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Evolutionary Architecture at Amazon: Summary

The 2002 case study of the “Evolutionary Architecture at Amazon” was about how Amazon transformed its architecture from a monolithic system to a service oriented architecture. This is a great case of how by improving the software design can drastically improve flexibility, scalability, and innovation.

Amazon began in 1996 using a monolithic application that was known as Obidos. Obidos handled every aspect of Amazon’s operations, including business logic, UI display, recommendations, customer reviews, and other key features. Eventually, with Amazon’s expansion, Obidos would go on to become very complex and tightly coupled, with features sharing deep dependencies with each other. This caused the system to be very fragile and even more difficult to change or scale as time went on. The monolith was stuck and unable to evolve due to this, as updating one part of the application came at the risk of causing issues or breaking other parts. Developers would need to work around these tightly coupled components which caused a lot of constraints.

The architecture of Obidos didn’t have the isolation that was needed for scaling different parts of the system and independent innovation, which was a huge problem. To deal with this issue, Amazon thoroughly assessed its software architecture and decided to move forward with service oriented Architecture or SOA. This shift from a monolith to distributed services would start in 2001 and last until 2005. This transition to SOA would enable Amazon to build and deploy software components much faster and more independently than before. Every function was changed into a service with a clearly defined interface. This would allow each individual team to own, build, and deploy services without needing to wait or worry about causing issues with other teams and their services.

From this change, there were three main lessons learned. The first was that strict service orientation creates powerful isolation. This allows for teams to not need to worry about dependencies on other services, speeding up the development cycles. The second lesson was that disallowing direct database access from outside the service layer improved Amazon’s ability to scale while still being reliable. This way database changes could be made without impacting client systems. The third lesson was that team autonomy does best under a service model since each service has a dedicated team which allowed for more accountability and innovation.

To conclude, the architecture transformation to SOA that Amazon implemented allowed for significantly more scalability, innovation, and autonomy than they would have had sticking with their original monolithic systems. The case study highlights the importance of isolating services and enforcing those boundaries in the best interest of scaling and evolving an organization and its systems.