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A software coupling measure reflects the strength of interconnection between software modules by analyzing incoming and outgoing connections: low coupling is a feature of a well-structured and properly designed system while a high coupling may signalize a poorly structured and designed system that is difficult to maintain, reuse and modify [1]. Therefore, let us study the coupling software components of the car dealership information system (IS), considering two possible types of their architectural design – monolithic and microservice (Fig. 1a). The histogram that compares coupling metrics of the car dealership information system software components based on microservice (green) and monolithic (blue) architectures is demonstrated in Fig. 1b.

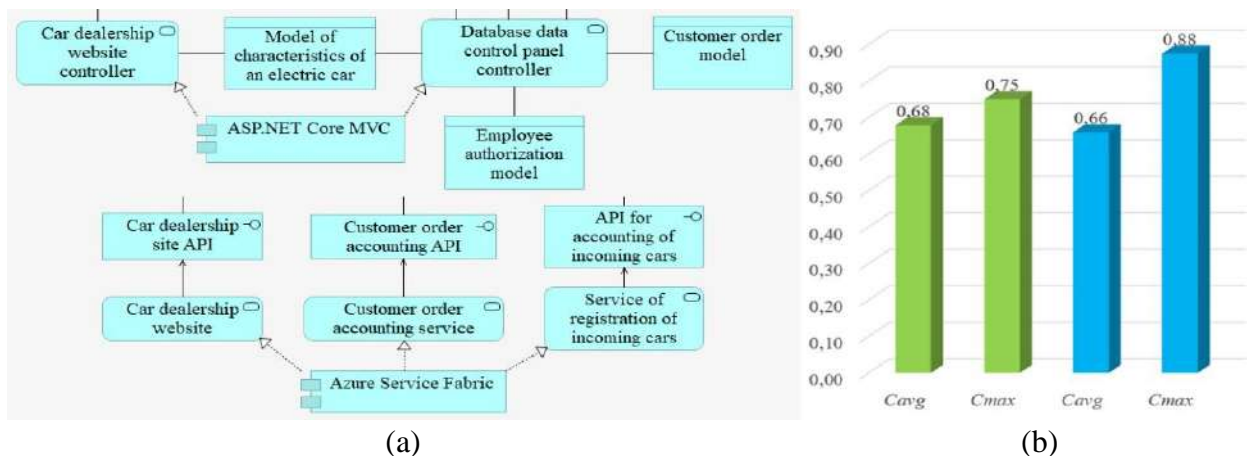


Fig. 1. – Software architecture (top – monolithic architecture, bottom – microservices) model (a); coupling metric comparison histogram (b)

As the results, the average coupling of the microservice architecture components is stronger ($C_{avg} = 0.68$) than the average coupling of the monolithic architecture components ($C_{avg} = 0.66$), however, the maximum coupling among all monolithic architecture components is stronger ($C_{max} = 0.88$) than the maximum coupling among all microservice architecture components ($C_{max} = 0.75$).

Therefore, if a website or a web application is small, simple, and not intended to be scalable, then a monolithic architecture may be more appropriate. However, if the project is large, complex, and involves a high load, such as the car dealership IS, then a microservice architecture may be more effective in the long run.

References:

1. Kopp A. M., Orlovskiy D. L., Ersoyleyev D. An approach to analysis of ArchiMate application architecture models using the software coupling metric. *Вісник Національного технічного університету «ХПІ»*. Серія: Системний аналіз, управління та інформаційні технології. 2021. №. 2 (7). С. 67–72.