MIGRATING ON-PREMISES APPLICATION TO WINDOWS AZURE PLATFORM (MICROSOFT CLOUD)

ASGHAR PAKBAZ

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ABSTRACT

Legacy systems are usually attached with outdated technologies which over time become a bottleneck for organizations to manage and maintain. Old and poorly utilized architecture make systems run slow and far from expected, however sometimes organization cannot live without those. Renewing application architecture can be considered as an option but it is time consuming and very costly. Cloud computing as an ultimate solution can be proposed to migrate on-premises application to a utilized environment in terms of infrastructure, computing power and virtualization. In addition, it provides a highly available and elastic computing environment which makes organizations to only pay for what they use. In this research, after a brief introduction to main concepts of cloud computing particularly Windows Azure platform (Microsoft Cloud), it is tried to analyze and assess OnePortfolio system developed by Riskk Sdn Bhd, to see whether it is feasible to be moved to Windows Azure. OnePortfolio operates on a SOA architecture comprised of three main components: services, client application and database. Throughout this research, Windows Azure migration lifecycle in compliance with ISO/IEC 14764 international standard is used as the methodology to perform the migration. Once the application is analyzed and migrated to cloud, it is compared to on-premises environment to evaluate its performance and security mechanism.

ABSTRAK

Sistem legasi dengan teknologinya yang ketinggalan zaman sentiasa menjadi halangan bagi organisasi untuk mengurus dan menyelenggara dari masa ke semasa. Senibina yang lama dan tidak optimum telah menyebabkan sistem beroperasi secara perlahan dan ketinggalan jauh daripada jangkaan. Walaubagaimanapun organisasi tetap memerlukan sistem tersebut. Memperbaharui senibina aplikasi boleh dianggap sebagai satu pilihan tetapi ia memakan masa dan sangat mahal. Pengkomputeran awan adalah antara penyelesaian yang boleh dicadangkan dengan melakukan migrasi bagi menggantikan aplikasi-aplikasi yang sedia ada di premis kepada penggunaan persekitaran sepenuhnya sama ada dari sudut infrastruktur, kuasa pemprosesan and virtualisasi. Selain itu, teknologi ini menyediakan servis yang lebih memuaskan dan fleksibel menyebabkan organisasi hanya membayar untuk apa yang mereka gunakan. Dalam tesis ini, selepas beberapa pengenalan ringkas kepada konsep utama pengkomputeran awan terutamanya platform ‘Windows Azure (Microsoft Cloud) ‘ , analisa and penilaian akan dibuat ke atas sistem ‘OnePortfolio iaitu sebuah sistem yang sedia ada kepunyaan Riskk Sdn Bhd, untuk melihat sama ada migrasi ke ‘Windows Azure boleh dilaksanakan atau tidak. Sistem OnePortfolio beroperasi menggunakan senibina SOA yang terdiri daripada tiga komponen utama iaitu: perkhidmatan, permohonan klien dan pangkalan data. Sepanjang kajian ini, proses migrasi Windows Azure yang mematuhi standard antarabangsa ISO/IEC 14764 akan digunakan sebagai kaedah migrasi. Setelah aplikasi ini dianalisa and dimigrasi ke pengkomputeran awan, ianya akan dibandingkan dengan sistem yang sedia ada di premis untuk menilai prestasi and mekanisma keselamatannya.

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AES	**:**	Advanced Encryption Standard
AIS	**:**	Advanced Informatics School
HTTP	**:**	Hypertext Transfer Protocol
IaaS	**:**	Infrastructure as a Service
IIS	**:**	Internet Information Service
LAN	**:**	Local Area Network
OS	**:**	Operating System
PaaS	**:**	Platform as a Service
SaaS	**:**	Software as a Service
SDK	**:**	Software Development Kit
SLA	**:**	Service Level Agreement
VHD		Virtual Hard Disk
VM	**:**	Virtual Machine
VPN	**:**	Virtual Private Network
WCF	**:**	Windows Communication Foundation

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CHAPTER 1

PROJECT OVERVIEW

1.1 Introduction

This chapter provides an overview of the project "migrating on-premises application to Windows Azure platform (Microsoft cloud)". This chapter shall describe the background of the company as well as the project progress and findings during eight months of industrial attachment at Riskk Sdn Bhd Company. Also, this chapter briefly describes the existing problem, and identifies the project objectives and scopes.

1.2 Company Background

Riskk.Com is a boutique Software and Outsourcing house for Asset Managers such as Unit Trusts, Life Offices, Custodians, Trustees, Bank Wealth Management Units and Asset Managers. Its product hallmark is an Uncanny Simplicity and Imaginative Innovations (Riskk.com, 2013).

Among all software products that the company developed, OnePortfolio considered being the premier solution to solve unique financial problems. Riskk Sdn

Bhd, was founded on 1997, from its early establishment there was potential to propose business solutions for financial industry. Over the years, various products developed and distributed to the market but none was as successful as OnePortfolio. Risk Sdn Bhd describes OnePortfolio as below:

"OnePortolio, our signature product, is a truly unique innovation that will power the next wave of productivity gains of the industry. It smoothly combines the Front, Middle and Back Office Functionality in ONE system. It is the ONLY system that is designed from ground up as ONE unified system for Pre Trade Compliance, Performance Attribution, Risk management, Multicurrency Accounting, Settlement, Unit Pricing, Position and Transactions management. This introduces simplification, innovation, leveraging of functions and smoother flow of processes. It also eliminates complicated "work around" and duplication of functions of three separate systems (Riskk.com, 2013)".

1.3 Problem Statement

Availability, Scalability and Cost Saving are the three major factors in every financial application to keep the process running smooth all the time. Availability is to improve uptime and scalability offers resource elasticity. Riskk Sdn Bhd as one of the pioneers in developing financial applications started to establish a plan to migrate their signature product to a cloud platform. Perhaps the initial probe is to find out which cloud service provider is compatible with the current solution. OnePortfolio has been developed based on Service-Oriented Architecture (SOA) which simply means to design the application principles in form of interoperable services as software components which can be reused as required. Therefore, it consists of two separate solutions, one plays the role of a server which all services resides there and the other one is client application which used as the interface to send users' interactions to server side.

Figure 1.1: OnePortfolio Architecture

Microsoft has recently introduced its cloud computing platform with various functionalities to quickly build, deploy and manage applications across a global network of Microsoft-managed datacenters (Windows Azure portal, 2012). As it is said earlier, OnePortfolio is developed based on Microsoft technologies which make Windows Azure more compatible towards this particular migration process.

The project aim is to analyze and evaluate migrating OnePortfolio application from on-premises environment to Microsoft cloud computing platform known as Windows Azure.

1.4 Project Background

Cloud computing become so popular over the last decade. An increasing number of organizations used clouds to build highly scalable systems to provide more cost effective, equally or perhaps more reliable and highly scalable solution for their users. Like other competitors in the market, Riskk Sdn Bhd set a record to put a financial application on cloud to offer an effortless and elastic solution to its different type of clients from small to large. Besides, cloud infrastructure opens a prospect for the future

project to be designed and developed completely running on cloud to gain the full advantages of available features which will be discussed in Chapter 2.

1.5 OnePortfolio Background

Oneportfolio project has been initiated back in 2009 as the company intended to integrate core functions of fund management into one system. The project comprised of three main cores:

- Pre trade limit engine
- Unit pricing
- Multicurrency fund accounting

As one of the premier financial application provider, Riskk Company has been tried to form comprehensive services to financial parties. In order to survive within the competitive market, The Company has to build a signature product to make them distinct in the market. To accomplish this objective the company decided to establish a framework by developing a financial tool in order to improve the services given to its client. The achievement has been completed by wining several awards from different organization during the last few years.

Over the years OnePortfolio has been improved and upgraded with new features to fulfill new requirements demanding from the clients. The latest version is OnePortfolio v7.0 which released recently in 2012. As the company stated the followings as their Disruptive Difference in OnePortfolio solution:

- A Zero Error Technology
- Unit Pricing - 20 Times More Productive
- Pre Trade Limit Utilisation Engine

- Fund Accounting. Simplified! No Integration, No Reconciliation
- Cloud Magic

1.6 Project Objectives

According to problem statement and improvements discussed in current version of OnePortfolio, this research will focus on migration analysis and evaluation for OnePortfolio system which is running on-premises environment to Microsoft Cloud computing platform. To ensure achieving the goal, the following objectives are aimed to be gained:

1) To study and analyze the concept and feasibility of migrating an existing application to cloud environment.
2) To modify and convert OnePortfolio to be deployed to cloud computing environment.
3) To migrate OnePortfolio from on-premises environment to cloud computing infrastructure.
4) To formulate a guideline for developers to perform modification prior to development for future works.

Each step and activity related to that objective will be defined in project scopes and project methodology.

1.7 Project Scope

The migration process is conducted in an integrated environment consists of a server machine running windows server 2008 R2 providing services for clients machines

running windows 8. According to ISO/IEC 12207, the purpose of the Software Maintenance Process is to provide cost-effective support to a delivered software product (ISO/IEC 12207, 2008). Riskk Sdn Bhd clearly stated its purpose of migrating to cloud computing to deliver a cost-effective and secure solution for its clients to eliminate business overheads as they grow.

Scope of migration as a maintenance process includes analyzing the modification request for its impact on Riskk Sdn Bhd and the legacy system (OnePortfolio) to distinguish type of maintenance, scope of process and criticality (ISO/IEC 12207, 2008).

ISO/IEC 12207 classifies type of maintenance to corrective, improvement, preventive or adaptive to a new environment. As this research is defined, migration lies under the category of adaptive maintenance.

Availability and Scalability are two main elastic features offered by any cloud computing service provider. Riskk Sdn Bhd is striving to discover new and improved techniques to leverage capabilities of cloud computing in the long run. Definitely, for a financial application, uptime is one of the most critical prospects and as the organization grows it need a scalable plan to further enlarge its assets with less overhead.

According to Figure 1.1, migration is considered being one of the activities with respect to the Software Maintenance Process. During migration any modification should be in accordance to ISO/IEC 14764 standard. The process will be initiated by a migration plan which includes:

- Requirements analysis and Definition of migration.
- Development of migration tools.
- Conversion of software product and data.
- Migration execution.
- Migration verification.

- Support for the old environment in the future.

For smooth transition to the new environment, employees at Riskk Sdn Bhd and users of the system will be notified regularly including why a migration is crucial, description of Windows Azure platform and its availability, also any contingency plan in case new environment doesn't meet their requirements.

Since OnePortfolio is dealing with financial data transaction, some clients prefer to have on-premises environment as a backup in case any unexpected circumstances occurs, this is when parallel operation of the on-premises and cloud environment could fulfill the requirement.

For Rissk Sdn Bhd, a successful migration is very imperative, but to apply the obtained knowledge from the migration process to business operations and future works is perhaps the greater achievement, that is the reason an explicit guidelines need to be documented.

Finally, a post-operation review shall be performed to assess the impact of changing to the new environment; the result shall be carefully studied to execute proper actions. More importantly data shall be preserved and accessible by the new environment, data in OnePortfolio is the most critical part as it builds the structure of financial transactions.

1.8 Project Vision Statement

The aim of the project is to analyze and evaluate migrating OnePortfolio application from on-premises environment to Microsoft cloud computing platform known as Windows Azure.

1.9 Deliverables

The author performs an intensive research on cloud computing area and concept of migrating an existing application to cloud infrastructure to be able to formulate an appropriate solution for future works.

According to ISO/IEC 14764 the output of a migration activity should be:

- Project Maintenance Plan
- Requirement Analysis; covers details of approach and methodology used
- Migration tools
- Migrated Software Product
- Measures
- Archived data

All the above mentioned deliverables will be included in this research document, in other words, since the aim of this project is to analyze and explore cloud environment, the above mentioned deliverables will be discussed and documented throughout this research.

1.10 Project Schedule

A Gantt chart illustrating the schedule of the project is shown in Appendix A.

1.11 Summary

This chapter described an overview of the research to be carried out. Background of the problem, the software application, standards, project plan and various activities performed over the period this research also defined. As discussed the main motivation for the Sdn Bhd to migrate OnePortfolio application to cloud services is to improve and expand its signature product with outstanding and up-to-date solution be stay resilient in the market. The objectives of this particular research are to study and understand cloud services and to document acquired knowledge for the future works.

OnePortfolio is benefiting from a service-oriented architecture which clients are running in an integrated environment to be remote consumer for services residing on a server machine. Managing and maintaining this architecture with a large-scale application like OnePortfolio needs extra budget and effort to operate smoothly; however, cloud environment with its unique architecture can greatly saves and enhance journey.

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Note: Arranged alphabetically according to author's name.