МІНІСТЕРСТВО ОСВІТИ І НАУКИ УКРАЇНИ
ХАРКІВСЬКИЙ НАЦІОНАЛЬНИЙ УНІВЕРСИТЕТ
ІМЕНІ В. Н. КАРАЗІНА

ІТ-ПРОСТІР СЬОГОДЕННЯ: ТЕНДЕНЦІЇ, ІННОВАЦІЇ ТА ПЕРСПЕКТИВИ РОЗВИТКУ

Збірник тез доповідей
III Міжнародної науково-практичної студентської конференції

(21 жовтня 2026 року, м. Харків, Україна)

Електронний ресурс

Харків – 2026

УДК 338.46:004](063)
І-70

Реєстраційне посвідчення УкрІНТЕІ МОН України
(№ 761 від 09 грудня 2024 р.)

Затверджено до розміщення в мережі Інтернет рішенням Вченої ради Харківського національного університету імені В. Н. Каразіна

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І-70 ІТ-простір сьогодення: тенденції, інновації та перспективи розвитку: збірник тез доповідей ІІІ Міжнародної науково-практичної студентської конференції (21 жовтня 2026 року, м. Харків, Україна) [Електронний ресурс]. – Харків : ХНУ імені В. Н. Каразіна, 2026. – 1 ел. опт. диск (CD-ROM). – Систем. вимоги: Процесор Pentium-класса ; ОС Windows 7/10 ; дисковод CD-ROM; Acrobat Reader 10. – 524 с.

У збірнику представлені тези доповідей учасників ІІ Міжнародної науково-практичної студентської конференції на загальну тему «ІТ-простір сьогодення: тенденції, інновації та перспективи розвитку».

Для студентів, аспірантів, науковців вищих навчальних закладів. Матеріали подано в авторській редакції. Відповідальність за зміст і оформлення матеріалів несуть автори.

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УДК 338.46:004](063)

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MINISTRY OF EDUCATION AND SCIENCE
OF UKRAINE
V. N. KARAZIN KHARKIV NATIONAL UNIVERSITY

IT-SPACE OF TODAY: TRENDS, INNOVATIONS AND DEVELOPMENT PROSPECTS

Collection of abstracts
of the II International Scientific and Practical
Student Conference

(October 21, 2026, Kharkiv, Ukraine)

Electronic resource

Kharkiv – 2026

UDC 338.46:004](063)
I-70

Registration certificate of UkrINTEI of the Ministry of Education and Science of Ukraine
(No. 761 dated December 09, 2024)

Approved for publication on the Internet by the decision of the Academic Council of V. N. Karazin Kharkiv National University

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I-70 IT space of today: trends, innovations and development prospects: a collection of abstracts of the II International Scientific and Practical Student Conference (October 21, 2026, Kharkiv, Ukraine) [Electronic resource]: V. N. Karazin Kharkiv National University, 2026. 1 electronic disk (CD-ROM). – System requirements: Pentium-class processor; OC Windows 7/10; CD-ROM drive; Acrobat Reader 10. – 524 p.

The collection presents abstracts of the participants of the II International Scientific and Practical Student Conference on the general topic "IT Space of Today: Trends, Innovations and Development Prospects".

For students, postgraduates, and researchers of higher education institutions. The materials are presented in the author's edition. The authors are responsible for the content and design of the materials.

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UDC 338.46:004](063)

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UDC 621.317

Skorin Yuriy
Candidate of Technical Sciences, Associate Professor
Kharkiv National Economic University. S. Kuznets, Ukraine
Mizyak Denys
Student
Kharkiv National Economic University S. Kuznets, Ukraine

ANALYSIS OF APPROACHES TO THE CONSTRUCTION OF ELECTRONIC DOCUMENT MANAGEMENT SYSTEMS

The purpose of the study is to conduct a comprehensive analysis of modern architectural approaches to the creation of electronic document management systems (EDMS), aimed at further optimization of the corporate IT infrastructure of enterprises. The result of the study is the development of a comprehensive methodology for evaluating market platforms, taking into account the criterion nomenclature. The proposed methodology allows us to quantitatively prove that the implementation of cloud microservice architecture in comparison with monolithic solutions makes it possible to optimize the used hardware resources during peak loads and reduce the overall costs of document processing.

The acceleration of digital transformation of management processes and the significant rapid growth of corporate information create fundamentally new problems for the IT industry. The architecture of electronic document management systems has evolved from local isolated file storages to large distributed ecosystems. This revealed that traditional approaches to the development of content management systems show their technical inability when processing large amounts of data (Big Data), and this also applies to issues of ensuring fault tolerance.

The use of cloud-native and microservice models is now an indisputable technical imperative. The correct selection and integration of the architectural design of EDMS directly ensures the economic profitability of an institution or enterprise, ensures sustainable security of trade secrets, and is a guarantee of rapid adaptation to regulatory changes. The paradigm shift in the regulatory framework of Ukraine necessitates an in-depth analysis of existing market solutions, as well as approaches to their construction.

The Law of Ukraine "On Electronic Trust Services" and its harmonization with European eIDAS standards provide for a completely different level of cryptographic protection and comprehensive integration with external registers of information systems.

Modern EDMS is not just a tool for registering incoming correspondence, but is a rather complex integration platform that requires a much more thorough engineering analysis before implementation in order to avoid significant financial problems due to the wrong choice of technology stack.

The scope of the research covers a number of subject areas, such as software engineering, system analysis of information technologies, database design and information protection in corporate networks.

The object of the study is information processes related to electronic document management, both in corporate and government ecosystems.

The subject of the study is the developed architectural solutions, data storage technologies and cryptographic protection algorithms in modern electronic document management systems.

The purpose of the work is to create and apply a comprehensive methodology for choosing the EDMS architecture. This will allow the client organization to significantly optimize document routing processes, as well as achieve comprehensive legal compliance with the standards of electronic trust services and a quantitative reduction in the total cost of IT infrastructure ownership as a result of the implementation of the developed system.

To achieve this goal, you need to complete the following tasks: to analyze the problems and evolution of approaches to the development of electronic document management systems; to analyze the mechanisms for ensuring cryptographic protection and regulatory requirements for electronic trust services; to investigate the theoretical and methodological foundations of designing the architecture and databases of modern EDMS, to develop appropriate UML models; to form a system of criteria and conduct a comparative analysis of leading market solutions (Megapolis.DocNet, FossDoc, ASCOD, etc.); to assess the economic and operational efficiency of the implementation of the selected platforms in the context of digital transformation. As a methodological basis for evaluating information systems, methods of system and comparative analysis were chosen.

In order to formalize business processes, as well as to reflect architectural relationships, object-oriented modeling methods were used, i.e. a unified UML modeling language. In order to assess efficiency, qualification methods and methods for analyzing technical and economic indicators were applied.

The scientific novelty of the obtained research results lies in the systematization of architectural templates of modern EDMS, taking into account the latest modern requirements of the subject area.

A comprehensive matrix of criteria for evaluating modern market platforms for electronic document management was formed, which combines technological aspects, security, as well as encryption standards and integration with the parameters of the state register.

The comparative analysis carried out and the results achieved are of a fairly high applied value. The scope of use of the research results is not limited to IT departments of enterprises and government agencies, they can be used as a ready-made methodological guideline for the selection, design and implementation of an optimal electronic document management system that can significantly reduce operating costs and minimize the risks of information leakage.

A comprehensive analytical and engineering study conducted in the work is able to fully confirm the scientific hypothesis about the irreversibility of the technological evolution of electronic document management systems.

The achieved results prove the feasibility of the industry's undeniable transition from outdated local monolithic storage to distributed, microservice and intelligent cloud ecosystems.

The theoretical analysis of the problem under study showed that the existing rigid monolithic IT systems today have turned into an infrastructure bottleneck that prevents the scaling of large corporations and government agencies.

The study of deployment models confirmed that the most economical strategy for most modern enterprises is to migrate microservices EDM to a private or public cloud (Private Cloud / SaaS).

This solution makes it possible to transfer quite significant capital expenditures (CAPEX) for the purchase of servers to flexible operating costs (OPEX) and ensures unprecedented system availability. The study also proved that for critical infrastructure facilities, it is the deployment (On-Premise) in their own local data center that is the only legal compromise required to pass the CISS certification.

The economic case for practical implementation (ROI and TCO analysis) also confirms the significant effectiveness of the presented methodology. A quantitative analysis of the results showed that the transition to multi-threaded electronic routing and the implementation of high-speed NoSQL search can accelerate the document lifecycle by 85% (from 120 to 18 hours) and reduce the time of access to files to 2-3 seconds.

The optimization of hardware resources due to the use of microservices will significantly reduce the peak load on processors (by 42%). In addition, the rejection of physical paper and the use of legacy local servers reduces direct operating costs (OPEX) by 77.2% per transaction, which guarantees the full return from the implementation of a comprehensive platform within 12-18 months. In conclusion, it should be emphasized that all the planned tasks have been fully completed, that is, the global goal of the study has been achieved.

A modern electronic document management system has been developed, which is built on the basis of cloud microservices with cryptographic integration, it is the main tool for ensuring business continuity, operational stability, undeniable legal legitimacy of transactions and strategic competitive advantage of the organization in the digital age.

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Електронне наукове видання
комбінованого використання
Можна використовувати в локальному та мережному режимах

ІТ-ПРОСТІР СЬОГОДЕННЯ: ТЕНДЕНЦІЇ, ІННОВАЦІЇ ТА ПЕРСПЕКТИВИ РОЗВИТКУ

Збірник тез доповідей
ІІІ Міжнародної науково-практичної студентської конференції

(21 жовтня 2026 року, м. Харків, Україна)

Матеріали подаються в авторській редакції

Формат 60×84/8. Гарнітура Таймс.
Обл.-вид. арк 26,73 Умовн. друк. арк. 21,38

Системні вимоги:
Процесор Pentium-класса; ОС Windows 7/10;
дисковод CD-ROM; Acrobat Reader 10.
Об'єм даних 16,4 Мб. Замовлення № 113/23.

Харківський національний університет імені В. Н. Каразіна,
м. Харків, 61022, майдан Свободи, 4.
Свідоцтво суб'єкта видавничої справи ДК No 3367 від 13.01.2009 р.