

# The use of a shared database for cost reduction with user licenses: An experience report

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***Abstract.** This article presents an experience report that analyzes the migration of servers to the data center as a solution to reduce financial costs and improve the performance and usability of the Jira tool. The solution adopted by the team resulted in a 70% reduction in costs compared to the option of maintaining the old data process and servers provided by Atlassian. Such works reinforce the need for companies to rethink traditional models, always aiming to reduce costs and process risks. Solutions from research and development (R&D) projects can play an important role in evaluating and testing possible changes in the process without compromising or interrupting production.*

## 1. Introduction

The accelerated development of new technologies has driven the emergence of new business models, making it imperative for companies using these services to adapt (Sayabek, Z. and Omarova, 2018). According to Sahin, I. and Zahedi, F. (2001), changes to software systems often result in high costs after the changes. Therefore, it is in the organization's interest to keep costs under control.

In this context, there is the sale of licenses and support for web applications (Jira). In order to use these web applications, they need to be installed on a server, which will keep them running constantly. The price of certain business software varies according to the number of customers using it. Software as a service allows software providers to charge the customer based on the number of users or the volume of transactions (Kroenke and Boyle, 2015). Additionally, these software solutions have version limitations, necessitating regular updates and upgrades, so that the system is free of vulnerabilities that do not compromise its use.

This article presents an experience report on the customization of Jira, through changes and improvements made to the migration of Jira instance servers, each instance being a virtual server used to serve the business model. Thus, in the current configuration, it was found that the instances had many users in common, which would represent unnecessary costs for the company in the study. As a result, work is underway to carry out the migration, in which it is already possible to obtain a 70% reduction in possible costs, compared to the old process of five instances.

The aim of this article is the unification of the instances. Through a cost analysis, the solution used was to migrate to a self-managed data center. This option indicated to be a viable alternative to reduce costs, reduce duplicate data and make it possible to maintain the applications contained in each instance. This article presents a possible solution with the unification of these databases, the challenges encountered with the migration and the practices adopted to facilitate this type of process in different contexts.

## **2. Experience Report**

The Instituto de Pesquisas Eldorado currently has projects focused on several areas: including health, oil and gas, energy, agribusiness and information and communication technology. The projects are carried out in collaboration with companies in these sectors, in which problems are identified and ways to solve them are developed through research and development.

In this context, in February 2021, the partner company in the case study had to rethink how it would deal with license changes imposed by Atlassian. The partner company could no longer acquire new licenses for the version it was used to working with. Consequently, Atlassian would cease to develop new features for the old products, potentially posing vulnerability risks for the use of these applications in the Company discussed in this article.

Atlassian provided two options to handle the license changes: the first would be to migrate to the cloud, while the second would be to upgrade to a self-managed data center (Atlassian, 2024). In a cost analysis carried out by the software engineering team, after the cost simulation available at the Atlassian website, in addition, attributes were raised for choosing the solution: security, ease, flexibility for customization.

Therefore, the first option was discarded, due to the restrictions of the partner company's own business requirements in maintaining its product data in a self-managed environment. In addition, cloud migration solutions typically entail higher costs and come with challenges related to workload and ensuring a smooth transition from one environment to another with minimal interruptions (C. Ward et al., 2010). On the other hand, the second option involves hosting the applications on the partner company's own infrastructure. Taking into account the attributes of the cost analysis, the decision was made to proceed with the data center upgrade. The results of this cost analysis may be expected.

However, when mapping the current state, it was identified that the costs of the new move (to the data center) would be higher if no action was taken to get around the problem of the license cost per user. Since the web application used five different instances with separate databases (for production, development and testing), which totaled 15 virtual machines, and with different volumes of users, the largest of which had 4,612 users. In addition, these users could also exist on the other instances for different projects, representing approximately 11,200 users. Therefore, if the migration took place with all these instances and duplicate users, the cost would be in the range of 15,000 users (the number defined by Atlassian for the new data center).

As a way of making the option of migrating to the self-managed data center viable and avoiding high costs, it was decided to eliminate duplicate users by refactoring the source code and comparing duplicates. The aim of the code refactoring was to improve the maintainability of the applications contained in Jira, where it was noticed that some of them were duplicated in other instances. With the migration underway, these duplicate plugins were improved and this ensured that the objectives of the new instances were met.

Another adopted solution was the consolidation of instances. Previously, we operated with five instances, but we transitioned to only two instances (for production, environments, and testing), totaling six virtual machines. This solution was feasible due to the implementation of sanity tests, which helped save time and resources. These tests facilitated the swift detection of potential usability issues during the migration process (Chauhan, 2014).

In order to balance the workload, four-node clustering was adopted, which made it possible to maintain the stability of the instances, especially during the migration process, since in some cases it was necessary to restart the instance due to applications being migrated to the production database. To maintain stability, stress tests were also carried out with a larger amount of data in the indexing, which allowed more users to be active simultaneously.

Once the workload was balanced, because there was always a cluster node available to receive the necessary changes, it was possible to reduce the number of non-existent users and eliminate tools with duplicate logics that existed in the previous process, by validating data conflicts between customized functionalities for each instance.

### **3. Results**

The obtained results indicate that the migration to the data center was the best option for the partner company in the case study. Concerning the analyzed attributes, it is observed that in terms of security, especially when dealing with specific business rules, the preference is to keep the data self-managed by the organization rather than in the cloud environment. Regarding ease of customization, it is evident that in this case, Atlassian would be the better option as it provides technical support services and security updates. However, the team identified this as an opportunity for improvement, and it was in this area that the software engineering team focused their efforts. In terms of flexibility for customization, the optimal choice was to leverage the software engineering team. This allowed new developments to align with the new business rules of the present study's company, resulting in significant improvements in application web performance and usability. In terms of costs, the cloud solution ends up being a more expensive option compared to the self-managed data center.

In this way, the solution adopted by the team with the unification of instances not only reduced financial costs, but also maintained high performance, data security and reliability and ensured that updates to the web application versions were possible. With the actions used, the number of users went from approximately 12,000 to less than 10,000 users, bringing usage into a range with fewer users, which made it possible to work within the range of 10,000 users and also made it possible to improve efficiency and reduce the maintenance of the applications contained in each instance.

Therefore, the solution adopted through a research and development project resulted in a cost reduction of 70% compared to the option of maintaining the old data

process and servers provided by Atlassian. Work of this kind reinforces the need for companies to rethink traditional models, aiming to reduce process costs and risks. In addition, solutions from research and development (R&D) projects can play an important role in evaluating and testing possible changes to the process, without compromising or interrupting production.

Expected results for the future include further cost optimization, enhanced data security, improved application performance, task automation, infrastructure scalability, and innovation drive. These objectives aim to streamline processes, ensure regulatory compliance, boost operational efficiency, accommodate future growth, and leverage advanced technologies for continuous improvement in the shared database environment. By achieving these outcomes, the organization can enhance productivity, reduce risks, increase agility, and stay competitive in the dynamic business landscape.

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