

Bohdan OHORODNIK
Svitlana PIDUBCHAK

PROSPECTS AND OPPORTUNITIES FOR CLOUD AND SERVERLESS COMPUTING FOR BANKING SERVICES

Vinnytsia National Technical University

Анотація

Інформаційна революція щороку набуває все більших обертів, змушуючи всі індустрії – від найбільших до найменших – змінювати існуючу інфраструктуру інформаційних технологій і звертатися до останніх можливостей видобутку, обробки та зберігання інформації. Серед переліку найбільш трансформативних цифрових рішень перші місця посідають хмарні технології.

Ключові слова: Хмарні технології, Безсерверні обчислення, Банківські сервіси, Інформаційна інфраструктура, Безпека даних, Масштабованість, Фінансові установи, IaaS, PaaS, SaaS, FaaS, Amazon Web Services (AWS), Microsoft Azure, Google Cloud Platform (GCP), Банки часу.

Abstract

The information revolution is gaining momentum every year, forcing all industries – from the largest to the smallest – to change their existing information technology infrastructure and turn to the latest opportunities for information extraction, processing, and storage. Among the list of the most transformative digital solutions, cloud technologies occupy the top positions.

Key words: Cloud technologies, Serverless computing, Banking services, Information infrastructure, Data security, Scalability, Financial institutions, IaaS, PaaS, SaaS, FaaS, Amazon Web Services (AWS), Microsoft Azure, Google Cloud Platform (GCP), Time banks.

The term "cloud computing" today is not surprising as we encounter some form of cloud every day. Cloud technologies offer scalable infrastructure and software tools without being tied to physical machines [1]. Virtualisation has made it possible to combine Internet servers into single clusters with huge computing power. Such unified networks provide computing services on-demand, so from a user's point of view, the resources in the cloud can be infinitely expanded.

The banking sector is not the least among those that need to transform their existing information infrastructure. The introduction of cloud computing technologies will allow the industry's financial institutions to increase efficiency of using the banking systems with a significant reduction in the cost of maintaining and managing traditional information infrastructure. If we classify the types of software applications used in banking structures according to the criterion of significant differences in the requirements for these information services, we can distinguish the following groups of banking information systems:

- electronic payment systems of various levels (state; international; time banks);
- internal corporate information systems of banking institutions;
- systems for managing remote payment terminals and supporting plastic card (ATMs, POS), processing terminals etc.;
- services for remote management of bank accounts of legal entities and individuals. [2]

All of these services have quite different business requirements, but they have a common set of non-functional requirements and requirements imposed by regulators in this sector of the economy, requirements dictated by competition in this segment of the global economy. [3]

Given that banking organisations of any type process and store personal data, confidentiality becomes one of the critical factors when choosing an information model infrastructure. Banking operations with money also require special attention from cloud service providers to ensure proper information protection.

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Given that banking organisations of any type process and store personal data, confidentiality becomes one of the critical factors when choosing an information model infrastructure. Banking operations with foreign exchange also require special attention from cloud service providers to ensure proper data protection. The general requirements for cloud providers can be summarised as follows:

- Ensuring the security of banking information infrastructures in accordance with applicable law;
- ensuring the confidentiality of client data;
- ensuring data integrity and preventing unauthorised persons or software applications from making changes to banking data;
- Ensuring access control and security interaction between information infrastructure components.

In addition to traditional transactions with conventional currencies, there are transactions with alternative currencies. Time can be used as a form of money in certain economic models, where its value is defined by units of time, like person-hours or other agreed-upon credits. Banks that use time credits as a currency are called time banks or time banks. The philosophy of time banking is to operate with services instead of traditional money. Time banking is not the same as barter. Barter in the classical sense implies an equal exchange. In time banks, on the other hand, a time currency is credited to the account after the service is provided, which can be used later, i.e. time credits circulate in time banks in the same way as cash or non-cash money in a classical economy. [5]

Let's look at the services that provide cloud computing.

- **IaaS** (Infrastructure as a service) - cloud platforms that allow users to manage the operating system, software, and information processing and storage independently.tools
- **PaaS** (Platform as a service) - cloud-based platforms with a full set of necessary middleware and auxiliary software (e.g., a DBMS, a framework, a service).
- **SaaS** (Software as a service) is a business application that is ready for use: the client interacts with the application, while the provider handles the basic settings.

The main reason for the popularity and promising future of cloud computing is that cloud technologies are extremely cost-effective. Cloud computing includes such services as the provision of computing power, data storage, the creation of networks and information structures and the provision of analytics. [6]

The giant cloud service providers include Amazon Web Services, Microsoft Azure and Google Cloud Platform. The dominant position in the market is undoubtedly occupied by AWS, which actually has become a pioneer in the field of cloud computing services. Among the disadvantages are the cost of services and the complexity of the system for beginners. Amazon Web Services Azure offers a wide range of services and integration with other Microsoft tools and software, but it puts users off by the lack of clear and understandable documentation and the complexity of managing the cloud system. Google Cloud Platform is gaining popularity like never before due to the ease of integrating cloud services into existing projects and supporting businesses that are natively built on cloud technologies. GCP offers a wide range of tools for working with cloud computing, while pleasing users with cost-effectiveness of its packages, making them the best choice for start-up businesses.

In addition to the services IaaS, PaaS, and SaaS discussed above, the largest providers offer a separate cloud service called serverless computing. The term serverless does not imply the absence of physical servers. Serverless means that there is no need to think about servers. The provider is fully responsible for setting up, scaling and managing the server.

Serverless computing is a new model of cloud computing, now known as FaaS - Function as a service. When using the FaaS model, developers can focus on creating a quality product without

worrying about the server maintenance. Services like AWS Lambda, Azure Functions, and Google Cloud Functions are examples of serverless computing solutions developed by leading cloud providers.

Serverless computing is the most attractive solution for time banks. Since a time bank can actually be considered a social network with special functionality, there is no urgent need to set up a server from scratch and then install special software, and easy scalability to meet the needs of the bank becomes a significant advantage over traditional cloud services, as the number of users of the social network tends to grow much faster than the number of customers in the bank. The above characteristics of cloud computing are attracting the attention of many industries, including banking.

The cloud is a favourable solution for banks because it can provide fast computing of large amounts of data, ensure its security and easily scale to the needs of financial institutions. Cloud maintenance is more cost-effective than traditional information infrastructure maintenance, and you pay only for the resources and services consumed. So what are the prospects for using cloud computing in banking? The combination of advanced data analytics and cloud computing will allow banks to quickly extract valuable insights from huge amounts of data. Cloud services have an undeniable advantage in terms of data processing speed, quality of analysis and scalability as needed. The cloud is more reliable than traditional information structures and does not have their disadvantages. Cloud computing solutions maximize the maintenance and use of information infrastructure for financial institutions to the extent. The use of cloud technologies significantly increases efficiency of the bank's operations and interaction with customers, as the speed of service is not limited by the capacity of individual bank branches.

Some banks are already choosing to move to cloud computing. Among them is the Australian bank Westpac, which is one of the four largest. Westpac has announced the integration of the latest cloud technologies into its existing infrastructure and a gradual transition to cloud computing. The announcement of such a "cloud strategy" by the giant bank should motivate other banks around the world to move to the cloud infrastructure mode.

Thus, the advantages of cloud have been considered serverless computing and the prospects for their use in the banking sector have been highlighted. The potential for integrating cloud technologies into the banking sector is inexhaustible. Already today, the gradual introduction of cloud services into existing information infrastructures will yield significant results in improving the efficiency of banks, reducing the cost of server maintenance and the speed of customer service and the provision of banking services. With regard to cloud service providers, most efforts to engage banks in the transition to a cloud-based model of information infrastructure should be focused on improving data and computing security, compliance with existing legislation, and ensuring data confidentiality and integrity [7].

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Information about authors **Bohdan Ohorodnik** – student of group 2KN-23b, faculty of intellectual information technologies and automation, Vinnytsia National Technical University, Vinnytsia, e-mail: ogorodnikbogdan047@gmail.com

Supervisor: **Svitlana Y. Piddubchak** – a teacher of English, Foreign Languages Department, Vinnytsia National Technical University, Vinnytsia, e-mail: piddubchak@vntu.edu.ua

Відомості про авторів **Огороднік Богдан** – студент групи 2КН-23б, факультету інтелектуальних інформаційних технологій та автоматизації, Вінницький національний технічний університет, Вінниця, e-mail: ogorodnikbogdan047@gmail.com

Науковий керівник: **Піддубчак Світлана Юріївна** – викладач кафедри іноземних мов, Вінницький національний технічний університет, м. Вінниця, e-mail: piddubchak@vntu.edu.ua