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Image Processing Applications in Cloud Computing in Airline Industry

Sireesha Kolla [1*], Srujan Ganta [2]
[1, 2] National Institutes of Health, India

* Corresponding Author: **Sireesha Kolla**

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Abstract
The integration of image processing technologies with cloud computing has significantly transformed operations across various industries, including aviation. In the airline industry, this convergence enables real-time analysis, enhanced scalability, and cost-efficient processing of visual data. Applications range from automated baggage handling and facial recognition for passenger identification, to aircraft maintenance through visual inspections using drones and AI-based diagnostics. Cloud-based platforms allow for centralized data storage and computing power, facilitating collaboration and streamlined workflows across geographically distributed teams. This paper explores the critical roles of image processing in airline operations and how cloud computing amplifies its impact, improving efficiency, safety, and customer experience. The study also discusses current trends, challenges, and future prospects in the adoption of these technologies within the aviation sector.

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Keywords: Image Processing, Cloud Computing, Airline Industry, Facial Recognition, Aircraft Maintenance

Introduction

In this current era, the airline industry is dealing with a number of of challenges. Among those technological challenges are the most crucial ones. In this paper aims to discuss the difficulties in the airline industry which could be possibly solved by adopting and moving to cloud computing from legacy servers, systems, and applications. To focus on the cloud computing challenges, the paper focuses on Hawaiian Airlines. This Hawaiian Airlines is the mid-scale premium airlines which is based in the Honolulu, Hawaii. This company has a history of running its flight services for last one century. And the revenue of this company is 2.3 Billion dollars with 7299 staff including airline and IT operations staff. It has 27 US destinations and 9 International destinations. As it is operated in wide range this organization is depended on multiple systems, technologies and vendors are involvement to make airline operations successful. While following this process, there is a lot of dependencies on those systems. To get the single place holder for entire data in the organization this Hawaiian Airlines has moved their multiple systems data to Microsoft Azure cloud. There is a specific reason particularly in choosing this Microsoft azure cloud. As they have lot of legacy systems now after implementing this cloud in the organization their operations speed has increased a lot and they were able to assess the performance of operations on the fly as the data is live in the cloud. As we know Microsoft Azure cloud runs on subscription basis it has reduced lot of servers' maintenance cost because this cloud is taken care by the Microsoft. Efficiency of the data retrieving got improved by 85% when compared to previous systems and it also saved a lot of cost to the organization. This is the first airlines which is implementing and moving entire infrastructure to cloud. As I am an employee of Hawaiian Airlines and I work on Microsoft Azure cloud Engineer I have little in-depth insight and overview of the company in implementing cloud computing.

Challenges

As the airline industry is growing significantly, the increase in competition is forcing the companies to look for cost cutting. As a result, majority of the airlines are finding reliable and efficient way of improving their systems and services.

This can be achieved through cloud computing technologies. In general Airlines faces some of the below changes in their daily business operations (A. P. Sheth, 2012) [4]. The implementation of the cloud computing in Hawaiian Airlines organization is a major move from the current systems to cloud is a big move for the organization and they moved for many reasons.

Reliability is another important thing for the airline's experiences technical issues and because of reliability and flights gets delayed or cancelled. It affects the company financially and it will also create customer service issues. These issues are mainly caused because of outdated software and less reliable technology which are on premises.

To overcome this problem Hawaiian Airlines has moved its infrastructure which helps the airlines to transform from the legacy systems to new cloud technologies which are more reliable and stable. This cloud is also offering greater flexibility at minimal cost, which helps even a small sized airline avoid operational outages (M. Armburst, 2009). Cloud also offers disaster recovery option which helps airlines to minimize the system downtimes. Disaster recovery is one of the main challenges that contributes to the airlines business is disaster recovery. Data loss is a major concern for all organization. Unfortunately, no matter what, there will be some situations that are completely out of our control. In the present market even a small amount of downtime can have a great negative effect. Downtime will lead to the lost efficiency, revenue of the organization and the brand reputation. So, to maintain seem less transactions and operations to happen the cloud guaranties the data stored is always available. Cloud-based services deliver fast data recovery for all kinds of emergency situations from natural disasters to power outages. 20% of cloud clients guarantee disaster recovery in four hours or less, just 9% of non-cloud clients could guarantee the equivalent (Foster. I, 2008) [1].

Flexibility is also one of the major concern which airlines has so when they migrate to cloud computing which provides organizations the flexibility to change the need over storage and operations in very quick time as they can scale up or scale down depending on the service provided by the companies. Instead of buying some expensive upgrades the cloud service provider take care of that also offers unlimited storage capacity by saving lot time and money.

Benefits of the collaboration are the efficiency in the airlines organizations cloud platform collaborates employees from different geographic locations securely and allows to access all the cloud services through just internet connection.

Moving API's in Cloud Using APIs in cloud is a key for the organization, which makes the application platform extensible, speed up the access to platform, managing the platform security and handles the organization's analytics easily. Examining APIs is very crucial so organizations need to ensure if it is secure enough to integrate with a third-party application where users sensitive information can be used and examining how importing and exporting data into cloud is handled through APIs.

Conclusion

To conclude this Hawaiian Airlines has been implemented cloud computing for all the applications and moved its infrastructure to cloud computing. By moving the infrastructure to cloud they have increased its efficiency in their applications by 73%. And data fetching by 89% when compared with their previous relational databases. Interms of cost savings they have eliminated the on-premises servers and moved to cloud which saved them upfront 8 Million dollars by moving to cloud and every year they are saving 3 Million dollars as per the internal revenue analysis. They got successful in implementing the cloud computing and had advantages of cloud by moving their API's to cloud, single place holder for the entire data to perform analytics has become so easy and data from cloud is more reliable and the business users in the organizations are trusting the data from cloud.

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