JOURNAL OF APPLIED SCIENCE AND SOCIAL SCIENCE
eISSN 2229-3113 pISSN 2229-3205
Volume 15 Issue 03, March 2025
Impact factor: 2019: 4.679 2020: 5.015 2021: 5.436, 2022: 5.242, 2023: 6.995, 2024 7.75

MODERN TRENDS AND TECHNOLOGIES IN THE DEVELOPMENT OF CORPORATE WEB APPLICATIONS

Karimov I.S.
Master's student, Bukhara State University
Supervisor: ***Kasimov F.F.***
Associate Professor of Applied Mathematics and Computer Science, Bukhara State University

Annotation: This article explores the latest trends and technologies shaping the development of corporate web applications. It covers key advancements such as cloud-native development, progressive web apps (PWAs), artificial intelligence (AI) and machine learning (ML) integration, microservices architecture, serverless computing, mobile-first design, and API-first development. Additionally, the article highlights the growing importance of security and privacy by design, emphasizing the need for businesses to create scalable, efficient, and secure web applications to stay competitive in the digital age. By understanding these trends, organizations can enhance their web application strategies and improve user experience, performance, and operational efficiency.
Keywords: corporate web applications, cloud-native development, progressive web apps, artificial intelligence (AI), machine learning (ML), microservices architecture, serverless computing, mobile-first development, web application trends, digital transformation.

Introduction. In recent years, corporate web applications have become indispensable tools for businesses, serving as platforms to streamline operations, enhance productivity, and improve customer experiences. As organizations increasingly adopt digital transformation strategies, the development of web applications has evolved significantly. Emerging trends and technologies are reshaping how these applications are built, deployed, and maintained. This article explores the current trends and technologies that are defining the development of corporate web applications. As our projects start to grow, managing them becomes increasingly difficult, especially when the components of the system are tightly coupled. This can cause puzzles and scalability issues. Today, we'll talk about two popular approaches to application architecture: monolithic architecture and microservices . Each has its pros and cons, and the choice of approach can depend on a variety of factors, including the size and goals of your project.

Materials and methods. The development of corporate web applications is being driven by several emerging trends and technologies, from cloud-native development and progressive web apps to the integration of AI, microservices, and serverless computing. These innovations provide businesses with the tools to create more scalable, efficient, and secure applications, enabling them to stay competitive in an increasingly digital world. As technology continues to evolve, staying abreast of these trends will be key for businesses looking to leverage web applications to their full potential. As data breaches and cyberattacks continue to rise, security and privacy have become top priorities in corporate web application development. The concept of "security and privacy by design" involves incorporating robust security measures and data protection practices into the development lifecycle from the very beginning.

- Encryption: Ensuring that sensitive data is encrypted both in transit and at rest.

JOURNAL OF APPLIED SCIENCE AND SOCIAL SCIENCE
eISSN 2229-3113 pISSN 2229-3205
Volume 15 Issue 03, March 2025
Impact factor: 2019: 4.679 2020: 5.015 2021: 5.436, 2022: 5.242, 2023: 6.995, 2024 7.75

- Authentication and Authorization: Implementing strong authentication protocols such as multi-factor authentication (MFA) and role-based access control (RBAC).
- Regular Audits and Testing: Continuously testing and auditing web applications to identify vulnerabilities and address them before they can be exploited.

Microservice architecture is a modern approach to software development in which an application is broken down into many small, autonomous services, each responsible for its own specific business function. These services can be developed, deployed, and scaled independently of each other.

Key characteristics of microservice architecture:

1. **Independent deployment:** Each microservice can be deployed separately from others, making it easy to update and implement new features.
2. **Decentralized management data:** Each service can have its own database, which allows you to choose the optimal data storage for each specific task.
3. **Weak coupling:** Microservices interact with each other through well-defined APIs, which reduces the dependencies between them.
4. **Scalability:** Each microservice can be scaled independently based on needs.
5. **Diversity of technologies :** For each microservice , you can choose the most suitable technologies and tools.

Benefits of Microservice Architecture	**Disadvantages of Microservice Architecture**
Improved scalability	Increased complexity
Speed of development	Network latency
Increased stability	Difficulties in ensuring data consistency
Flexibility in choosing technologies	Infrastructure requirements
Improved support and upgrades	Difficulties with testing

Microservices architecture is especially useful for large, complex applications that require high scalability and flexibility. This approach is great for organizations that actively use DevOps and continuous delivery practices, as well as for teams with experience working with distributed systems.

Example of microservice architecture:

JOURNAL OF APPLIED SCIENCE AND SOCIAL SCIENCE
eISSN 2229-3113 pISSN 2229-3205
Volume 15 Issue 03, March 2025
Impact factor: 2019: 4.679 2020: 5.015 2021: 5.436, 2022: 5.242, 2023: 6.995, 2024 7.75

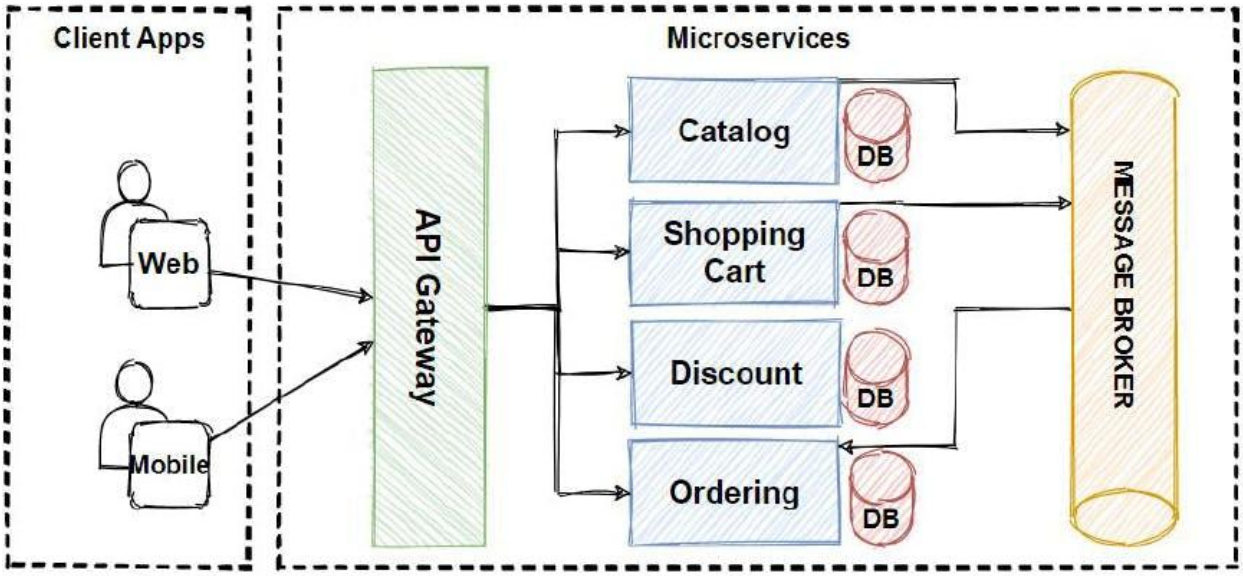

Figure 1. Imagine an online store. Such a system may have the following microservices

- User Service : Manages registration, authentication and user profiles.
- Product Service : Responsible for the product catalog, their characteristics and availability.
- Order Service : Manages customer orders and their statuses.
- Payment service : Processes payments.
- Delivery service : Manages logistics and tracking of shipments.

Each of these services can be developed, deployed and scaled independently, allowing the online store to be more flexible and resilient to changes and loads. Microservice architecture is a powerful tool for developing scalable and resilient applications. When used correctly, this approach can greatly improve your projects and make them easier to manage. Microservice architecture is actively used by many well-known companies that have successfully implemented it to improve the flexibility, scalability, and resilience of their applications. Here are some examples:

Yandex
Uber LinkedIn
amazon Spotify

JOURNAL OF APPLIED SCIENCE AND SOCIAL SCIENCE
eISSN 2229-3113 pISSN 2229-3205
Volume 15 Issue 03, March 2025
Impact factor: 2019: 4.679 2020: 5.015 2021: 5.436, 2022: 5.242, 2023: 6.995, 2024 7.75

These companies have shown that microservices architecture can significantly improve the flexibility, scalability, and resilience of applications, allowing them to respond more quickly to change and improve user experience. Monolithic architecture is a traditional approach to software development in which all components of an application are combined into a single unit. In such an architecture, all application functions, from the user interface to business logic and data access, are in a single code base and are deployed as a single unit.

The main characteristics of monolithic architecture:

1. Single code base: All application functionality is concentrated in one place, making code management easier.
2. Tight coupling: The components of the system are tightly coupled to each other, which can make changes difficult.
3. Centralized data management : Typically one database is used for the entire application.
4. Single deployment: All parts of the application are deployed at the same time.

Advantages of Monolithic Architecture	**Disadvantages of Monolithic Architecture**
Ease of development	Difficulty of scaling
Performance	Limited flexibility
Unified management	Long deployment cycles
Simplified deployment	Limited technology

When to use a monolithic architecture. Monolithic architecture is particularly suitable for small and medium-sized applications where ease of development and management is more important than flexibility and scalability. It can also be a good choice for startups and MVPs (Minimum Viable Product), where speed to market is critical and architectural complexities must be kept to a minimum.

Example of monolithic architecture:

JOURNAL OF APPLIED SCIENCE AND SOCIAL SCIENCE
eISSN 2229-3113 pISSN 2229-3205
Volume 15 Issue 03, March 2025
Impact factor: 2019: 4.679 2020: 5.015 2021: 5.436, 2022: 5.242, 2023: 6.995, 2024 7.75

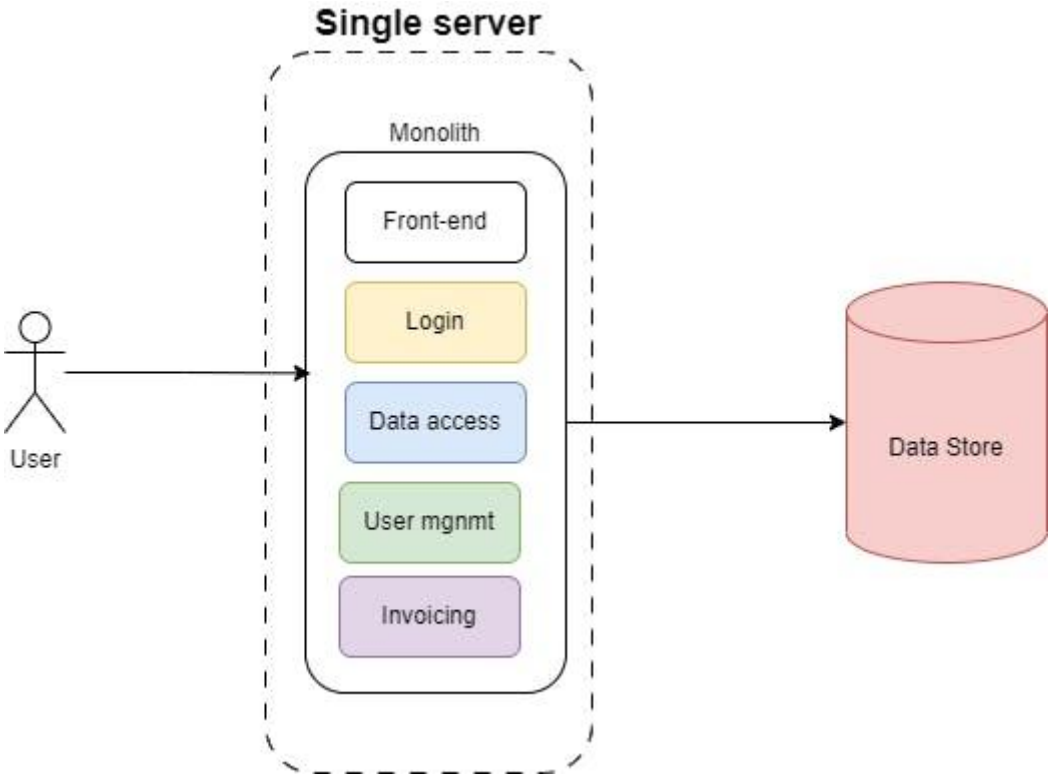

Figure 2. Imagine a blogging platform. Such an application might have the following components

- User Interface : Handles user interactions, displays articles and comments.
- Business logic : Manages the logic for creating and editing articles, authorizing users and managing comments.
- Data Access : Interacts with the database to store and retrieve articles, comments, and user data.

All of these components will be bundled into a single code base and deployed as a single unit. This approach simplifies development and management, but can be challenging to scale and make changes as the application grows.

JOURNAL OF APPLIED SCIENCE AND SOCIAL SCIENCE
eISSN 2229-3113 pISSN 2229-3205
Volume 15 Issue 03, March 2025
Impact factor: 2019: 4.679 2020: 5.015 2021: 5.436, 2022: 5.242, 2023: 6.995, 2024 7.75






Monolithic architecture is a simple and effective solution for small projects, but as the application scales up, it can limit flexibility and make management more difficult. The right choice of architecture depends on the specific requirements and goals of the project.

Conclusion. Due to the rapid development of information technology, in particular, the development of web applications, information on the problem of designing and implementing state management in web applications is either absent or mentioned indirectly, as if this problem does not exist or
is solved automatically. All authors are mainly busy solving other
problems. Although due to the peculiarities of the architecture of web application implementation, the problem does exist, since there are solutions that help
implement state management. But nowhere is there any mention of how to
design it for a specific project.

References

1. Malikov R.F. Workshop on computer modeling of physical phenomena and objects: Textbook. manual. - Ufa, 2005.-291 p.
2. Gurko A. I. Economic and mathematical methods and models: a manual for students and masters // - Minsk: BNTU, 2020. - 236 p.
3. Korolev A. V. Economic and mathematical methods and modeling: textbook and practical training for bachelor's and master's degrees // - M.: Publishing house Yurait , 2016. 280 p.
4. Pechnikova A.G., N.A. Gruzintseva, V.I. Ronzhin . Mathematical modeling of economic systems: a tutorial // – Ivanovo: IVGPU, 2015. – 96 p.
5. Kundysheva E.S. Mathematical methods and models in economics: textbook for bachelors// Publishing house "Dashkov i K". 2017. 286 p.
6. V.I.Pokhabov , D.G. Antipenko, M.N.Grinevich . Economic and Mathematical Methods and Models (Practical): Textbook// - Minsk: BITU, 2003. - 130 p.

JOURNAL OF APPLIED SCIENCE AND SOCIAL SCIENCE
eISSN 2229-3113 pISSN 2229-3205
Volume 15 Issue 03, March 2025
Impact factor: 2019: 4.679 2020: 5.015 2021: 5.436, 2022: 5.242, 2023: 6.995, 2024 7.75

7. Montgomery D.K. Experimental Design and Data Analysis: trans. from English. – L.: Sudostroenie, 1980 – 384 p.
8. Using the method of compositional experimental planning to describe technological processes: method. instructions / compiled by A.N.Gaydadin , S.A.Efremova ; VolGTU . – Volgograd, 2008. – 16 p.
9. Zhumaev Zh., Opokina N.A. Solving mathematical problems in the Maxima mathematical software packages and Mathcad // Electronic textbook. Kazan. 2021. 227 p. https://repository.kpfu.ru/?p_id=253062
10. Khaidarov A., Zhumaev Zh., Shafiev T.R. Fundamentals of mathematical modeling// Textbook. Bukhara. "Durdona", 2022. 216 p.