A Framework for Analysing the Impact of Cloud Computing on Local Government in the UK

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ABSTRACT

Cloud computing is hailed as the next-revolution of computing services. Although there is no precise definition, cloud computing refers to a scalable network infrastructure where consumers receive IT services such as software and data storage through the Internet like a utility on a subscription basis. With an increasing number of data centres hosted by large companies such as Amazon, Google, and Microsoft cloud computing offers potential benefits including cost savings, simpler IT, and reduced energy consumption. Central government and local authorities, like commercial organisations, are considering cloud-based services. However, concerns are raised over issues such as security, access, data protection, and ownership. This paper develops a framework for analysing the likely impact of cloud computing on local government and suggests an agenda for research in this emerging area.

Keywords: *Business Process Change, Cloud Computing, Data Privacy, Data Protection, Government IT, IT Innovation*

INTRODUCTION

Cloud computing is held as the next revolution in the delivery of computing services. It offers enormous potential advantages to organisations such as cost savings, scalable computing services, simpler IT infrastructure, reduced energy consumption, and so on. In response to declining IT budgets and the lack of adequate skills, and as part of the e-Government agenda, cloud-based delivery models are rapidly gaining the attention of government IT leaders.

The primary driving factor compelling government organisations to consider cloud computing is the potential for capital and operational expenditure savings. Faced with the ongoing economic downturn public sector organisations are seriously considering cost saving strategies to optimise computing resource. However, software applications; hardware, infrastructure, platforms, services and storage, or whether the government should develop its own cloud, are key issues that require careful consideration.

Concerns about the use of cloud computing in private organisations have already been raised. But this has not deterred the government from continuing developing the government cloud (G-Cloud). In the UK government has already begun the process of developing the

G-Cloud which will be rolled out over the next few years. Key concerns relate to the security and ownership of data, the potential impact on employment and the structural and cultural implications of moving to cloud provision.

As yet, little research has been carried out on the implications for local government. This paper provides a framework for analysing the likely impact of cloud computing use within local authorities and suggests an agenda for research in this emerging area.

THE CONCEPT OF CLOUD COMPUTING

Although there is no universally agreed definition of cloud computing the term refers to a computing service provided via internet connections, a service that can be scaled up and down. It can mean a storage service; or it can be seen as a platform or as a software service. According to a group of researchers at Gartner cloud computing has five key attributes: service-based, scalable and elastic, shared, metered by use and using Internet Technology (Plummer *et al.,* 2009). Customers and providers of cloud services will consider any of above attributes or a combination of attributes to determine the expected services. Essentially it is a style of computing where IT capabilities are provided as a service delivered over the Internet to a customer's workplace, similar to utilities like water and electricity which are 'piped' to the customer's premises.

It can be argued that cloud computing evolves from and integrates a number of IT practices both private and public organisations have experienced over past years: outsourcing, software as service (SaaS), web-based storage etc. The development of cloud-based services has accelerated its pace in the last few years due to improved technologies and faster internet speed.

For service users cloud computing is an attractive alternative to building their own computing infrastructure, which can be cost efficient (Korri, 2009). The key advantages of cloud computing are held to be greatly reduced costs, increased efficiency and a significant reduction in energy consumption leading to cost savings and greener IT (Foster *et al.*, 2008; Luis *et al.,* 2008; Aymerich *et al.*, 2009; Grossman, 2009; Korri, 2009; Maggiani, 2009; Nelson, 2009). In the *Digital Britain* (2009) report, the UK government sees the adoption of cloud computing as critical to the success of its plans to increase efficiency in the public sector and is working with various suppliers to develop a dedicated G-Cloud for the delivery of all government services.

In the private sector, concerns have been expressed both about the security of data management and loss of organisational control of a key resource (Buyya *et al.*, 2009; Grossman, 2009). The confidential and sensitive nature of data stored in the public sector has made this issue particularly sensitive (Nelson, 2009). There is also concern about possible effects on employment caused by the introduction of centrally-run computer services. So far, in the public sector, there has been limited adoption of cloud computing.

THE CONCEPTUAL FRAMEWORK AND ITS APPLICATION

The conceptual framework (Figure 1) and application of cloud computing in local government draw on a number of models for analysing the change process including Lewin's model (Lewin, 1947) and PEST. Key issues of cloud computing are outlined using the PEST framework (political, economical, social and technological) to give the general background and the relevance of cloud computing for government organisations. Through applying Kurt Lewin's change process model driving forces and resisting forces are identified.

The implementation of cloud computing involves business process change, information assurance and governance, and choices of vendors, products, platform and approach. These issues will be discussed to raise aware-

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