Keanu Foltz
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Operation InVersion at LinkedIn Case Study

LinkedIn had a successful IPO in 2011 but would go on to face some very tough technical challenges in regards to its infrastructure. They used a legacy system called Leo, a monolithic Java application that managed most of their traffic, and it was struggling to keep up with the sudden growth. Although they did some vertical scaling efforts, Leo would crash frequently, was difficult to troubleshoot, and slowed down biweekly new feature deployments. Due to these issues there was a lot of firefighting and less productivity from engineering.

LinkedIn's instability would become severe enough that new feature development would end up getting paused. The Senior leaders would go on to take two months to exclusively work on overhauling their architecture, deployments, and computing environment in what would be called Operation InVersion. The pause of feature releases right after IPO was a big immediate risk to take but was in the best interest of the company's long-term stability.

Operation InVersion would proceed to focus on switching from the monolithic Leo system and change to a microservices architecture. LinkedIn would develop new tooling and automated deployment pipelines that allowed engineering to quickly and safely launch new services. This cultural shift allowed the engineering teams to do major upgrades up to 3 times daily, a big jump in deployment speed and system reliability. The result was that site outages became less common, troubleshooting time was reduced, no more huge crises, the infrastructure became scalable and supported the growth of microservices, and developer productivity and agility increased.

The main takeaways could be boiled down into a number of points. First was that technical debt needs to be managed proactively, as ignoring it can cause systemic instability. We must invest in improving things such as architecture, tooling, and deployment if we want sustainable growth. Another is it highlighted the importance of culture and leadership, as the decision to pause feature development required strong leadership that focused on long term gains over short term benefit. One more important point that can be taken away is that automation and microservices give us better agility. Automated testing and deployment pipelines, along with modular services, improve how often we can release in addition to system stability.

To conclude, Operation InVersion is a great case study on how paying technical debt can allow for better engineering culture, rapid growth, and better maintain system health. We should always strive to manage technical debt rather than wait until a crisis arises.