

## ABSTRACT

Explanatory note size – 135 pages, contains 17 illustrations, 23 tables, 7 applications, 75 references.

**Topicality.** Increasing resource utilization efficiency (random access memory in particular) is an important problem which arises in modern data centers. Memory utilization is uneven between nodes in a computing cluster even with modern schedulers and virtualization. Far memory allows using random-access memory more efficiently and evenly, while also allowing to access more memory than available on a compute node. At the same time, existing implementations and methods of providing far memory have a limited application scope and low efficiency, which are defined by the specifics of the task. Because of that, increasing efficiency by modifying existing methods of providing far memory is relevant.

**The aim of the study.** Improving the efficiency of using far memory by developing an effective method for providing far memory to the information software of modern datacenters.

**Object of research:** far memory in distributed information systems.

**Subject of research:** the process of creation of the architecture of software tools that implement methods for providing fast access to span in far memory, their replication, deployment and integration of far memory into the software.

To achieve this goal, the **following tasks** were formulated:

- perform analysis of existing far memory implementations and methods;
- develop far memory integration methods into new and existing software;
- develop architecture, structure and interaction between far memory components;
- decrease average latency of far memory spans access by using span replacement algorithm that relies on memory access statistics and predictive models;
- develop methods to ensure far memory resiliency;
- assess solution efficiency.

**The scientific novelty** unlike existing methods, span replacement problem is solved statistically more efficiently by implementing the adaptation of span access

prediction model parameters based on statistics that are continuously collected during runtime of software.

**The practical value** of the obtained results lies in the fact that the developed software for providing far memory is easy to deploy and does not require significant changes to the software during integration. This software can be used to enhance the efficiency of resource utilization in datacenter for software which operating parameters allow using such memory class as far memory.

**Relationship with working with scientific programs, plans, topics.** Work was performed at the Department of Informatics and Software Engineering of the National Technical University of Ukraine «Kyiv Polytechnic Institute. Igor Sikorsky».

**Approbation.** The scientific provisions of the dissertation were tested at the V International Scientific and Practical Conference for Young Scientists and Students "Software Engineering and Advanced Information Technologies SoftTech-2023".

**Publications.** The scientific provisions of the dissertation published in:

1) Methods and software for providing software-defined far memory in distributed systems/ N.O. Volobuev, O.A. Pavlov, M.M. Holovchenko // Proceedings of the V International Scientific and Practical Conference for Young Scientists and Students "Software Engineering and Advanced Information Technologies SoftTech-2023" - Kyiv: National Technical University of Ukraine «Igor Sikorsky Kyiv Polytechnic Institute», December 19-21, 2023.

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