



## Case study

# Cloud computing procurement and implementation: Lessons learnt from a United Kingdom case study



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## ARTICLE INFO

## Article history:

Received 24 July 2015

Accepted 27 July 2015

Available online 21 August 2015

## Keywords:

Cloud Computing  
UK local authority  
Case study  
Implementation  
Transformation  
Public Sector

## ABSTRACT

The United Kingdom Public Sector delivers a wide range of public services to the citizen. These complex service delivery functions are underpinned by sophisticated information technology and information system solutions. The information technology and systems field is rapidly changing, developing and emerging. A recent evolution is Cloud Computing, where information technology and systems are hosted outside the host organisation, on the internet by third parties. There is a need for the Public Sector to review these solutions to determine whether they are feasible and advantageous. This case study investigates the rationale for the implementation of Cloud Computing in a practical setting and from a user perspective in a United Kingdom Public Sector organisation. The analysis demonstrates how the Cloud Computing solution was deployed and these findings are then mapped against the current research. The case also identifies a set of practical lessons for future Cloud Computing implementation. The findings and lessons learned will benefit other analysts implementing Cloud Computing and undertaking Cloud Computing research.

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## 1. Introduction

Cloud Computing (CC) is one of the newest developments of the Internet. CC allows information technology and systems to be delivered and used externally over the Internet (Tassabehji and Hackney, 2014). This technology includes servers, personal computers, laptops, tablets, applications, telephones, smart phones, email and file storage (Pillay, 2014). Historically, these systems have been hosted, managed and supported locally, in house and internally by the host organisation. Usually by the organisations internal IT department. CC elements have been around for a number of years. Some companies such as Google have implemented CC solutions such as CC email (Guardian, 2011) and Apple has implemented CC data storage solutions (Accenture, 2010). However, in more recent years CC has developed and matured to offer the full range of IT services, systems, applications and mobile computing services (Pillay, 2014). UK Public Sector organisations have traditionally delivered and hosted IT systems locally and in-house. There have been a few exceptions where the internal IT service, in part or whole, has been outsourced to a third party. With outsourcing, the internal IT delivery and hosting can be either locally, remotely or a combination (Simpson, 2011).

UK Public Sector organisations have been strongly encouraged by the UK National Government to embrace and adopt CC, in particular, the Government Cloud (G-Cloud). It has been both predicted and reported by UK National Government IT strategy architects that by switching to these initiatives, significant savings can be achieved (Accenture, 2010; Cabinet Office, 2011b). The reason being cited is that as G-Cloud is recognised as a shared and common service, costs would be shared amongst each organisation (Sultan, 2013). There is also increasing recognition that efficiencies will come from common information technology systems, common business processes and 24/7 service delivery in the Public Sector (Simpson, 2011). CC therefore would appear to fit well in assisting to achieve this Public Sector vision (Pillay, 2014). It has also been argued that CC will deliver more agile IT responses to evolving Public Sector business requirements and business processes (Xu, 2012). It has also been reported that CC facilitates mobile working and enables organisations to become more transformational and innovative (Sivarajah et al., 2014). Furthermore, Sultan (2013) contends that CC will improve IT resilience and security.

Against this positive and optimistic backdrop however, there is concern about the potential risks of CC. These risks could include for example governance issues, integration with legacy systems, data security and ownership, vendor immaturity and the inability to back up and restore data (Jansen, 2011). Many authors (Gartner, 2010; Shin, 2013) contend that IT and CC is critical to modern organ-

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isations and therefore it is vital that any implementation considers both the advantages and risks that CC presents, especially when considering or implementing CC (Xu, 2012). This case therefore investigates a United Kingdom Local Authority (UKLA), which has recently procured and implemented CC. CC was introduced with the aim of primarily reducing costs and to comply with the UK political mandate to investigate Cloud opportunities. The concern is how CC was initiated and deployed and draws upon the literature and case study findings to extrapolate lessons to help understand its implementation aspects in a Public Sector organisational setting and from an organisational perspective. The research therefore is concerned with the high level, key strategic issues and lessons that have emerged from the case study.

This case is structured as follows: Section 1 above contains a brief introduction to the UK Public Sector and CC. In Section 2, a literature review of CC is undertaken, including the advantages and risks of CC. This is followed by Section 3, in which the research methodology, Grounded Theory, is presented. In Section 4, the case study findings are analysed and discussed. Section 5 contains a discussion and lessons learnt for CC and Section 6 provides the conclusion, wherein the summary of the case study is presented.

## 2. Cloud computing

The deployment of CC has been heralded as the solution to a host of IT and organisational problems (Xu, 2012). Proponents of CC argue that the implementation can reduce costs and improve current IT deployment. There have been case studies in the UK Public Sector where CC deployment has delivered proven benefits to the organisation in question (Gartner, 2010; Cabinet Office, 2011b; Shin, 2013). (Sivarajah et al., 2014) note that significant operational efficiency and organisational transformation can be achieved through the deployment of CC. This is achieved by 24/7CC operations and allowing staff to access CC anywhere worldwide where there is an internet connection. This has resulted in CC access from internet cafes, mobile wi-fi and hot-desking in back office locations. There is a growing demand for the public sector to embrace more emerging and newer technology (Pillay, 2014). Furthermore to be more innovative (Shin, 2013). Organisations are therefore increasingly implementing CC in an attempt to transform service delivery and provide 24/7 access to Public Sector services. This is both internally to the staff of the organisation and externally for the citizen.

According to Pillay (2014) the primary advantages of CC are summarised as follows:

- Faster implementation for small scale systems.
- Easier access from any appropriate Internet ready device.
- Increased resilience.
- Improved agility.
- Reduced costs.
- Improved security.
- Reduced maintenance and support.
- Release IT resources.
- Empowerment of end-users.
- Virtualisation technology.
- Sharing of resources and costs.
- Centralization of infrastructure.
- Peak-load capacity function.

The potential risks that have also been noted include:

- Increased costs.
- Data location.
- Poor performance.

- Service availability.
- Limited capacity.
- Security and privacy.
- Disaster recovery.
- Data ownership.
- Integration.
- Difficult to customise.
- Governance.
- Provider trust.
- Portability restrictions.

The advantages and risks as highlighted above from the normative literature are now investigated via an in depth case study and then mapped against the literature.

## 3. Case study research methodology

CC is both a technical and social phenomenon. To undertake a valid case study, it is necessary to choose a qualitative research methodology. The literature demonstrates the need for case studies where the main research areas are the CC concepts employed and where the researcher wishes to understand how different actors engage with the technology. The focus therefore is understanding human action in the case study to develop CC in an organisational setting. The research approach uses grounded theory (GT) (Glaser and Strauss, 1967). GT is a field based, discovery qualitative research methodology, which allows the researcher to develop an account of the organisation under study by empirically investigating the organisation from a user orientated and organisational perspective. The research methodology extrapolates findings that are grounded in the research data. GT is well suited to research situations that deal with “qualitative data gathered from participant observations, face to face interaction, semi-structured or unstructured interviews” (Glaser and Strauss, 1967).

Baskerville and Wood-Harper (1996) have demonstrated the value of interview based field research in the context of case study exploration. GT is interpretative research, wherein the researcher develops a rich account of the case organisation. GT is useful for exploratory research where rigid and well-controlled experimental design is not possible (Glaser and Strauss, 1967). The findings therefore become derived from knowledge that is grounded in the data (Glaser and Strauss, 1967).

The case study involved interviews with key staff associated with CC, which were identified in conjunction with the Chief Executive and the Authority's board of Directors. The interviews were semi-structured and interviewees were encouraged to comment and to raise, reveal and suggest issues and challenges that they regarded as important to the subject in question. These interviews were subsequently transcribed and analysed using the GT interpretative research methodology. The approach required the collection of empirical evidence from a variety of sources in the case study. The main aim was to understand CC in the case organisation via concept discovery and to extrapolate outcomes in the form of discussion and lessons learnt. The knowledge gathered was used to be informative rather than true or valid. A total of eight staff members, consisting of key stakeholders within the UKLA, were interviewed individually. The interviews gave good oral testimony. This enabled a broad and rich view of CC to emerge via the GT approach.

Data triangulation was undertaken by comparing and contrasting the interview findings with observation results and document reviews. This was required to validate and verify the findings of the primary research data with secondary information (Walsham, 1995). This also helped to ensure that no bias emerged from either the participants or the researcher, thus the findings and conclusion made from the cases are valid (Yin, 2009).

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