Evolutionary Architecture at Amazon

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Amazon’s architecture transformation is one of the most well-known transformations that has been studied to date. Werner Vogels Amazon’s CTO says that when Amazon started back in 1996 it was a monolithic application that was running on a web server that talked to a database on the back end. Amazon named this application Obidos. This application evolved to hold all the business logic, all the display logic, and all the functionality that its well-known for today.

The famous Obidos application quickly became too complex making the individual pieces unable to scale the way Amazon needed to grow. This essentially made Obidos useless and the company soon realized big changes where needed to keep Amazon on the right track. After a period of serious introspection, Amazon concluded that a service-oriented architecture would give them the level of isolation that would allow them to build numerous software components rapidly and independently.

In order to better understand Amazons approach lets look at what service-oriented architecture is and how it will benefit Amazon. Service-oriented architecture is a style of software design where services are provided to the other components by application components, through a communication protocol over a network. The basic principles of service-oriented architecture are independent of vendors, products and technologies. This allows Amazon’s designed as components, services can be reused more effectively, thus reducing development time and the associated costs. SOA services are complete and self-contained programs. This makes it easy for testing, debugging or any form of maintenance. One of the advantages of SOA is the elimination of the complexities associated with interacting services within an environment. When it comes to updating, upgrading, and maintaining the services in the SOA environment there are no complications resulting from interactions with other connected and interacting services. This is because the program is complete and self-contained. In environments with complex components, this makes things easy.

This huge architectural change Amazon underwent took five years from 2001 through 2005. This move took Amazon from a two-tier monolith to a fully distributed, decentralized, services platform serving many different applications. This took a lot of innovation due to Amazon being the first to take on such a challenge. There were three major lessons that Vogel’s experienced at Amazon during this major shift in architecture.

The first lesson they learned at Amazon was when applied rigorously. Strict service orientation is an excellent technique to achieve isolation. By doing this you achieve a level of ownership and control that wouldn’t have been able to achieve before. This allows Amazon to structure their services the way they need. The second major lesson was that prohibiting direct database access by clients makes performing scaling and reliability improvements to your service state possible without involving your clients. This helps with security of their application and speeds up the overall application for the user which will enhance the users experience. The third and final lesson that Amazon noticed was that the development and operational process greatly benefits from switching to service- orientation. The services model has been a key enabler in creating teams that can innovate quickly with a strong customer focus. Each service has a team associated with it, and that team is completely responsible for service – from scoping out the functionality to architecting, building, and operating it.

The move for Amazon took was a huge leap to take that defines the path their application would take in the future. Service-oriented architecture turned out to be a great choice for Amazon and can be a very powerful way do design your application.

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