

CLOUD ADOPTION FRAMEWORK : QANTAS

Deep Roychoudhury
School of Computing (Msc in Cloud
Computing)
Utility Computing
Dublin, Ireland
x19109130@student.ncirl.ie

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INTRODUCTION

The Cloud Adoption Framework is a simple and agile solution to achieve sustainable business value with cloud services. The Cloud Adoption Framework consists of four phases to make the business grow making the company to concentrate on more valuable and productive outcomes. The four phases of Cloud Adoption Frameworks are :

- Align Business & Cloud Strategies
- Rapid Discovery & Planning
- Realize & Sustain Business Value
- Innovate & Transform

Below is the Cloud Adoption Framework for Qantas (Australian airline) which explains the companies business value and ideas to increase their productivity.

QANTAS : TRANSFORMATION TO CLOUD

I. ALIGN BUSINESS AND CLOUD STRATEGIES

A. Qantas

Qantas, one of the leading and growing aviation industries of Australia was founded on 1920 and is currently the third oldest airline in the world. The airline has an overall reach of over Australia's domestic and international air. Qantas began its international journey in the year 1935. The growing Australian aviation industry has developed a group of Qantas over the years and is looking forward to increase its domain to other areas. The **Qantas group** includes Qantas Domestic, Qantas International, Jetstar and Qantas Loyalty. The Qantas group also has a range of subsidiary companies and strategic investments. The group has an employee count of over 30000. As of March 2014, Qantas had a share of 65% on the Australian domestic market and hence it is listed in **Australian Securities Exchange(ASX)** also known as Australian Stock Market.

B. Triggers of digital transformation

The Commercial Aviation market is characterized by high cost, fierce competition and very low margins. In order to stand out from other aviation industries, Qantas has to provide the best customer experience. The experience must be of high standards and meet the customer expectations. Qantas aims to provide a consistent and smooth experience for its customers right from booking till the arrival at the final destination. With this and the rising customer numbers were making Qantas fallback in the race. Qantas had to develop a new strategy to conquer the market. The corporate

strategy to this problem by Qantas was that they wanted to develop an in built application that would accumulate and present passenger information to the cabin crew for better recognition and improve customer intelligence captured on board the flight. For Example, the task of the application would be to alert the crew members about the customer who is registered in Qantas and had their tier promoted on the last flight. Hence, the crew could prepare their greetings and service plans according to the events. Previously, these information were not available in timely manner without manual intervening.

C. Why cloud?

To obtain an approval for the application, Qantas had to develop a prototype application in a very short period of time for the trial. Developing an application in such short period of time in which the application has to fetch data from various systems of data from around Qantas was a very difficult task. In addition to this the application also has to comply with Qantas security policies. This adds up cost and is time consuming. The platform had to be cost effective, should have the ability to **scale up and down** as per the demand, should be available in fractions of seconds, should have lower latency and should be redundant. Initially, this was to be launched for 1000 crew members and have the plan to extend it to other customer facing employees such as receptions lounge staff and check in personnel. In this scenario, the only solution to make the application platform cost effective with **scalability and redundancy** is to move Qantas to cloud. Cloud was the only solution to Qantas to make their application redundant, scalable and which follows Qantas **security policy**. The **capital expenditure** could also be minimized and replaced with **operational expenditure** by moving to cloud. Hence, the team could concentrate more on innovation and productivity. At that point of time clearly, Amazon Web Services (AWS) was one of the best cloud service providers compared to other cloud service providers.

D. Company Interests -

With hours and days of brainstorming over the options of Cloud Service Providers and **on premise** setup company was keen to know about the profits and loss of shifting or migrating their data over cloud and not on premise. The idea of leveraging the capital expenditure to operational expenditure changed the mindset of the company to shift to cloud. This shift could enable them to concentrate more on core areas and leaving the rest to CSP(Cloud Service Provider). Apart from this shifting to cloud could also help them in coming future where the Qantas group can

expand their business without worrying about the underlying changes to infrastructure. Amazon Web Service(AWS) was definitely one of the most reliable and secure in terms of experience and **accountability**. Hence, Amazon Web Service was chosen as the cloud service providers for Qantas. “The capability and maturity of the AWS brand and its proven track record really stood out for us when evaluating service providers,”. (Andrew Stevens,2012, aws)

II. RAPID DISCOVERY AND PLANNING

2.1 Rapid Discovery-

A. *Were they were before in terms of its landscape:*

With the technology rising and the number of users having access to internet increasing day by day, Qantas group were able to manage their tasks with on premise or private deployment model. As the number of users using the on premise services increased they started to lag behind and it was getting difficult to manage the load. It was getting difficult to manage the work loads which was caused by the **increased number of users** for the flight booking systems, to the weather **health check systems, fuel detection systems** as well as the **crew management systems**. Also with the idea of taking Qantas airline to greater lengths and to other overseas countries, the company was facing problems with managing its big data. The Qantas legacy systems could not handle the **compute power** required to run the analysis around determining if its ambitious flight was possible.

For Example, Qantas were facing problems with its big data while planning and attempting to run a new flight from Sydney, Australia to Dallas, Texas. The company was facing problems with the computational capacity of running a flight for such a long distance. They were facing computational challenges using the weather forecasting system, the crew and passenger management system and the fuel detection system to make the flight successful. With computational power limited and storage capacity requirements increasing day by day, the estimate of the total computation time would be several months. With on premise model, the total cost of ownership was also accelerating.

In addition to this, due to on premise model of Qantas, they were not able to reach a lot of customers across the world. They had to implement a solution which could enable them to influence customers across the globe without much delay or latency.

B. *Total Cost of Ownership (TCO) :*

With the total cost of ownership(TCO) increasing, the number of passengers travelling on a particular month will not be the same on the other month. For Example, people will travel more during the holiday seasons but those cases are intermittent. Also, there might be situations when the fuel consumption will be less and the number of passengers are also less. If the company keeps on buying the server, storage and the hardware based upon the requirements or as per demands, the company will have to face a huge loss. From the technical perspective and with the help of utility computing the total cost of ownership for the company should not lead to **wastage of resources**. The graph for the

demand with total cost of ownership is never steady with an on premise model. Also, with the above example, Qantas was facing issues with the scalability and the computational power for huge amount of data and its processing.

Hence, this problem of scalability and the computational timeframe could be reduced using a **hybrid setup** of private and public cloud. Also, the cost efficiency of the company will increase with the implementation of this hybrid cloud. Most of the **Capex(Capital Expenditure)** will be converted to **Opex(Operational Expenditure)**. By moving to a hybrid cloud architecture they will be able to reach customers from all the remote locations by implementing a fast **Content Delivery Network(CDN)**. Through content delivery network(CDN) contents can be cached over a distributed global network which would solve the problem of latency and they could even get a benefit of high transfer speeds. Basically, the idea of a hybrid cloud is to rent the servers and services of Cloud Service Providers(CSP) for a better operational performance. With a hybrid cloud the total cost of ownership(TCO) will be reduced since, the cloud charges only for the services that are used and not pay for the entire services as they were paying for the entire private servers whether in use or not.

2.2 Planning -

C. *Proposed action to avoid breakdown :*

In order to solve the problem of scalability and computational requirements the only solution is to shift the on premise model to a much better hybrid model. Which means in addition to the private resources, Qantas will have to **leverage some of its resources** to public cloud. The best possible option for a public cloud with a much better experience and reliability was Amazon Web Services(AWS). With AWS framework much of the infrastructural needs can be overcome such as, the cost over buying additional servers to compute and storage can be reduced. With AWS the problem of **elasticity** can also be reduced. For Example, during the off season the number of servers required to accomplish the tasks were much less than during the high demand seasons.

D. *Plan of action to mitigate problem :*

The solution that was proposed for the Qantas technical glitch was to make use of Amazon EC2(Computational) and Amazon S3(Storage). With Amazon EC2 Qantas could utilize millions of instances over multiple operating systems. In addition to enormous capability over computing, Amazon EC2 also provides high level of security over its infrastructure. The Qantas group can implement **Multi Factor Authentication(MFA)** to allow certain level of abstraction to the users such as cabin crew would get access to only those applications which are related to the crew members and cannot access the details of the applications that are authorized to the Qantas airline pilots. Also with **Identity Access Management(IAM)** Qantas, will be able to dedicate traffic based upon the roles assigned such as, customers would be directed to the urls which are assigned to them by the company. This will lead to full resource utilization and there will be no wastage of resources.

With Amazon S3 the storage capability of Qantas would increase to billions servers. This would solve the problem of big data which the Qantas group were facing for airline services to longer distance. For example, the problem of big data that the Qantas airline was facing for flight from Sydney to Texas was will be solved using Amazon S3.

E. What solution they used :

The solution the Qantas group used was to implement **Amazon EC2** for computation and **Amazon S3** for enhanced storage capabilities. Amazon Web Services was implemented. The airline engaged **Full 360**, an Advanced Consulting Partner with the AWS Partner Network (APN), to quickly iterate and test multiple big data technology solutions to best fit the business objectives.

III. REALIZE AND SUSTAIN BUSINESS VALUE

A. What was the impact on the organization -

With the implementation of Amazon EC2 and Amazon S3, the Qantas team were able to mitigate a lot of technical limitations that they were facing during the on premise model. With the hybrid model, Qantas was able to solve the problem of big data as well as the computational timeframe. Qantas is now able to run almost 4000 instances at a time and that's a mixture of multiple instance types and multiple operating systems. Till date "we've launched about 2.7 million instances and we've got a significant spend across hundreds of accounts." (Steven Tyson,2019,itnews)

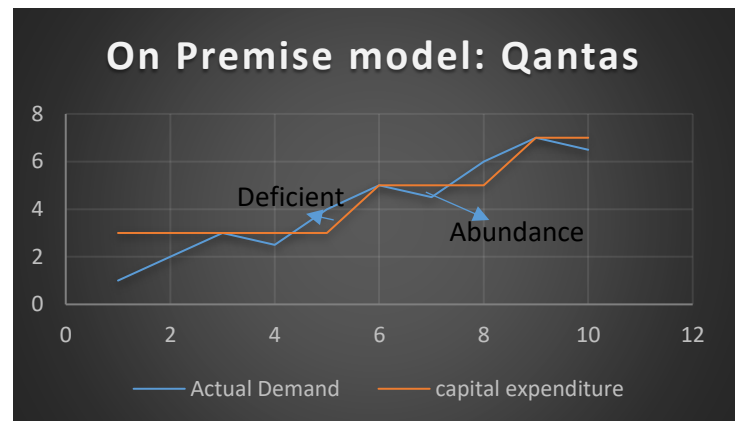
B. Business value-

With such a fierce market on airline industries, the Qantas group were able to draw customers attention and soon they started to show the effect of moving systems to cloud. The advantage AWS provides is it enables large enterprises to innovate in ways not previously possible. The airline started work on the application in June 2012, and was able to roll out the pilot program to 20 people within just 12 weeks. The application is used by nearly all 1,000 cabin crew supervisors – at least one on every domestic and international flight – and the carrier expects to extend this reach to another 500 crew. The application enables Qantas to capture incidents where a customer is not completely happy with the service they receive. The crew uptake was incredible, and from an engagement perspective of staff members, was a huge success. The reliability and redundancy of solution on AWS has ensured almost **99 percent availability**. The employees have learned a lot about the cloud through this process and it has all been very positive. The airline can then refer these situations to its customer care team to resolve proactively before the customer contacts them. In addition to this AWS also takes into account the security measures that Qantas can comply with.

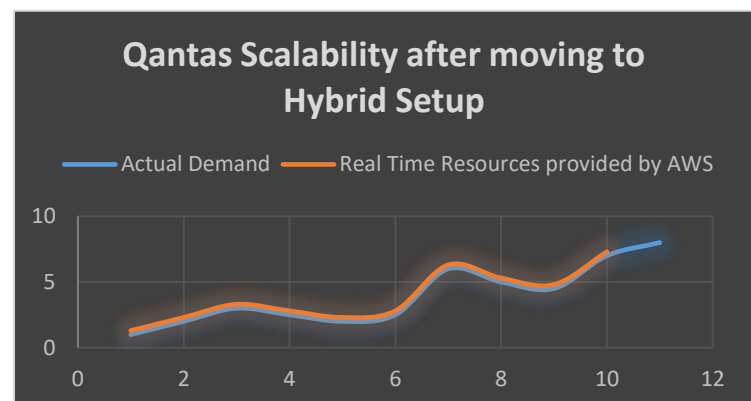
C. Critical analysis and examination

Analyzing the shift of workloads from on premise model to a hybrid model has definitely given an edge over the market to Qantas airline. Clearly, the problem of scalability and **operational efficiency** has been solved. Apart from work efficiency, the productivity of the company has increased a lot. For Example, the **cost of infrastructure** has been

largely reduced with AWS coming into picture. They don't have to worry about buying servers, maintaining the servers and deployment compatibilities. Below graph shows the benefits that Qantas has achieved shifting from Capex(Capital Expenditure) to Opex(Operational Expenditure).



With On premise model we can see that there is and deficient of resources at one point when the demand is very high. Whereas, at other point of time the resources can be seen in abundance. This clearly shows that with on premise model, Qantas had to do a lot of predictions which are not always correct. This leads to lot of resources as being waste and sometimes **over utilization of resources** which are making the systems very slow. Hence, the traditional setup was lagging behind in terms of scalability, speed and efficiency.



As can be seen from the figure implementing AWS has taken over the scalability issue with autoscaling feature, which enables Qantas to focus on productivity and not on the infrastructure. As the demand increased so as the resource supply. Hence, Qantas is getting maximum utilization of resources.

After moving to Amazon Web Services or by making their systems to hybrid model, Qantas was able to gain a lot of benefits like they benefited by the improvement on **agility and responsiveness**.

Qantas should also consider about the type of instances which could help them save financially. Qantas should choose to make a bid on **spot instances** since spot instances can be cost effective rather than relying upon on demand

servers. Amazon gives its users 4 basic options with pricing benefits such as on demand, reserved, spot and dedicated. On demand is the basic pricing tier in which it has a fixed price for all instance and as the demand increases so does the number of instances with fixed pricing. A Reserved Instance is a reservation of resources and capacity, for either one or three years, for a particular **Availability Zone** within a region. The company has to pay a bit less than the on demand service and a steady price unless it reaches the bid value and has to pay at the usual higher rate after that. A Spot Instance is an unused EC2 instance that is available for less than the On-Demand price. Hence, this type of instance is the cheapest and can reduce the total cost of ownership.

Dedicated instances are completely dedicated set of instances for a particular company and pricing is high for this type of instance. Hence, Qantas should focus on spot instance to reduce its Total Cost of Ownership.

IV. INNOVATE AND TRANSFORM

A. Next 5 years

The next 5 years are crucial for Qantas airline in terms of fierce market competition and customer experience. With implementation of public cloud in their systems they are able to reduce costs as well as Qantas is able to pivot itself towards the agility to innovate. The aim of Qantas in next five years will be to grow the market to much larger distance across the globe. With EC2 coming into picture giving the power to compute big data Qantas will be able to manage its resources without much computational issue. Qantas will be thinking about moving its sixty to seventy percent of resources to cloud to make their systems much faster.

B. Future Technologies:

In the field of **Artificial Intelligence** as well, Qantas could even introduce its booking systems using Artificial Intelligence bots that could easily book or terminate tickets as per the requirements of customer. In addition to this, Qantas can also implement an automatic monitoring tools to keep track of the customers right from beginning of the journey, entering the gate of the airport till boarding the plane. In this way, the customer experience for Qantas will be much simpler. Even the record for the aircraft health checks can be monitored using Robotics. With implementation of robotics and AI, the crew members could more concentrate on a better customer experience and leaving the rest to bots.

With implementation of **robotics** and setting foot on Artificial Intelligence, the burden on the computation and storage could rise. Which could also lead to ambiguity and mismanagement of right services. Qantas should focus on putting the applications on **ECS(Elastic Container Service)**. By putting the applications on Elastic Container Service, the applications can be more secure and can have separate environments for applications user by customers, applications used and crew members, pilots, etc. Also the container service, checks for any breakage in the container itself and if any breakage is found then, it is replaced by a new container without any additional setup. Hence, the management of applications becomes easy.

Amazon ECS includes multiple scheduling strategies that place containers across clusters based on resource needs (for example, CPU or RAM) and availability requirements.

In the future, Qantas can implement **drone services** in the airport as well as for aircraft health check. The drones could automatically detect any faults in the aircraft by using image processing, sensor technologies to find any leaks in the aircraft interior as well as using **thermal imaging** to find any blinded heated spots which could get worst while on the flight. For Example, in the current scenarios of **coronavirus**, the thermal imaging in a camera could easily track a person travelling with fever and particular symptoms which the crew members could obtain the details of a particular person and take necessary actions.

In addition to this, **IoT(Internet of Things)** could be implemented by Qantas. With IoT, passengers luggage can be tracked easily if misplaced. In the coming future Qantas will be focusing on pretty much everything that could make their customer experience on the top list of any airline industry.

Conclusion

Qantas is a growing and stable airline industry which believes in best customer experience and innovation for its users. With AWS the company has reached a big height and is also keen on building up on new areas to look forward in the future. If Qantas keeps on engaging into development and building user centric models, soon Qantas could make it to a much large scale company in the next coming years.

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