Week 6: Examine Architectural Tactics

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# Architectural Tactics

An architectural tactic is a design pattern that seeks that efficiently address a business problem. When software does not correctly implement these tactics, it produces significant risk toward the application’s security, reliability, and maintainability. Mirakhorli (2014) states once the architect becomes a “pile of mud,” any future changes likely come with a high regression risk. For instance, a program might hardcode the credentials or follow a monolithic design. These anti-patterns prevent the software from evolving into future needs. It is therefore critical that engineers understand design decisions and build to specification.

# Literature Review

Kontopoulos et al. (2018) describe the challenges of validating Automatic Identification System (AIS) metadata. Shipping vessels use this insecure protocol to transmit their location and intended route. The initial design requires that only ships exceeding 299 tons send these messages. However, countless smaller boats voluntarily leverage the system for safety purposes. Due to the data’s high volume, performing analysis is overly complex. Fraudulent and malicious transport companies spoof their location to exploit these issues. Along with hiding their location, it is also possible to fabricate congestion, causing legitimate cargo vessels to divert.

Addressing this big data problem is essential for preventing illegal activity, ensuring efficient routing, and protecting sailor’s safety. Exploiting the AIS data enables scenarios, such as illegal fishing and whale hunting. Farming animals into extinction will create irreversible changes to the fragile wildlife. Malicious actors that redirect third-party ships can increase costs and delays, creating unfair competitive advantages. When participants lose confidence in a safety system, that will result in accidents. These risks justify research investments into detecting deceptive activity and preventing it.