





## About this paper

Despite many years of raising awareness of the benefits offered by cloud computing there are still some perceived challenges about the security of cloud services that remain and are holding back cloud adoption and its benefits. Given the importance of cloud computing to the UK's digital future it is vital that the cloud security messages and advice being delivered today are relevant to how cloud services have evolved over recent years. They should also address the concerns being raised by cloud users and ensure that they are communicated to, and understood by, the right audiences.

To ensure that this happens techUK has brought together cloud computing industry leaders and cyber security experts to develop this paper. It aims to provide information, advice and specific messaging for local government organisations, who can start to address trust and security concerns and misconceptions surrounding the use of cloud services. While the following is aimed at supporting local government organisations, this information and advice is considered to be applicable to other public sector organisations.

techUK would like to thank the members of the Cloud Security Working Group, and in particular:

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## Introduction

Cloud computing is fundamental to the UK's digital future. The next wave of the digital revolution is being powered by the Internet of Things (IoT), mobile applications, big data analytics and Artificial Intelligence (AI). Cloud computing underpins all these developments. It provides the capability to store, process and manage the vast volumes of real-time information being created through digital innovation.

The volume of digital information now both created on a daily basis means that cloud is fast becoming the easiest solution to adopt for organisations and consumers. Cloud provides the ability to access computing platforms and resources on an 'on-demand' basis, driving organisational efficiency and often cost savings. This flexibility increases innovation, productivity and operational effectiveness.

The UK Government has committed to adopting cloud computing, seeing cloud as key to delivering its ambitions for end-to-end digital transformation. However, the public sector market as a whole is not yet fully utilising the benefits of cloud computing. Local Government is on the cusp of a digital revolution and pockets of excellence are developing across the country in the transformation and delivery of services to meet the needs of citizens. Cloud has a crucial role in this, helping to break down traditional barriers to service delivery and enabling councils to do this differently. This is in addition to the efficiency savings that can be gained. For local government organisations to realise the full benefits of cloud computing trust must be built in the cloud and any perceived security challenges must be demystified.

A recent GovNewsDirect survey<sup>1</sup> highlighted a growing concern over the security of data in the cloud. Additionally in a survey of the 100 biggest councils in the UK, conducted by eduserv, 44% claim that they have no cloud adoption policy<sup>2</sup>. Other concerns include who owns data stored in the cloud, data protection compliance, and data access.

However, the reality is that cloud services can offer much greater levels of security and resilience as required by users. With the range of cyber security tools, solutions and educational initiatives available today cloud computing services can be as secure as users require them to be.

In fact there may already be public sector bodies in your area, such as local government departments and justice and emergency services organisations, that are successfully using cloud services today. These bodies are often a useful source of information and provide best practice examples which could help you in considering how best to select and use cloud services.

The following document is intended to build greater trust in the security of cloud computing with local government leaders that may be considering looking to use cloud services. It aims to provide information and advice for those who are deciding whether to transition to the cloud.

<sup>1</sup> [http://assets.govnewsdirect.co.uk/netapp/GovNews\\_and\\_NetApp\\_Survey\\_Report\\_July\\_2016.pdf](http://assets.govnewsdirect.co.uk/netapp/GovNews_and_NetApp_Survey_Report_July_2016.pdf)

<sup>2</sup> <https://www.publictechnology.net/articles/news/almost-half-top-councils-have-no-cloud-strategy-survey-says>

## Ensuring effective local government adoption and usage of cloud

The UK Government has recognised and shown commitment to adopting cloud computing and sees cloud as key to delivering its ambition for end-to-end digital transformation. Crucial to this has been the G-Cloud framework,<sup>3</sup> which originated as a joint Government and industry initiative, that now has over two thousand suppliers and has enabled over a billion pounds worth of spend.

However, local government departments may not yet be fully utilising the benefits of cloud computing. To reap the full benefits of cloud computing, public sector leaders must enable a culture which allows commissioners and buyers to leverage cloud computing as part of a process of business transformation.

The following advice is intended to support local government leaders to move to the cloud by addressing some of the common cloud security concerns and offering advice about how to build trust in the security of cloud services.

### What is cloud computing?

Cloud computing is an approach to computing which enables on-demand access to computing power and resources as and when required. Computing resources such as software applications, development platforms and Information Technology (IT) infrastructures are all delivered as a service on-demand and charged as they are consumed.

Cloud represents a shift from traditional computing. Benefits of adopting the cloud include the ability to:

- tap into state of the art and efficient information and IT infrastructures without having to make up-front capital investments
- scale up and scale down IT requirements based on business need resulting in reduced IT costs
- increase operational flexibility, agility and efficiency by not having to wait to build traditional complex computing hardware based infrastructure
- access automated and repeatable deployment of computing infrastructure
- offer employees the applications and tools they need to do their job which can help organisations to reduce the risk of shadow IT<sup>4</sup>.

Cloud computing is sometimes described as a utility-like service and realised on pooling resources across multiple organisations or other groups of users in order to achieve economies of scale. Cloud can provide organisations with increased agility, flexibility in how they use IT as well as reduce business costs and increased efficiency.

<sup>3</sup> G Cloud Framework allows public sector organisations to buy cloud services listed on the Digital Marketplace without going through a full tender process.

<sup>4</sup> Shadow IT refers to IT devices, software and services used by employees within the workplace that are unknown or outside the control of the organisation.

The full value of cloud computing to your organisation will only be realised if it addresses your organisation's needs, aims and objectives in a secure manner. For example, a decision to use private or public cloud services, or a mixture of the two in a hybrid cloud services model<sup>5</sup>, might depend on your organisation's needs, the type of data involved and the levels of assurance required.

The decision to take the first steps towards cloud should be driven by not just a desire to invest in the latest technological innovation, but also to solve a specific issue or business problem. For example, the ability of remote public sector workers (e.g. social workers) to securely access data and files when away from the office.

## Taking the first steps – how can cloud help you?

If you are a local government leader interested in adopting cloud computing, you may have even made the decision to implement a move to the cloud. Before you move forward, take a moment to consider the importance of the information for which you are responsible and the security controls and requirements you may need from your cloud provider.

Organisations of all sizes across the public sector have a responsibility to ensure appropriate security measures are in place at all times to protect the information you create, collect, process, manage, store and share. This can include information about your employees, customers, and supply chain partners as well as business related information such as tax returns and audit reports.

The good news is that cloud offers security benefits that can help local government to protect their information by providing greater security and resilience on demand as a service. Many reputable cloud computing services, including Infrastructure as a Service (IaaS), Platform as a Service (PaaS) and Software as a Service (SaaS), are already aligned with best practices in cyber security. There are also a number of industry recognised, independent and externally validated frameworks (for example ISO standards<sup>6</sup>) that different cloud providers may demonstrate their compliance with. Examples of these standards include:

- ISO27001 (Information Security Management System)
- ISO27017 (Security Controls for Cloud Services)
- ISO27018 (Personal Data in Cloud Environments)
- Cloud Security Alliance (CSA) STAR
- Cyber Essentials & Cyber Essentials Plus

As soon as a customer starts to use a cloud service, they should benefit from the investment made by cloud providers in state-of-the-art security network defences that are updated automatically in response to changes in the online threat environment. This means that organisations may no longer have to manually download security updates, install patches or run back-ups to ensure that their information remains secure.

But are these security benefits right for your organisation and the information you want to move to the cloud?

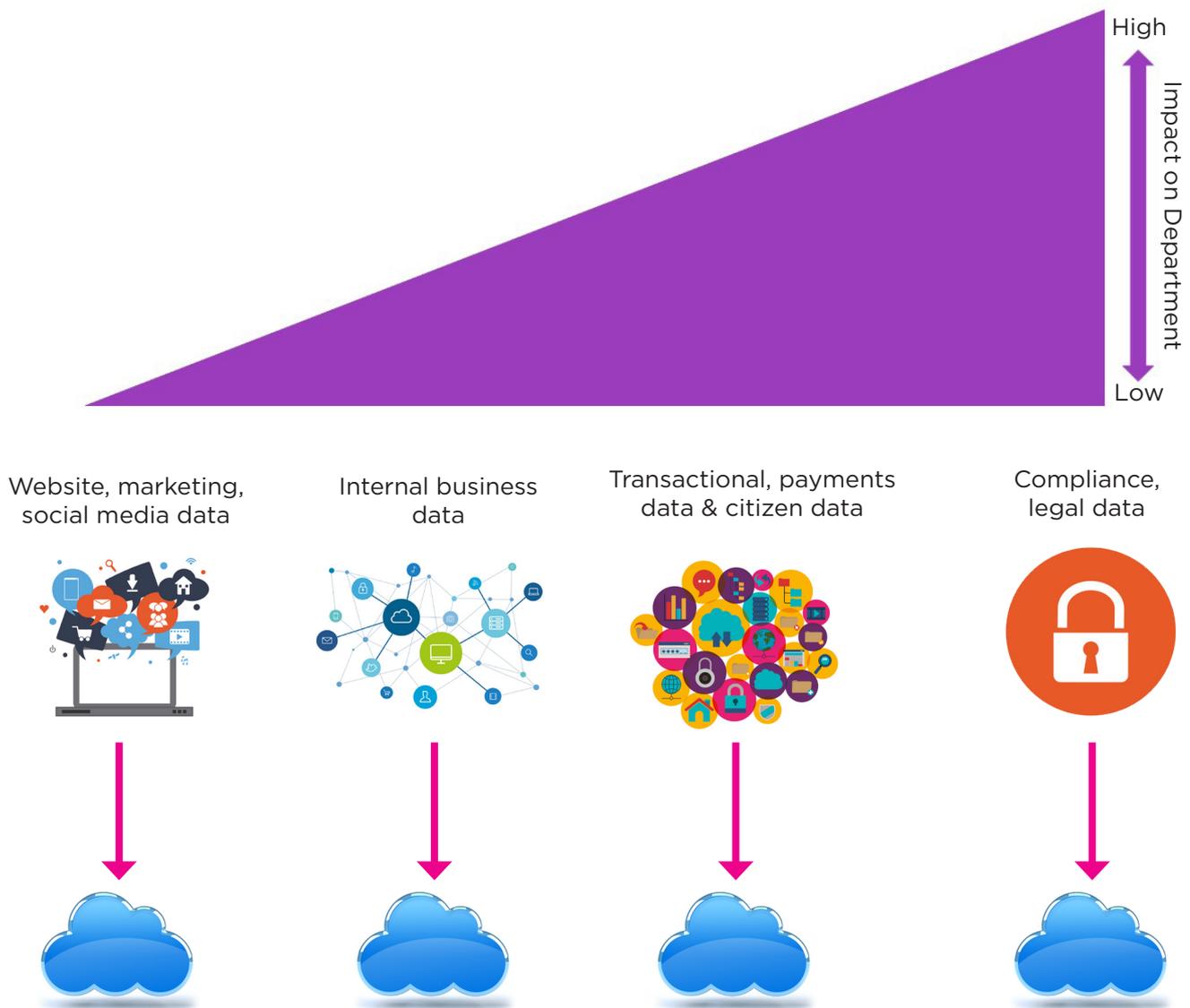
<sup>5</sup> NIST Definition of cloud computing <http://nvlpubs.nist.gov/nistpubs/Legacy/SP/nistspecialpublication800-145.pdf>

<sup>6</sup> [http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_tc\\_browse.htm?commid=601355](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_tc_browse.htm?commid=601355)

## Are cloud services secure and safe?

Before deciding whether to move to the cloud you should think about how you want to use cloud services and what information your organisation is happy to share with the cloud, as well as which provider meets your needs. Not all cloud services will be the same.

The chart below illustrates how the level of data privacy and security requirements you might be looking for from a cloud services provider might be different depending on the type of information you are sharing when using a cloud service:



## Is the security offered by the cloud right for your organisation?

The UK has a vibrant, fast moving and ever evolving cloud computing market. There are multiple cloud providers, of all size and shape, offering a range of innovative cloud services, both as a free to use and paid service, that local government can take advantage of.

With many different services available it's important that you remember to read the providers Terms and Conditions and consider the different levels of services, and data privacy and security measures that might be offered. Also, consider what industry recognised and independent standards (for example ISO standards) cloud providers are compliant with and whether these standards are externally validated. Remember it's your choice. Reputable cloud service providers continue to invest significantly in cyber security to ensure customer's information, wherever it is being stored, is protected against a wide range of cyber threats. They ensure policies and procedures are put in place to ensure information is secure and to prevent disruptions to information access should a security incident ever occur.

## Cloud ABC for Local Government

Before deciding whether to move to the cloud, consider the cloud ABC. Below are some issues and key questions you might consider when determining whether the security controls in place are appropriate to your needs.

Points to consider	Questions to ask your cloud provider about the service being provided
<p><b>A</b> <b>Always Ask</b> questions early in the commissioning process about the security arrangements available given the data you want to move to the cloud. This will ensure you can better understand and maximise the full opportunities from cloud computing services.</p> <p>techUK has published a three point plan<sup>7</sup> to transform the delivery of public services. It provides a framework for effective engagement with the public sector and industry.</p>	<p>What are the IT security arrangements in place?</p> <p>Is the data suitably encrypted when it is in transit?</p> <p>What standards are you compliant with? Have they been externally validated?<sup>8</sup></p> <p>Has the resilience of the underlying cloud infrastructure been independently security tested? How frequently does this take place?</p> <p>What are the technical and organisational measures in place in the event that a data security breach may occur? The Government's Cloud Security Principles can provide more advice here.<sup>9</sup></p> <p>What unscheduled service outage/unavailability has the cloud provider experienced in the last 12 months?</p> <p>Does the cloud provider have business continuity and disaster recovery procedures in place?</p> <p>Is there a standby or backup system in place if the main data centre fails, and how often do you test failovers?</p> <p>What are the access management processes, i.e. who has access to customer information and what policies are in place for staff access?</p> <p>What checks or vetting are undertaken on cloud service provider's staff?</p>

7 <https://www.techuk.org/insights/news/item/2266-techuk-3-point-plan-to-transform-delivery-of-public-services>

8 <https://www.bsigroup.com/en-GB/CSA-STAR-Certification/>

9 <https://www.gov.uk/government/publications/cloud-service-security-principles/cloud-service-security-principles>

Points to consider	Questions to ask your cloud provider about the service being provided
<p><b>B Best Practice</b> Work together with industry partners to identify and promote best practice and positive case studies of where the use of cloud computing is delivering significant business transformation in your organisation.</p> <p>Promoting what works and examples of best practice could help to create a cloud culture in your organisation which allows commissioners and buyers to leverage cloud computing as part of your business transformation to enable user-centered service design that focuses on innovation.</p>	<p>What data assets do you have in your organisation? Do you know where these data assets are currently stored or reside?</p> <p>Are other local government organisations or public sector bodies in your area using cloud services? What could you learn from their experiences of moving to the cloud?</p>
<p><b>C</b> Choose the best cloud service for your organisations information. It is your choice.</p> <p>Select a cloud provider that is offering a service that offers the security arrangement you need and meets your legal requirements.</p>	<p>Can the provider unilaterally change the contract and terms of service?</p> <p>Is there a right for the information to be transferred back to you at the end of a contract at no additional cost?</p>

## Changes to Data Protection Legislation (GDPR)

In May 2018 the new EU General Data Protection Regulation (GDPR) will come into force in the UK. This guide does not go into detail on the changes that the GDPR will introduce. However, if your organisation is processing or storing personal data of European citizens you will be impacted by the changes being introduced including measures relating to data portability and breach notification. The GDPR also introduces changes regarding liability for data controllers and data processors that will impact cloud services providers as well as significantly greater financial penalties in the event of breaches. The UK's Information Commissioner's Office (ICO) website<sup>10</sup> provides more information on GDPR and the changes it will introduce.

<sup>10</sup> www.ico.gov

## Conclusion

This paper can act as a guide for you to start to benefit from the full opportunities that cloud computing services have to offer. It is understood that a challenge facing leaders in making the transition to the cloud is the change it presents in the way organisations procure and access IT requirements whilst still needing to balance existing business demand for speed and security. However, it should be remembered that investment in cloud computing enables organisations to be more mobile and agile, increase collaboration between customers, suppliers and employees, improve efficiency and reduce costs.

Use the links below to find out more information about techUK's work on cloud computing and cyber security, including newsletters, upcoming events and activities which can support you on your cloud journey.

- **techUK Cloud, Data, Analytics and AI Programme**  
<http://www.techuk.org/focus/programmes/cloud-data-analytics-and-ai>
- **techUK Cyber Security Programme**  
<http://www.techuk.org/focus/programmes/cyber-security>



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