium Load Management System, NAU corporate email, Contacts Book, system of NAU documentation inter-change SharePoint Online, anti-plagiarism system and other resources.
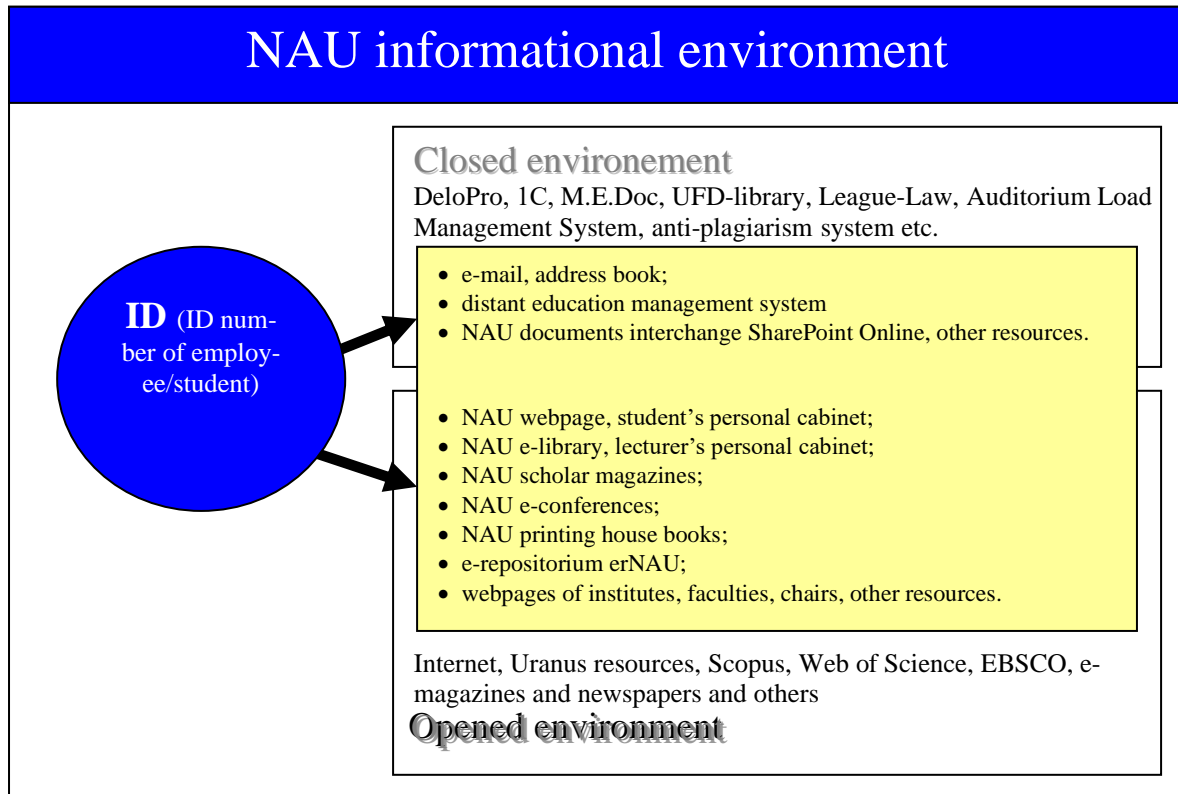
Fig. 1. Project of two communicational environments – closed environment for NAU employees and opened one for students.

In the opened environment designed for students (Fig. 1,2) it is proposed to use systems and databases based on web technologies. First of all, NAU webpage and the systems providing access to full-text scientific and educational resources - the system of distance learning management http://moodle.nau.edu.ua/ [9], e-repositorium erNAU http://er.nau.edu.ua/ [5], NAU e-library http://www.lib.nau.edu.ua/search/ [2-4], NAU scholars' magazines http://jrnl.nau.edu.ua/ [12], NAU e-conferences [3] http://conference.nau.edu.ua/, books of NAU publishing house http://omp.nau.edu.ua/, NAU harvester, which provides search among scientific resources of NAU http://ohs.nau.edu.ua/, sites of institutes, faculties, chairs etc. (Fig. 2).
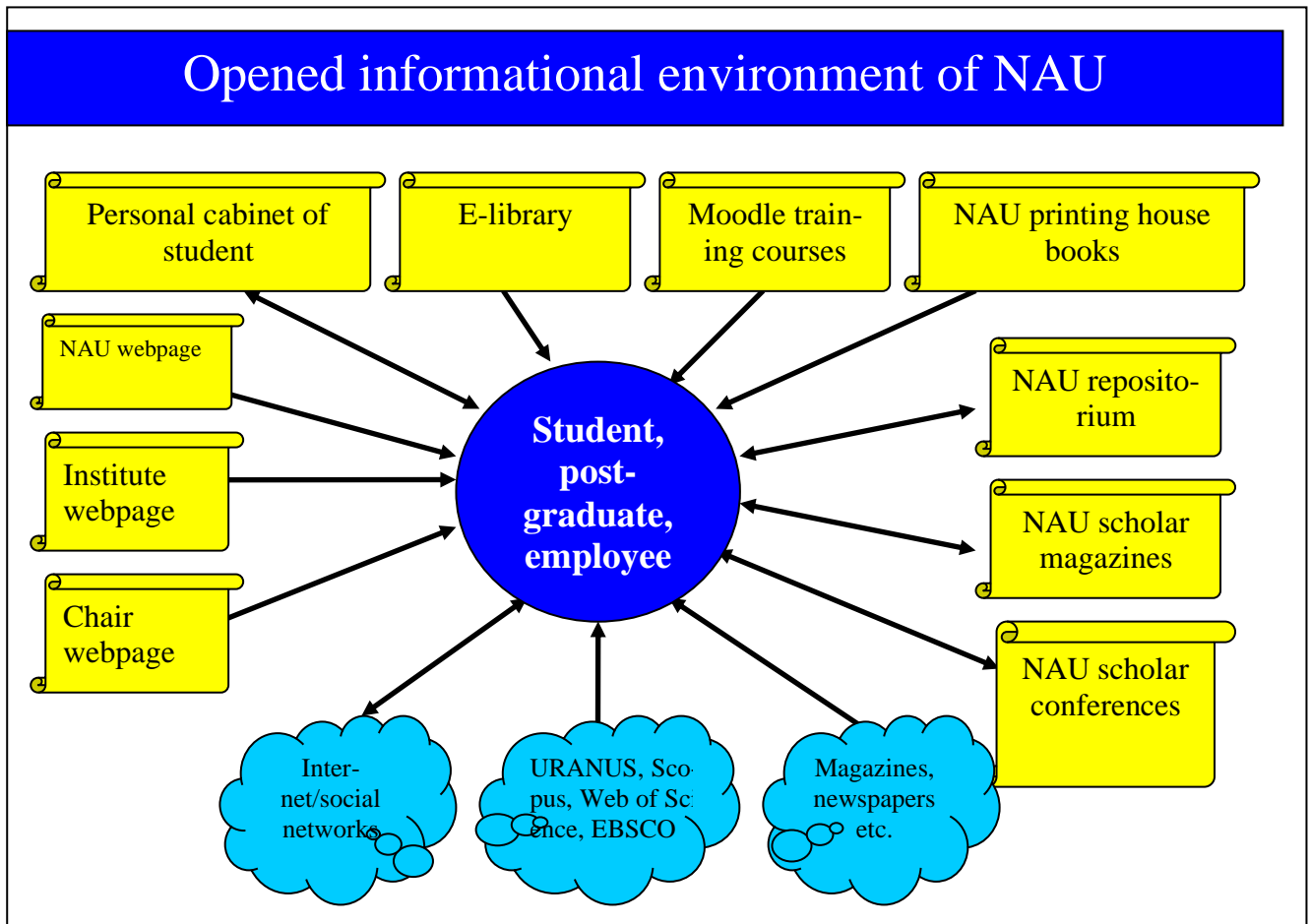
Fig. 2. Project of opened communicational environment for NAU students and post-graduates

The opened environment (Fig. 2) must also include Internet, social networks, resources of the Uranium educational network, databases and full-text resources subscribed by NAU. Scopus, Web of Science, EBSCO, a full text base of the Center for Educational Literature (CSL), electronic newspapers and magazines must be listed among them. [7,13].

All sites should be connected through IDS cross-authentication to prevent unauthorized access to adding and editing functionalities on these resources. The same authentication system should be used at the NAU entry check points (turnstiles), in the library (control of the books issuance) and all departments dealing with material values.

It is very important to synchronize sites with leading search engines, science-based systems and social networks, as well as provide support for material classification systems (for example, DOI). Due to the increase of the above-mentioned sites share, global NAU Internet presence and, as a result, Webometrics, Shanghai ratings and others ratings would be increased as well [11-13].

To access the opened environment, besides the computer classes in educational buildings and NAU library, it is suggested to use Wi-Fi access points (preferably with roaming functionality) and "information booths" - computer terminals with anti-vandal corps that will be installed in halls of educational buildings. And all "private" points must either be transferred to the general network, or be closed.

To access an open Wi-Fi network, the system must identify the user, while using a single transparent identification system which will require the user to be identified only once, and after-wards the same ID to be used to log on to all open source NAU systems. As add-ons to computer classes and Wi-Fi access points, terminals must be installed in the library departments and in educational buildings of NAU (Fig. 3) to work with library's electronic catalogs, book ordering and reaching out to other NAU information services. Additional paid services provided by NAU information systems could also be reached via those terminals. Such terminals are equipped with systems capable of working with RFID tags and bar codes printed in student documents.

Both opened and closed environments must be available to NAU staff to work together. Google Docs [8], commercial MS Office 365, or in-house system developed by NAU Information and Computing Center (Fig. 4) may be considered as the possible main tools for collaboration and exchange of e-mails. From a technical point of view, Microsoft Office 365 solution could be pre-ferred considering effective integration of with Active Directory Domain Name Service and that MS Windows and Microsoft Office are widely used in NAU.

Another important factor is the availability of a communication program Lync Online included in the package. It provides not only the support of instant messaging, but also video and audio calls, organization of conferences (including video conferencing), ability to share your desktop to call participants, joint drawing, presentation functionality, file sharing etc. [8].
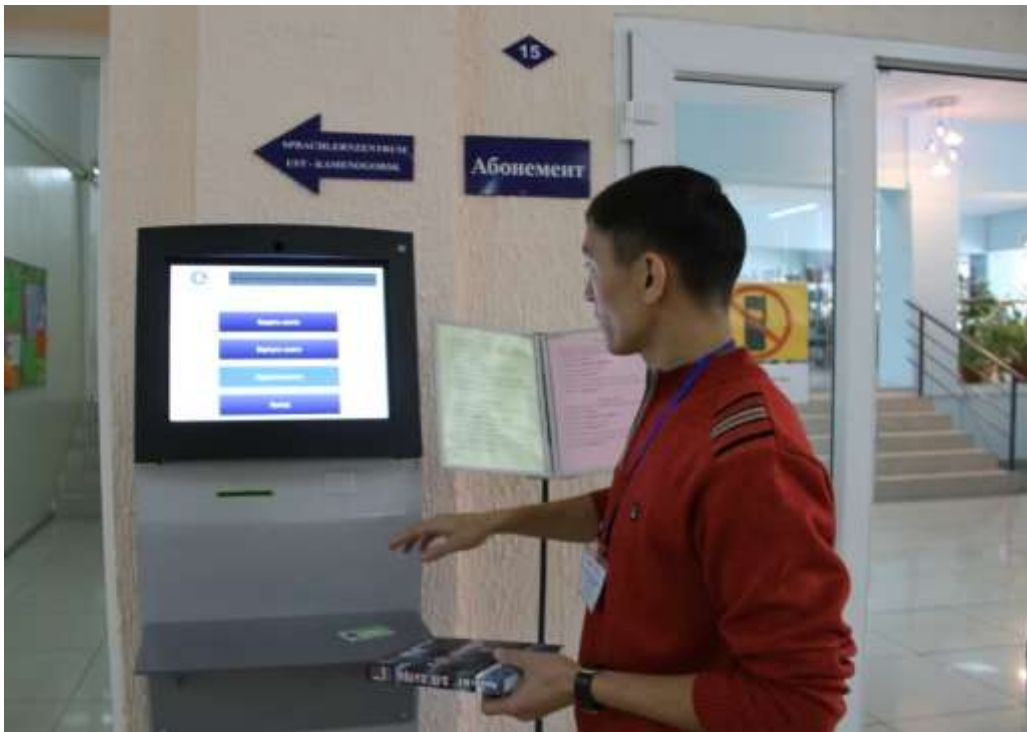
Fig. 3. Usage of information terminal.

Very important factor for successful operation of all NAU information systems is the implementation of IDS (Employee ID or Student ID) - a unified identification system. IDS will not only simplify the identification in the university, but also provide a single means of access to NAU computer systems, administration buildings, dormitories, library and other.

System could be created on a basis of Lightweight Directory Access Protocol (LDAP) technology, or by creating and configuring ADDS (Active Directory) - Microsoft technology. The introduction of technology will allow each user to be identified with consideration of individual access permissions, to manage rights for e-mail and NAU information systems usage, to gather the information about the user in the general address book of NAU and to receive personal access to all IT services of the university. Also such a system, due to user monitoring, will make obsolete current processes of dismissal in NAU.
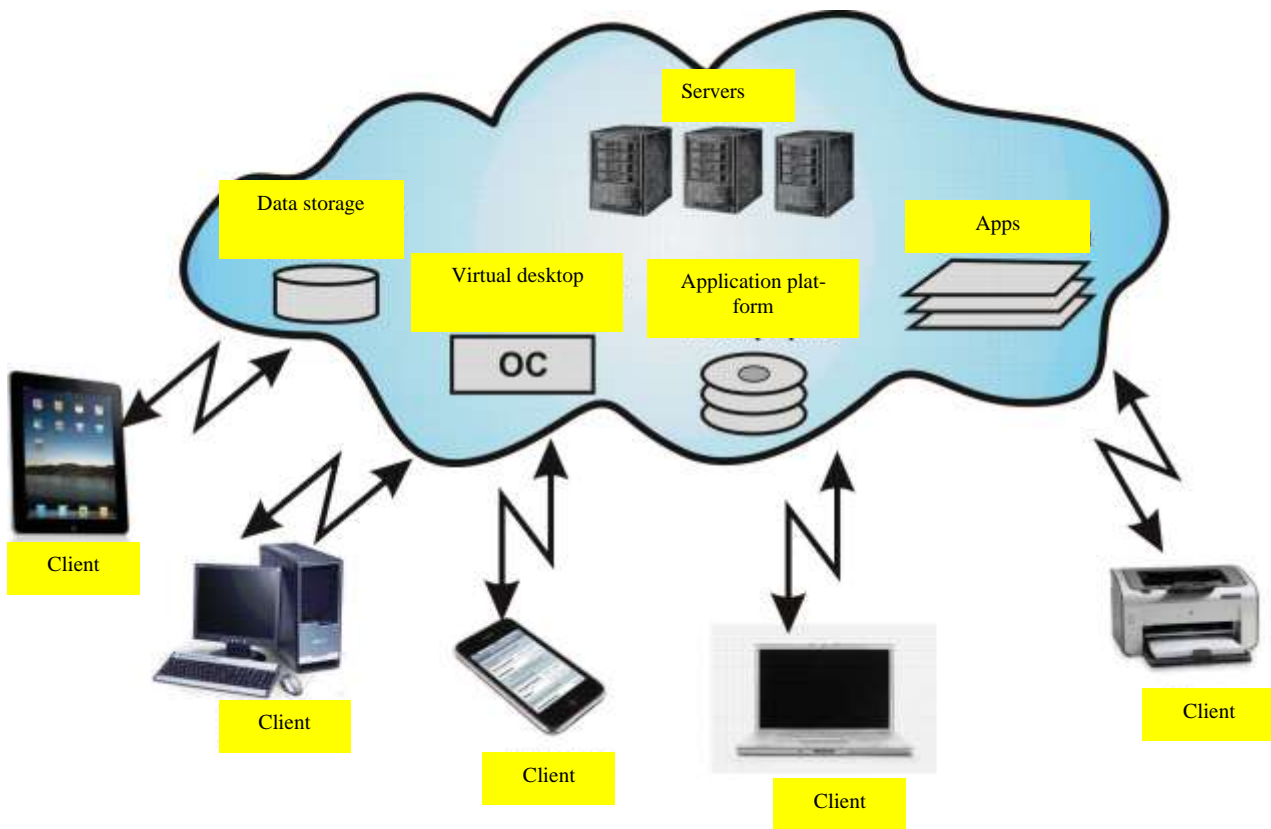
Fig. 4. Project of cloud technologies usage in NAU.

In case if Active Directory Domain Service (ADDS) would be implemented, it would become possible to make the most of the Microsoft Office 365 package, which is a Software-as-a-Service (SaaS) cloud-based software. Active Directory Federation Services (AD FS) may be used to interact with user logins, e-mail, and system accounts to create an expandable, secure, and scalable environment for managing user authentication and user permissions, as well as Microsoft DirSync for synchronization of all users, contacts and groups with email addresses. Therefore, NAU will receive an effective tool for interaction and exchange of information, which allows to organize educational process more effectively. In addition, the introduction of cloud technology will significantly reduce the cost of university's IT infrastructure maintenance, as well as to provide the optimization of the time spent by staff and students, and would guarantee the following functions:

• Email and calendars on basis of Exchange Online.

• Possibility of Office Web Apps usage for creation, edition and storage of documents in cloud.

• Audio and video calls as well as instant messaging with Lync Online.

• File exchange (SharePoint Online).

Microsoft Office 365 system provides solution to all the major educational tasks of a major university, providing students and teachers with possibility to create, store, modify, share information, access to it from any Internet-connected device anytime and anywhere.

CONCLUSIONS.

Due to integration of existing systems and deployment of new cloud technologies, NAU would receive innovative tool for interaction and information exchange, that will lead to more effective organization of educational process. The deployment of modern cloud services and their integration to the existing NAU infrastructure would create a unified educational information space, with a high degree of protection and reliability, and, moreover, will bring educational and administrative processes in university closer to the world's modern trends based on individualization, team work, and efficiency of work with information. Free services, corporate tools of future employers, full-scoped administrative access and many other advantages of the upgraded NAU infrastructure - it's not just a look into the future, but the future in the walls of NAU.

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