Cloud Migration: A Case Study of Migrating an Enterprise IT System to IaaS

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Contents

Introduction

- Many enterprises are attracted to cloud-based services
- But enterprises decision-makers should also consider factor in other dimensions
- Primary focus was on the financial and socio-technical enterprise issues

Introduction (cont'd)

- Currently few case studies that investigate the migration of existing IT systems to the cloud
- To enterprise, IaaS layer of the cloud is the most accessible
- Amazon Machine Images are readily available for enterprise applications such as Oracle Database and Citrix XenApp

Background

- SME organization based in UK provides IT solutions for the Oil and Gas industry
- It comprise of around 30 employes with offices in the UK and middle east
- It has an organizational structure based on functional divisions: Administration; Engineering; Support; of which Engineering is the largest department

Background (cont'd)

- In this case study, they want to study the feasibility of the migration of one of the organization's primary service offerings (a quality monitoring and data acquisition system) to Amazon EC2

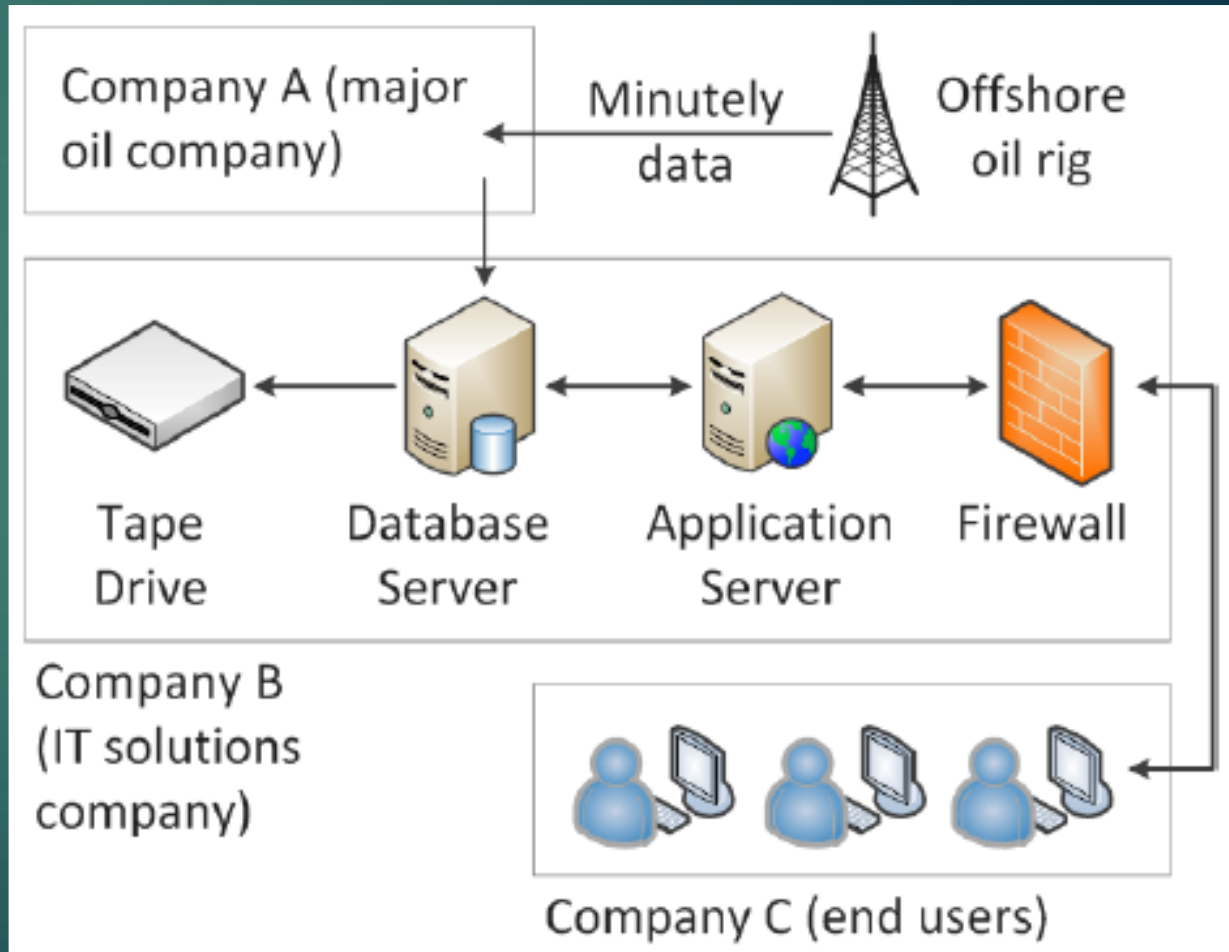

Figure 1: System Overview

Background (cont'd)

- This case study investigate how the same system could be deployed using the cloud offerings of Amazon Web Services.

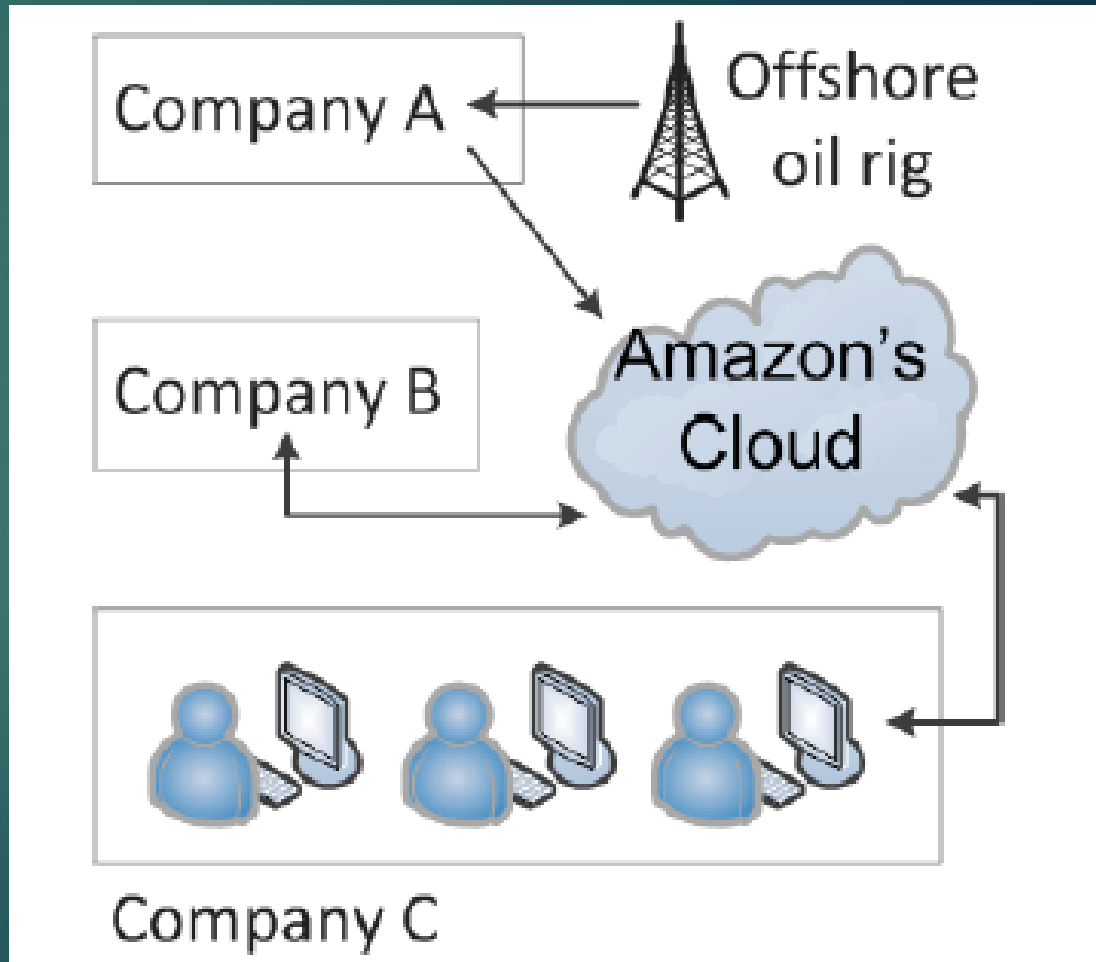

Figure 2: System deployed in the cloud

Related Work

- Armbrust et al. – elasticity an important economic benefit of cloud computing
- Motahari Nezhad – reduce operational and maintenance cost from business perspective
- Walker – developed a model to compare the cost of CPU hour when it is purchased as a part of a server cluster with when it is leased (e.g. from Amazon EC2)
- Klems et al. – presented a framework to compare the cost of using cloud computing with more conventional approaches

Methodology

- Initially, all the document related to the system were gathered and studied
- Stage 1:
  - Infrastructure cost of the system were calculated from project reports and invoices
- Stage2:
  - All the process affected by migration were identified and analyzed
- Stage3:
  - Produce a poster based on result of stage1 and stage2
  - Issues were identified and agreed using stakeholder impact analysis

Result

- Infrastructure costs
  - From B's perspective, the cloud present opportunity to bid for new project without having to worry about space in their data center
  - From Company C's perspective (the end users), cost of running their system in the cloud is cheaper than using Company B's data center

Period	Amazon Server Instances			Cmpny B
	2 small	1 small + 1 large	2 large	
1 Month	£200	£390	£590	£620
1 Year	£2,400	£4,680	£7,080	£7,440
5 Years	£12,000	£23,400	£35,400	£37,200

Table 1: Comparison of infrastructure cost between cloud and company B's data center

Result

- Support and maintenance
  - B's support department provides regular system check to ensure that the system is running as expected
  - Regular check involve checking error logs, backup logs, server load levels, communication links etc
  - The support and maintenance of the system would be affected if the system was migrated to the cloud
  - Cloud support department would no longer have full control over the system infrastructure

Result

- Stakeholder Impact analysis
  - Stakeholder impact analysis data suggests that there are numerous potential benefits and risks

Benefits

Benefits	#
Opportunity to manage income & outgoings	3
Opportunity to offer new products/services	2
Improved status	2
Removal of tedious work	2
Improve satisfaction of work	1
Opportunity to develop new skills	1
Opportunity for organizational growth	1

Result

Risks

Risks	#
Deterioration of customer care & service quality	3
Increased dependence on external 3rd party	3
Decrease of satisfying work	3
Departmental downsizing	2
Uncertainty with new technology	2
Lack of supporting resources	1
Lack of understanding of the cloud	1

Benefits

- Opportunity to manage income & outgoings
- Opportunity to offer new product/services
- Improved status
- Removal of tedious work
- Improve satisfaction of work
- Opportunity to develop new skill
- Opportunity for organizational growth

Benefits

- Opportunity to manage income & outgoing
  - Improved management of income and outgoing
  - Buying hardware are high cost and clients can be slow to pay
  - Customer have many choices
- Improved status
  - Support engineers improve their status by successfully championing the high profile migration that has strategic implication
  - Support manger takes benefit by working with new and potentially prestigious technology
  - It may lead to career career progression and satisfaction

Benefits

- Improved satisfaction of work
  - Support engineers can focus on more satisfying and value adding work
  - Technical developers involved in system support
  - Opportunities for sales and marketing staff
- Opportunity to develop new skill
  - For support manager and engineers, to develop new skills in cloud computing administration
  - Sales and marketing staff to develop skill by producing product and service creation and launching

Benefits

- Opportunity for organizational growth
  - Opportunities for sales and marketing staff to create new products
  - It may target market segments that was previously not attracted

Risks

- Deterioration of customer care and service quality
  - Support manager and engineers are at risk of becoming dependent on cloud service provider
  - Support manager doesn't control the deterioration of service quality
  - It has also risk temporary requiring more resources to cope with migration and also relative lack of knowledge and experience held by support staff in cloud system
  - Difficulty in customer support

Risks

- Decrease in satisfaction
  - Decreasing job satisfaction
  - Dependent on third party
- Departmental downsizing
  - Risk of downsizing to IT support departments
  - IT companies has majority of work in hardware and network support

Risks

- Uncertainty with new technology
- Lack of supporting staff
  - Staff may initially require more time to perform the same tasks due to having learn how to do so in the cloud environment

Conclusion and future work

- Cloud computing can be significantly cheaper alternative to purchasing and maintain system infrastructure in house
- Cloud computing potentially eliminate many supported related issues
- It reduces cost 37% in infrastructure and 21% for support call
- Migration of cloud has both impact i.e. benefits and risk
- Limitation of this paper is only consider on system infrastructure cost

Thank you