CONTAINERIZATION AND VIRTUALIZATION IN CLUSTER ARCHITECTURES FOR FACILITATING E-LEARNING SYSTEMS

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Abstract. *This paper examines virtualization and containerization as key approaches for building reliable, efficient, and highly scalable cluster architectures used in enabling e-learning systems. The main advantages and limitations of both approaches are analyzed, including performance, resource utilization, isolation, manageability, and their impact on system security. Containerization offers rapid service deployment, efficient hardware utilization, and easy automated scaling, but requires careful configuration management and image protection. Virtualization provides stronger isolation between operating systems and applications, enhancing system security and stability. Based on this comparison, a hybrid model is proposed, combining the strengths of both approaches to optimize performance, resilience, and data protection in modern e-learning systems.*

Key words: E-Learning, Clusterization, Containerization, Virtualization

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