

ТЕХНИЧЕСКИЕ НАУКИ

TECHNICAL SCIENCES

ИНФОРМАТИКА,
ВЫЧИСЛИТЕЛЬНАЯ ТЕХНИКА
И УПРАВЛЕНИЕ

INFORMATICS,
COMPUTER ENGINEERING
AND MANAGEMENT

Современная наука и инновации. 2025. № 2. С. 11-18
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Modern Science and Innovations. 2025;(2):11-18
TECHNICAL SCIENCE
INFORMATICS, COMPUTER ENGINEERING AND
MANAGEMENT

Research article

<https://doi.org/10.37493/2307-910X.2025.2.1>



Multi-clients (AI) in the Corporate Environment

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Abstract. *The article addresses the implementation of Multi-client AI architectures in corporate environments. Against the backdrop of the rapid proliferation of artificial intelligence across organizational ecosystems, the discussed framework gains particular significance-primarily as a key enabler for scaling intelligent solutions without duplicating infrastructure. The relevance of the topic is driven by the growing demand for individualized AI services built upon a unified technological foundation, as well as the imperative for strict data isolation when serving multiple clients-both within a single enterprise and in B2B models. The aim of the study is to identify the structural characteristics of the multi-client approach in AI, its technological and organizational underpinnings, and the key challenges that hinder its sustainable deployment and operation. The analysis reveals conceptual discrepancies in how contemporary researchers interpret the management of cross-client contexts and evaluate multi-tenant AI platforms. Existing literature is predominantly focused either on superficial case studies or on narrow technical details, lacking systematic treatment of managerial dimensions. The novelty of the article lies in the proposed integrative conceptual framework that synthesizes principles of Parameter-Efficient Fine-Tuning (PEFT), Federated Learning, prompt engineering, and Retrieval-Augmented Generation (RAG) architectures within the context of enterprise AI adoption. The study contributes to the existing body of knowledge by offering a structured overview of the challenges and opportunities associated with Multi-client AI. The presented material is intended to support professionals in digital transformation, AI platform architects, corporate IT executives, and researchers engaged in designing scalable AI solutions.*

Keywords: AI architecture, client-side training, corporate environment, data isolation, federated learning, language model, model personalization, multi-clients (AI), scalability, parameter-efficient fine-tuning (PEFT), prompt engineering, retrieval-augmented generation (RAG), decentralized computing, digital transformation

For citation: *Andronchik GV. Multi-clients (AI) in the Corporate Environment. Modern Science and Innovations. 2025;(2):11-18. <https://doi.org/10.37493/2307-910X.2025.2.1>*

Научная статья
УДК 615.07:004.8

Multi-clients (AI) в корпоративной среде

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Аннотация. В статье рассмотрены вопросы, касающиеся реализации Multi-clients (AI) в корпоративной среде. На фоне стремительного распространения искусственного интеллекта в организационных экосистемах рассматриваемая архитектура приобретает особое значение — прежде всего, как ключ к масштабированию интеллектуальных решений без дублирования инфраструктуры. Актуальность обсуждаемой темы обусловлена заметно усиливающейся потребностью в индивидуализации AI-сервисов при сохранении единой технологической базы, а также необходимостью строгой изоляции данных при обслуживании множества клиентов — как внутри корпорации, так и в рамках B2B-моделей. Целью исследования служит выявление структурных особенностей мультиклиентского подхода в AI, его технологических и организационных оснований, а также проблемных зон, ограничивающих его устойчивое внедрение и функционирование. В процессе анализа обнаружены концептуальные расхождения в понимании современными исследователями управления кросс-клиентскими контекстами и оценки мультиклиентских платформ. Публикации сфокусированы, главным образом, либо на поверхностных кейсах, либо на технологических деталях без должной систематизации управленческих аспектов. Новизна заключается в том, что в статье предложена интегративная концептуальная «рамка», объединяющая принципы PEFT, Federated Learning, prompt-спецификации и RAG-архитектуры в контексте корпоративного использования. Исследование дополняет имеющийся массив знаний, представлена систематизация вызовов и перспектив multi-clients AI. Представленный материал будет полезен специалистам по цифровой трансформации, архитекторам AI-платформ, корпоративным IT-руководителям, исследователям, сосредоточенным на проектировании масштабируемых ИИ-решений.

Ключевые слова: изоляция данных, корпоративная среда, масштабирование, обучение на стороне клиента, персонализация моделей, федеративное обучение, языковая модель, AI-архитектура, Multi-clients (AI), параметрически-эффективная донастройка (PEFT), prompt engineering, Retrieval-Augmented Generation (RAG), децентрализованные вычисления, цифровая трансформация

Для цитирования: Андрончик Г. В. Multi-clients (AI) в корпоративной среде // Современная наука и инновации. 2025. № 2. С. 11–18. <https://doi.org/10.37493/2307-910X.2025.2.1>

Introduction. In the modern corporate environment, there is a growing need for the effective use of artificial intelligence to automate management processes, predict market trends, and optimize operational activities.

Conventional AI implementation models often prove to be insufficiently flexible when it comes to adapting to different business units or external customers with different requirements.

The challenge is to develop architectural solutions that can provide a high degree of customization, maintain data isolation between users, and be resilient to load scaling. This requires rethinking the principles of integrating AI into enterprise systems using both new learning methods and distributed storage technologies.

Taking into account the above, the focus of research interest is Multi-clients AI – the architecture and practice of implementing AI systems that simultaneously serve several independent clients, business units or organizations, while ensuring customization of AI behavior for each client, data isolation, and scalability of solutions. This can be implemented both within a single corporation (meaning different departments, subsidiaries) and in B2B scenarios, where one platform provides AI services to multiple external customers.

Materials and research methods. The problems of implementing multi-client architectures based on artificial intelligence in the corporate environment are reflected in publications of various methodology and focus, covering both applied aspects of integration and conceptual approaches to managing intellectual resources. It is advisable to conditionally divide modern research into three semantic groups: works devoted to the analysis of business value and efficiency of AI solutions; works that consider the managerial and organizational aspects of using AI in corporations; sources focused on the technological side of the platform multi-client architecture.

Thus, I.A. Bukhtueva and co-authors [1] emphasize that AI solutions increase the adaptability of business processes and contribute to more accurate management decision-making in conditions of uncertainty. A similar position is taken by I. Tairov and colleagues [9], considering AI as a driver of operational performance growth, especially in the context of Big Data analysis. Data and automation of corporate processes. Similarly, R. Sharma [8] links the use of AI with increased consumer satisfaction and increased social responsibility, which in the long term contributes to brand capitalization.

The work by E.N. Gapchenko, E.N. Maikova [2] emphasizes the importance of strategic integration of AI tools into the management system, with special attention paid to the risks of uneven distribution of technological resources. This position correlates with the study by V.Yu. Sofina, N.M. Galimullina [4], which reveals the mechanisms of transformation of project management under the influence of intelligent systems that allow flexible adaptation to changing conditions. An important aspect is touched upon by D.A. Zhdanov [3], highlighting intellectual capital as a priority area for AI investments in organizations and highlighting the high importance of intangible assets in the digital era.

A. Roth and colleagues [5] describe the trinity of human, AI, and service interaction as the basis for digital transformation in multi-tier organizations. Salesforce, SAP Business AI, and Databricks [6, 7, and 10] websites reflect specific mechanisms for implementing multi-client solutions, with an emphasis on customizing model behavior, isolating client data, and scaling flexibility. These platforms demonstrate how a single technology base can support multiple scenarios for different corporate clients, ensuring adaptability and compliance with privacy requirements.

Despite the extensive empirical and conceptual material, there are still some discrepancies and gaps in the literature. In particular, there is no unified approach to assessing the effectiveness of multi-client architecture in the long term. There are few publications that analyze the risks of knowledge transfer between client segments, and the issue of regulatory compliance of such platforms in different jurisdictions is not sufficiently covered.

The methods used in the preparation of this article include: case analysis (including platform solutions), comparative analytical approach, expert assessment, systematization, generalization. Particular attention is paid to the interdisciplinary approach - combining management theory with digital technologies.

Research results and their discussion. Multi-clients (AI) in a corporate environment is an architectural and methodological solution that allows one basic artificial intelligence system to simultaneously serve several business units or independent clients, while providing individualization of functional settings, data isolation in combination with flexible scaling [2, 4, 9]. The concept under consideration (Table 1) is focused on adapting the general AI model to the specific requirements of each user through fine-tuning and the use of distributed learning methods.

The basis of the paradigm under consideration is a multi-level architecture, in which the main "core" of the AI model is combined with individual "fronts" for each client. The described approach provides the ability to apply common basic knowledge, additionally training the system taking into account the specifics of the customer's data and business processes. The use of a standardized "core" ensures unification of updates and support, which is very important for large-scale corporate systems.

Table 1. Characteristics of the conceptual base of Multi-clients (AI) in the corporate environment (compiled by the author based on [1-3, 5, 8])

Component	Description
1. Model core and customization	1.1 Common Core – Using a single, pre-trained AI model that serves as a starting point for subsequent adaptation
	1.2. Parametrically Efficient Fine-tuning (PEFT) – methodologies that help adapt a basic model to individual customer needs without duplicating the full model
2. Isolation and data protection	2.1. Ensuring strict isolation of information flows between different clients using unique identifiers, encryption and special vector databases
	2.2. Federated approaches learning for training models on the client side, eliminating the transmission of sensitive data to centralized systems
3. Adaptive interaction interface	3.1. Development of specialized queries and interfaces to optimize user interaction with the base model, taking into account the specifics of each business process
	3.2. Providing unique “fronts” through which the AI system is accessed, which helps to take into account a variety of user scenarios
4. Infrastructure support	4.1. Multi-tier architecture - creating a system capable of combining centralized algorithms and distributed computing resources with support for microservices and containerization
	4.2. Horizontal scaling - organization of dynamic distribution of computing load through cloud solutions and modern orchestration tools , which ensures fault tolerance of the system
5. Knowledge control and adaptive learning	5.1. Application of regularization methods and knowledge transfer control, which makes it possible to update the model taking into account the specifics of each client, without violating the integrity of the general algorithms
	5.2. Continuous collection and analysis of AI system performance metrics, allowing for prompt identification of bottlenecks and targeted optimization

In order to individualize models, methods are actively used, for example, parameter-efficient fine-tuning (PEFT) and adaptive prompt engineering. The latter approach helps to construct specialized queries that are focused on a specific subject area, minimizing the cost of computing resources. In this case, the main training occurs on a generalized data corpus, which serves as a "foundation" for subsequent subtle additional training.

Multi-clients AI systems rely on decentralized computing environments, where horizontal scalability plays a key role. The use of microservice architecture and containerization ensures fault tolerance and dynamic load distribution, which is important in conditions of intensive data operations. In addition, the use of cloud platforms allows for the effective implementation of federated learning, minimizing the need to transmit sensitive information to a central server.

Among specific cases, it is worth highlighting Salesforce – a multi-client platform based on LLM, integrated into the CRM ecosystem, has been developed. Each corporate client has access to an individually configured AI interface that processes data in a strictly isolated environment. At the same time, there are some features:

- built-in prompt engineering per client;
- integration with private clouds;
- using LLM to automatically generate content, interaction summaries and analytics [6].

The next example concerns SAP Business AI - it implements multi-clients AI within its ERP platform, providing customized AI scenarios (e.g. demand forecasting, intelligent recruitment) for different clients without cross - data access. The following specifications stand out:

- fine-tuning of AI models for specific customer scenarios;

- federated data access in within the SAP Business Technology Platform;
- support for RAG and custom analytics [7].

Another case is related to Databricks, known for its infrastructure for data processing and ML, launched Mosaic AI, a platform that allows you to create LLM applications with isolated vector storage and settings for each client. This solution is actively used in the financial and pharmaceutical sectors. The following features are noted:

- PEFT and RAG support;
- memory and context management by client;
- MLOps automation for each tenant [10].

The diagram (Fig. 1) shows a systematization of the main problems of implementing the analyzed approach.

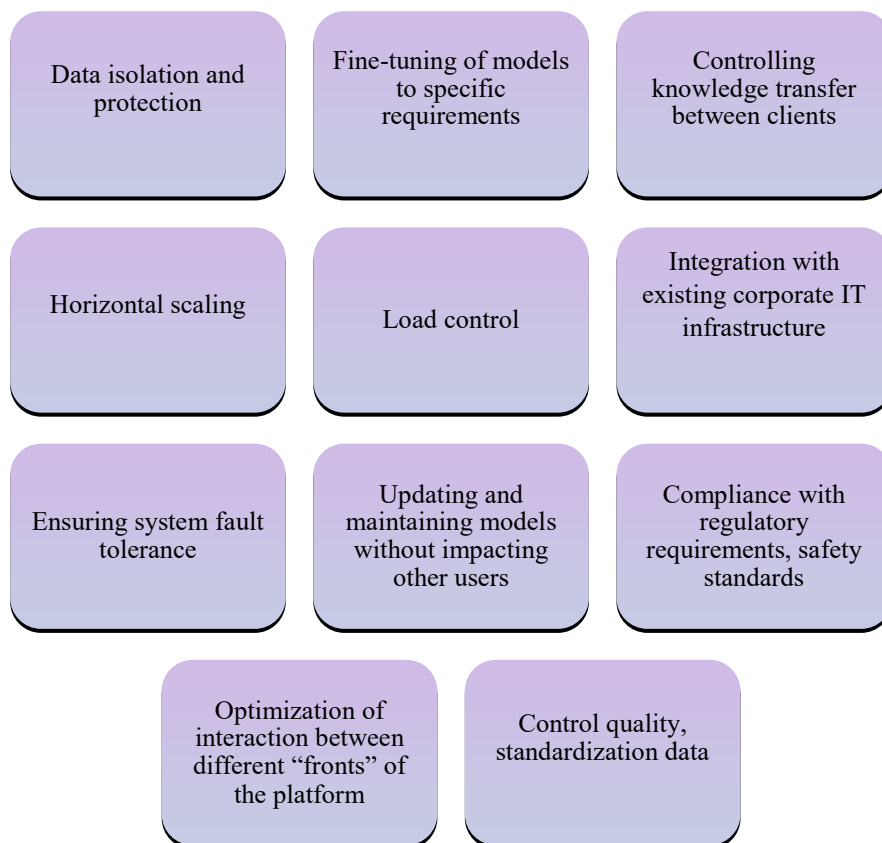


Figure 1. Highlighting problem areas in the implementation of Multi-clients (AI) in a corporate environment (compiled by the author based on [4, 5, 9])

Thus, one of the main technical tasks remains to ensure complete segregation of data between clients. Implementation of vector bases in combination with Retrieval Augmented Generation (RAG) helps create closed information channels for each customer, which eliminates the risk of accidental information exchange between different business units. This isolation is achieved through the use of unique identifiers, as well as encryption at each level of processing.

The most important aspect is to prevent unwanted diffusion of knowledge between models serving different segments. To solve this issue, regularization and modular retraining strategies are used, which allows maintaining the integrity of the original algorithm and simultaneously taking into account the specific nuances of each use case. Methods for checking the correctness of the model adaptation are provided both through test samples and through regular performance monitoring at the operational stage.

Given the high load when servicing multiple clients, it is necessary to build a system that can quickly respond to sudden surges in requests. Distributed computing resources include flexible clusters that can be easily scaled thanks to cloud technologies and modern container orchestration tools. At the same time, each unit of the system undergoes a cycle of continuous monitoring, which helps to promptly detect bottlenecks and optimize resource costs.

The diagram (Fig. 2) presents a systematization of development prospects and innovative approaches in the area under consideration.

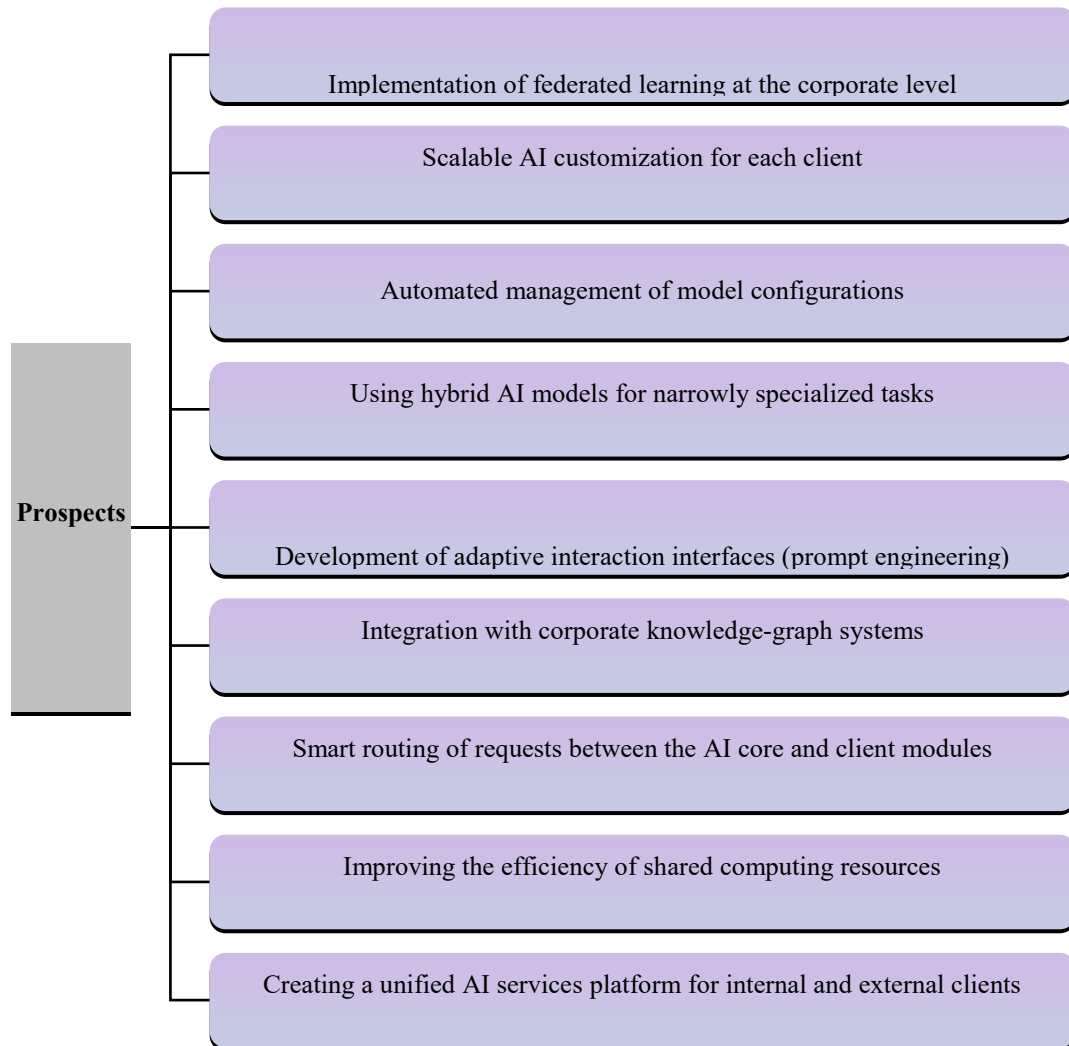


Figure 2. Prospects for implementing Multi-clients (AI) in a corporate environment (compiled by the author)

So, federated learning is one of the key areas that allows training models directly on the client side. The described approach not only ensures privacy, but also facilitates the rapid adaptation of AI to the specific conditions of a particular business unit. Against the backdrop of strict regulation in the field of data protection, the introduction of distributed learning will help to significantly strengthen the trust of corporate clients in AI solutions.

It seems that in the future the development of adaptive prompt methods engineering will lead to the emergence of “smart interfaces” between the user and the underlying model, where the system independently adjusts requests based on current business requirements. This will open up new options for integrating AI into highly specialized workflows, making the system more dynamic and responsive to market changes.

In turn, the use of hybrid algorithms that combine traditional machine learning methods with deep learning provides the opportunity to work out in more detail the scenarios for adapting the model to specific client tasks. The described approach allows you to compensate for the weaknesses of both methods, creating an integrated solution that helps meet a wide range of corporate requirements.

Conclusion. Multi-clients AI conceptual framework combines technical and methodological elements aimed at ensuring adaptability, security, and efficiency of using a single AI platform for multiple clients in a corporate environment.

Building multi-client AI systems is a relevant and complex task that requires a systematic approach to architectural solutions and data management. The use of modern technologies - from distributed computing environments to adaptive learning – provides an opportunity to significantly increase the effectiveness of AI use in business structures.

Ensuring a high level of confidentiality, scalability, and individualization becomes the key to successful integration, which is especially important in the realities of a competitive market and constantly changing business requirements. The methods and approaches developed to date open up new options in the field of automation and analytics, making multi-client AI systems a fundamental tool for modern business entities.

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Conflict of interest: the author declare no conflicts of interests.

The article was submitted: 01.04.2025;
approved after reviewing: 01.05.2025;
accepted for publication: 01.06.2025.

ИНФОРМАЦИЯ ОБ АВТОРЕ

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Конфликт интересов: автор заявляет об отсутствии конфликта интересов.

Статья поступила в редакцию: 01.04.2025;
одобрена после рецензирования: 01.05.2025;
принята к публикации: 01.06.2025.