Migrating to Cloud Computing

Task 1

1 Cloud Computing

In the Computing domain, a cloud is considered as the "virtual platform" that provides a variety of services to the user, that range from data storage to information exchange. Unlike the web provider, the domain of cloud computing adopts effective ways in order to store the information or data irrespective of requiring direct active user management (Prasad, Naik, and Bapuji, 2013).

Even though cloud computing can efficiently move data from one place to another, relying upon the services and features provided, but it must also be taken into consideration which cloud environment is more helpful as per fulfilling the organizational needs before migrating to cloud computing. Cloud computing provides three types of services, namely; "Platform as a Service (Paas) (Kulkarni, Khatawkar and Gambhir, no date)", "Software as a Service (SaaS)" (Naresh, Leela, and Suneetha, 2019), and "Infrastructure as a service (IaaS)".

1.1 Types of Cloud Computing

PaaS is a cloud environment that makes the organizations develop, execute and also organize their applications irrespective of facing the intricacy of cloud infrastructure maintenance and building (Yasrab and Gu, 2016).

SaaS is a cloud distribution model that enables the "third party providers" to not only host but also make the software applications accessible to its users and customers, through the internet. It is therefore also named as "on-demand software", for which it makes use of software licensing as well as the delivery model providing their customers a "subscription-based service". In this, the central system of hosting allows its customers to take advantage of several cloud computing features, along with the data storage (Palos-Sanchez, Arenas-Marquez and Aguayo-Camacho, no date).

IaaS is a cloud-based service model that provides its customers a computing infrastructure on the basis of outsourcing. After outsourcing the IaaS, organizations can freely conduct their operations over the cloud and can be stayed away from competitors or any other threat attacks (Shahzadi *et al.*, 2017).

2 Cloud Deployment Models

The organizations that want to migrate to cloud computing must consider their deployment models before adopting a specific one to fulfill the company's requirements (Bamiah and Brohi, 2011).

2.1 Private Cloud

A private cloud is a deployment model that is offered to be used exclusively by one organization. It is up to the organization to manage, own and function over that cloud on an individual basis or involving a third party to perform the organizational activities.

2.2 Public Cloud

Public cloud is another deployment model, where the cloud infrastructure can be openly used by anyone in the general public. Several Businesses, government, and academic institutes can own, manage as well as operate this deployment model as they have to provide their services publically.

2.3 Hybrid Cloud

Hybrid cloud is the deployment model whose infrastructure is made of both public and private models. Yet, it remains to be an exceptional entity that is bound by the standards and the proprietary technology.

For the manufacturing company in the case study, it would be better to use a Hybrid cloud model. This is because with this the organization can leverage the benefits of both public and private cloud and can use anyone of both when needed. The hybrid model proves to be grateful among the organizations especially when they need to scale up their IT infrastructure (Aryotejo, Kristiyanto, and Mufadhol, 2018).

3 Recommended Tasks for Incorporating Hybrid Cloud

Interlinking and integrating the cloud-based applications, information, and data with that of conventional, non-cloud-based enterprise applications as well as the data is considered to be the significant step for deploying a hybrid cloud system. The following tasks have been recommended for deploying Hybrid cloud into the organization for migrating the data to cloud computing, as follows (*Hybrid cloud integration in 7 easy steps*, 2016):

3.1 Figure Out Suitable Deployment Model for Data and Application

It is essential to opt for a suitable deployment model that can be aligned with organizational needs including IT and business, making it tranquil to accomplish the aims and objectives of the organization. The decision criteria that must be taken into consideration are security, flexibility, speed, cost, service level, automation, locality, and system interdependencies.

3.2 Addressing the Connectivity Requirements

If an organization deploys the hybrid cloud system, that organization must adhere to the availability of the following connectivity requirements:

- Contemplate the requirements of each of the links among the components spanning together two or more cloud-based services or the on-premises services. It must ensure that suitable connectivity can be accessed supporting the business requirements.
- An organization must be familiar with the virtualization technique and must install the network virtualization phenomenon, if available.
- IT must also be ensured that connectivity capabilities can sustain the resilience as well as the "disaster recovery requirements".

3.3 Managing the Cloud Environment

The organizations must take a few actions plans to provide management solutions for the deployed hybrid cloud, as follows:

- Organizations must enable hybrid system management, for spanning every environment that has been used within.
- It must integrate and adapt the on-premises management tools that are available or should consider some new tools if needed, also cloud management services must be enabled on the basis of expenses and functionality.
- Organizations must also look for the APIs as well as the integration points for enhancing the managerial abilities instead of the "fixed function management applications".

4 Recommended Work-Product to be Generated

The most essential part of migrating to a cloud computing system is to take into consideration some work products as the resulting outcome of every activity during the whole development process. Table 1 below shows the several work-products that can become an outcome for deploying cloud computing. "Legacy Application architecture model and Cloud architecture model" are considered to be the frequently recommended work-products (Gholami *et al.*, 2016).

Table 1. Recommended Work-Products to be generated from migrating to the cloud computing *(Gholami* et al.*, 2016)*

Work Product	Aim
Legacy App. Architecture Model	It is the architectural explanation of the "legacy application", the data model, the dependency among elements as well as the interfaces. This work-product assists the developers to comprehend well the existing state of legacy applications and offers a detailed insight about the effort that is needed to resolve the inconsistencies among the aimed cloud-based solution and legacy application.
Cloud Architecture Model	It is the model that identifies and states the deployment and distribution of application legacy elements within the cloud as per the criteria, for instance, data

	transfer, privacy, regulations, network latency, geographical positions of elements. This cloud-based model signifies the components that must be migrated to the specific cloud and also the components that must be kept within the local network and not to be migrated.

5 Recommended Role

Several roles can be identified while migrating the traditional system of the organization to cloud computing, which is listed as follows (Gholami *et al.*, 2016):

- Business Analysts
- System Architecture
- Project Management
- System Analyst
- Developers

Among all of the mentioned above, Business analyst plays a vital role to ensure the ideal cloud computing approach, either the hybrid system or cloud-only. It operates as the bridge among the issues that Cloud-based computing tries to resolve and execution of cloud-based technology.

In this regards, Business Analyst assists in (*The Business Analyst and the Cloud*, no date):

- Identifying the processes and the services that must be moved or transferred or migrated to the cloud.
- Outlining the essential governance, regulations, and policies to make sure the security as well as integrity of the crucial and significant organizational information and data.
- Helping organizations and businesses to comprehend the service levels that are required by the cloud providers to assure the cloud solutions to accomplish what business needs from them.
- Indicating the best steps to observe and monitor the cloud performance and help in identifying the responsibilities at the personal level for monitoring the performances.

Business analysts are considered to be the best-suited professionals in any organization to accomplish the above-mentioned responsibilities ensuring smooth incorporation within the cloud technology.

Task 2

6 Rational Unified Process (RUP)

The main purpose of RUP is to deliver the model to proficiently execute the commercially verified approaches for the deployment of processes and also for use during the development cycle of the software (Reyes-Delgado *et al.*, 2016).

The RUP is itself not a tangible development model, instead, it is intended to be tailored to the particular requirements of the project, or organizational team. The RUP is based on some key ideas like the phases and building blocks of the development processes, defining, who, when, what, and how for taking place the development ('What is Rational Unified Process And How Do You Use It?', 2017).

6.1 RUP Best Practices

RUP has some fundamental best practices, which are commonly used in the organization for executing the development process and completing the phases:

- **Iterative Software development**: It encourages iterative development by operating on high-risk elements in each phase of the "software development lifecycle (SDLC)".
- **Managing the Requirements**: RUP describes the methods to organize and track the operational requirements, tradeoffs, documentation, and decisions of the business requirements and functionalities.
- **Visually Model Software**: Based on UML, the RUP delivers the means to VMS, comprising of the components and the relationship among them.
- **Verification of Software Quality**: RUP helps with the design and its execution as well as the assessment and evaluation of all tests during each phase of the "software development cycle".

6.2 RUP Phases of SDLC

RUP follows the 4 types of phases during the SDLC process, which are as follows along with the explanation (*Introduction to Alternative Iterative Methods*, 2016).

6.2.1 Inception Phase

In this phase, RUP determines the initial structure of the project. It is decided if it would be worth pursuing the project. In addition to that, the estimated cost along with the time that the project will take to accomplish is also determined. Moreover, the required resources are also determined:

The inception phase completes after fulfilling the following assessment criteria:

- Stakeholder concurrence and cost & time estimation.

- Fulfilling the requirements to be considered as evidence
- Cost, time, development process, and risk credibility
- Evaluation of the architectural model.
- Actual cost versus the estimated cost analysis.

6.2.2 Elaboration Phase

Elaboration is assessed by the RUP depending upon the following criteria:

- Stability of the deployed process
- Architecture stability
- Addressing the risk elements and demonstrating the implementation process
- Sufficient detailed and precise project deployment planning and credibility
- Stakeholder agreement
- Difference between the actual resource cost vs the estimated costs

6.2.3 Construction Phase

This phase is considered to be fulfilled by accomplishing the "initial operational capability Milestone", based on the following criteria:

- Is the software deployed is stable enough to be executed within the user community?
- Are stakeholder agreed to the particular transition for deploying the software
- Are the estimated/ planned and actual expenditures still satisfactory and adequate?

6.2.4 Transition Phase

The "product release milestone" signifies the completion of the transition phase once the following criteria are fulfilled:

- Are users fully satisfied?
- Estimated and actual expenses of software deployment are still satisfactory?

6.3 Advantages of RUP

- It allows being capable enough to adapt to the changing requirements during the SDLC.
- It emphasizes fulfilling the requirements and execution of accurate analysis and documentation.

RUP methodology would greatly help the manufacturing company in the case study to go with a detailed deployment cycle and proceed with migrating towards cloud computing (Hybrid cloud system).

7 References

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