Evolutionary Architecture at Amazon

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Summary

In the early days of the company, Amazon operated as a monolithic application known as Obidos, a web-based system that communicated with a backend database. As time progressed, Obidos evolved to incorporate all of Amazon's business logic, display logic, and core functionalities. However, as Amazon began to grow, the limitations of this architecture became apparent. The system became increasingly complex, difficult to scale, and overall hindered the essential development tasks.

To address these unique challenges, Amazon made the crucial decision to step away from the monolithic structure to a distributed, service-oriented architecture. The shift required significant amounts of innovation and effort in reconstruction. However, the transformation enabled greater flexibility, scalability, and efficiency for the company.

A key strategy in this transition was the strict service orientation, promoting isolation and ownership rather than individual components of the system. By ensuring that clients could not directly access the database, Amazon helped to improve their reliability and scalability and minimize their disruptions

The shift to a service-oriented system had notable impacts on Amazon's development and operational processes. Instead of a single team managing all aspects of the website's functionality, different services were assigned to dedicated teams. This splitting of responsibilities helped to foster the specialization and acceleration of innovation. The modular approach allowed Amazon to scale the application efficiently, introducing new functionalities, and continuously enhance the platform year after year.

One of the most impressive results was the increase in deployments. By 2015, Amazon was making 136,000 deployments a day, highlighting the effectiveness of the service-oriented approach that the company took.

Lessons learned

The monolithic architecture structure can create some major complications for companies as they continue to grow. This structure is okay in the beginning stages, but it will lead to severe limitations to scalability and flexibility if the structure is not shifted. Service-oriented architectures provide better results in isolation, ownership, and scalability. It also allows teams to work more independently and efficiently. An area in which Amazon shines ahead of its competitors is that it offers extensive services to its

client base. Without the major change to their architecture system, this would not be possible.

Restricting the amount of direct access that clients have to the database helps to ensure greater system reliability and prevents any widespread disruptions from occurring. A modular service model fosters innovation by allowing teams to focus their skills on specific tasks and functionalities, rather than putting their focus on the bigger picture. Teams specializing in certain fields can shine when working on more centralized projects. Frequent deployment and continuous innovation are major advantages of a well-structured and distributed system. This has allowed Amazon to continue offering more services to their loyal customers.

Amazon's architectural transformation was a major shift that allowed the company to evolve for the better, becoming the industry leader that it is today. By embracing the service-oriented approach, and taking a risk restructuring their existing system, Amazon unlocked the ability to scale, innovate, and improve its offerings at a rapid pace.

References

Kim, G., Debois, P., Willis, J., & Humble, J. (2016b). *The DevOps Handbook: How to Create World-Class Agility, Reliability, and Security in Technology Organizations*. https://dl.acm.org/citation.cfm?id=3044729