The involvement of records managers in cloud computing decisions: a cross-sectional study of New Zealand records managers

by

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ABSTRACT

Research problem: Cloud computing has become an important topic in many organisations, due to the benefits it can provide to businesses and their operations. This increased interest in cloud computing is also reflected in the records management profession. However, records managers using cloud computing need to be aware of many factors that could negatively affect control of their records, and be able to manage these potential implications. This study aims to discover the level of involvement that records managers have in decision-making relating to cloud computing, and also to determine how informed records managers are about the implications of cloud computing.

Methodology: The research design used was a cross-sectional study, with an online web survey being distributed to members of the NZRecords mailing list (an e-mail list for the New Zealand recordkeeping community).

Results: The results of this study highlight that records managers have low levels of involvement in cloud computing decision-making, and mostly do not believe that their opinions will influence decisions about cloud computing in their organisations. The findings of the survey reveal awareness of the potential implications of cloud computing is high, although more resources and training should be made available to these records managers, especially in the area of portability and interoperability of records in the cloud.

Implications: Requests are made for additional training resources to be made available. Suggestions are made for further research into the factors affecting records managers' involvement in cloud computing decisions.

Keywords: *recordkeeping, records management, cloud computing, New Zealand*

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1. PROBLEM STATEMENT

Cloud computing has become an important topic in many organisations, due to the benefits it can provide to businesses and their operations. These benefits can include reductions in costs, increased speed, and improvement of business processes (for example, by allowing location-independent access or location-independent collaboration) (Stuart & Bromage, 2010). According to the Ponemon Institute's Security of Cloud Computing Providers study, 91% of customers chose cloud computing to reduce cost, 79% move to the cloud for faster deployment time, 37% use the cloud to improve customer service, 36% move to the cloud to increase efficiency and 34% move to the cloud to increase flexibility and choice (2011). It is predicted that cloud computing's popularity will be such that 80% of businesses will have moved to the cloud by 2020 (Ahuja, Mani & Zambrano, 2012). This migration to the cloud will either involve an organisation choosing to use software as a service (SaaS), customer use of service provider applications; platform as a service (PaaS), the installation of customer applications onto the service provider's infrastructure; or infrastructure as a service (IaaS), the supply of a provider's infrastructure to customers (Mell & Grance, 2011).

This increased interest in cloud computing is reflected in the records management profession, with an increasing body of literature appearing on the benefits of cloud computing for records management (Cunningham & Wilkins, 2009; James, 2010; Ferguson-Boucher, 2011). However, records managers using or considering cloud computing need to be aware of many factors that could negatively affect control of their records. This includes the likelihood that their records might be stored in unknown locations, the potential problems that might occur when applying retention and disposal schedules to cloud-based records, the possibility of not being able to export data stored in the cloud, and the potential privacy and security risks that could result from using cloud computing for records management (Stuart & Bromage, 2010). Although these are important matters to consider, it is unclear to what extent records managers are aware of these issues.

There is also a noticeable gap in the literature about the level of involvement of records managers when it comes to implementing and managing cloud computing. The decisions that records managers could potentially be involved with include choosing whether to go to the cloud, selecting a cloud provider to use for records storage, and choosing to

collaborate with their IT department regarding cloud computing. There are very few studies on the level of involvement of records managers in these decisions, or their overall knowledge of the potential implications of cloud computing. Therefore, this research topic was chosen because there was such a significant gap in knowledge about this topic.

2. RESEARCH OBJECTIVES

The objective of this study is to determine the level of involvement that records managers have in decision-making relating to cloud computing and to determine how informed records managers are about the potential implications of cloud computing.

3. RESEARCH QUESTIONS

1. How involved are records managers in decision-making relating to cloud computing?
2. How informed are records managers about the potential implications of cloud computing?

4. THEORETICAL FRAMEWORK
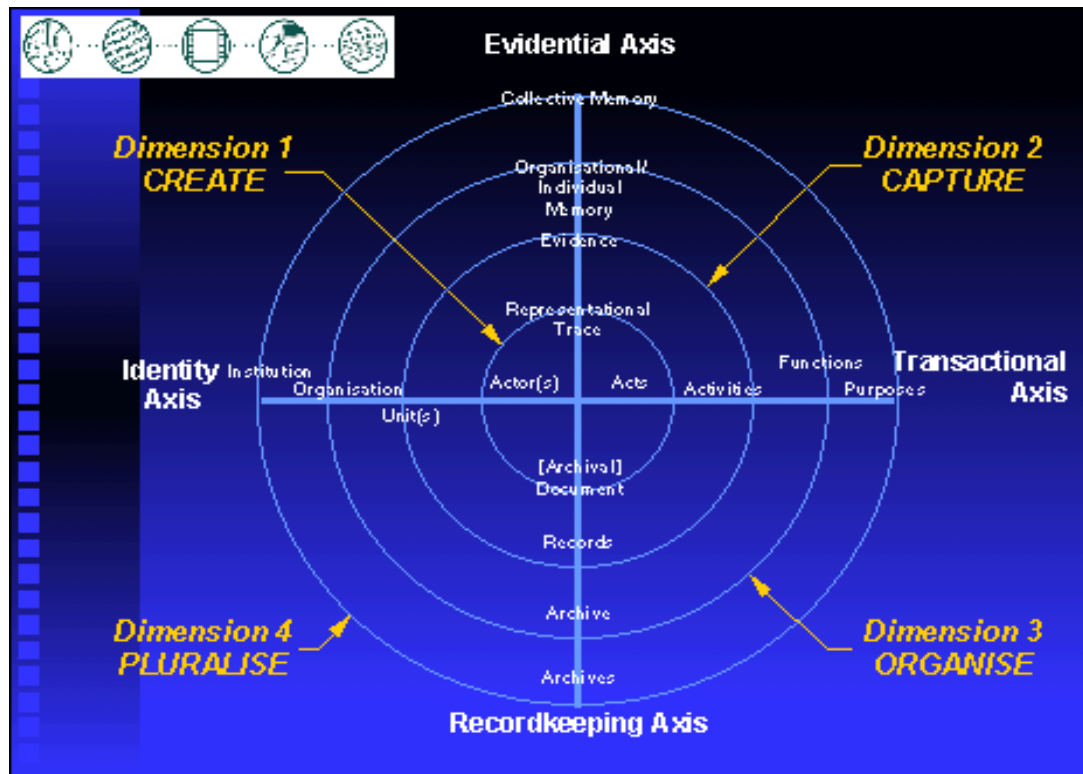
Figure 1: Recordkeeping continuum (Upward, 1997).

The theoretical framework that will be used to guide this study will be the recordkeeping continuum. The recordkeeping continuum consists of four dimensions – create, capture, organise, and pluralise – and four continua — evidentiality ("records as evidence"), transactionality ("records as products of activities"), recordkeeping containers ("the objects we create in order to store records") and identity ("the authorities by which records are made and kept") (Upward, 2000, p.124). The first dimension of the continuum (create) involves the creation of documents, which takes place between the author of a document and "the systems in which a document is created" (Upward & McKemmish, 2006, p.223). The second dimension (capture) extends the document beyond its author and system of creation by storing or linking the document "in ways that enable sharing and re-use" by immediate workgroups (Upward & McKemmish, p.223). This capture dimension allows documents to be reproduced authentically and allows them to be persistently linked to related documents and information. The third dimension (organise) allows documents and records to be accessed and used by those "not directly involved in specific business and social processes", while the fourth dimension (pluralise) enables access and use of documents "beyond organisational boundaries" (Upward & McKemmish, p.223).

The recordkeeping continuum is used to address "issues related to the rapidly growing complexity of electronic recordkeeping and archiving" (Upward & McKemmish, 2006, p.219). It is possible that certain tools used by records managers will cross multiple boundaries of the continuum, as the different transformations of the continuum can interact and blend into one another. This lack of boundaries could potentially occur with the use of cloud computing. Therefore, the use of the recordkeeping continuum as a framework could provide insight into how cloud computing is being approached in comparison with other recordkeeping tools in organisations, such as electronic document and records management systems, Intranets and portals. The use of the recordkeeping continuum as a framework will also provide a basis for understanding how records managers are integrating cloud computing as part of a "multidimensional environment" (Upward, 2000, p.116).

5. DEFINITIONS

These are the key concepts underpinning this research:

Cloud computing: "a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (including servers, storage, networks, services, interfaces or applications) that can be rapidly provisioned and released with minimal management effort or service provider interaction" (Mell & Grance, 2011, p.2).

Records: "information created, received and maintained as evidence and information by an organization or person, in pursuance of legal obligations or in the transaction of business" (Archives New Zealand, 2013).

Records management/records and information management: "activities within the management of the continuum of records of an organisation which facilitate the systematic capture, control, maintenance, dissemination and disposition of the records of that organisation. Records management is primarily concerned with capturing complete, accurate, and reliable documentation of organisational activity for current purposes" (Archives New Zealand, 2013).

6. LITERATURE REVIEW

The use of cloud computing has many potential implications that records managers need to be aware of when considering a move into the cloud. The areas of concern for records management that reoccur throughout the literature relate to the security, location, portability and retention of information (Blair, 2010; Stuart & Bromage, 2010). Although these concerns are varied, a major similarity exists in that they all present potential control issues for records managers (Stuart & Bromage). This is especially important for the profession to consider since records managers need to ensure that records remain "reliable, accessible, authentic and accurate" (Stuart & Bromage, p.220).

The security of records is highlighted as a major concern for records managers, as any loss of control over the records through unauthorised access, "hacking, interception and user misuse" is likely to breach the privacy or confidentiality requirements of records (Ferguson-Boucher, 2011, p.65). It is frequently advised that information should be stored in cloud environments that provide adequate protection, and that consideration should be given as to whether sensitive information should be stored in the cloud at all (Cunningham & Wilkins, 2009; Blair, 2010; Coutinho, 2012). However, it is often problematic to define what constitutes sensitive information, and organisations would then need to be "proactive" in determining what information would be too sensitive to store in the cloud (Ponemon, 2010, p.3). If this information is not excluded from the cloud entirely, it is likely that an "appropriate level of security" will need to be specifically applied for this information (Barnes, 2010, p.28).

Records managers are also advised that cloud computing use could impede their knowledge of the location of records. It is very likely that the "physical location of the cloud" will be in another jurisdiction (Barnes, 2010, p.27). Information stored in the cloud is also generally located on different servers "leased to the service provider", which means that it not always possible to know the exact location of the server upon which records reside (Reed, 2009, p.32; Stuart & Bromage, 2010). This creates a potential issue for records managers, since it is possible that cloud-based information might be subject to the laws of another jurisdiction if it is "physically stored" in that jurisdiction (Inland Revenue, 2013).

Another potential issue of control that records managers might face is in regards to the portability of their data (Blair, 2010; Sahandi, Alkhalil & Opara-Martins, 2013). Since "various cloud architectures lack formal technical standards governing how data is stored and manipulated in cloud environments", this could have implications for the preservation of metadata and the possibility of being able to export data from the cloud (National Archives & Records Administration, 2010, as cited in Blair, p.2). Sahandi, Alkhalil & Opara-Martins' study of small and medium enterprises (SMEs) found that concerns about portability issues were also quite common for businesses, as "about half of the surveyed SMEs considered vendor lock-in as a major concern for adopting cloud computing" (p.8). Records managers need to be aware that there could be "potential incompatibility between applications" and plan for this accordingly (Cunningham & Wilkins, 2009, p.30).

There are other concerns specific to records management that are also highlighted as potential issues, such as applying retention and disposal requirements to records stored in the cloud. Records managers must ensure that retention requirements for information generated or stored in the cloud can be met, and that the cloud system of choice can manage metadata and retention and disposal to a satisfactory level (Blair, 2010). Duplication of records on multiple servers is a potential issue facing records managers storing information in the cloud (Reed, 2009; Ferguson-Boucher, 2011). If records managers are not aware of these copies, they will not be able to adequately dispose of them (Stuart & Bromage, 2010). This duplication could affect legislated requirements for the disposal of records, since it would result in the "continued existence, after authorised disposal actions, of duplicates or copies of disposed records" (Archives New Zealand, 2008, p.28). All of these potential implications that have been discussed could therefore be having an effect on whether records managers choose to go to the cloud in the first place, how they determine which cloud provider to use and their discussions with IT departments about how to approach cloud computing in the organisation.

The importance of considering these potential implications before moving to the cloud is apparent from the records management literature. A significant proportion of the literature in this area involves lengthy discussions of the potential risks that should be considered and addressed before a move to the cloud is undertaken (Cunningham & Wilkins, 2009; Stuart & Bromage, 2010; Coutinho, 2012). Barnes believes that "cost, security, performance, availability, business viability and legal compliance" should all be assessed before a decision is made, while Gatewood believes that understanding of the implications "for applying

records management rules to information stored in the cloud" is necessary in order to make informed decisions (Barnes, 2010, p.28; Gatewood, 2009, p.32). Although these authors do not conclude that records managers should avoid cloud computing entirely, the majority recommend careful consideration of all implications before proceeding.

A commonly held viewpoint in the literature is that records managers need to remain closely involved with decisions relating to cloud computing. Blair (2010) believes that records managers should be involved as early as possible with the implementation of cloud computing as it is "easier and more effective to address information governance requirements early in the process" (p.4). This involvement should "include participating in the review and evaluation process for providers, including the review of contracts and service agreements" as well as possibly reviewing and adapting "existing information governance policies to cloud computing" (Blair, p.4). Involvement by records managers in choosing a provider is also stressed by other authors, due to the fact that most vendor products are generally developed or implemented "without regard for even basic records management principles" (Gatewood 2009; Cunningham & Wilkins, 2009, p.30). Barnes also believes that records managers should know what questions "should be asked of a potential vendor" in order to ensure that suitable cloud services are provisioned (2010, p.26). However, the Project 9 report on preservation of web 2.0 content states that recordkeeping professionals are often risk averse, and are "neither actively involved nor encouraged to be" (Reed, 2009, p.11). It is therefore unclear whether records managers are as actively involved in the process as the literature suggests they should be.

It is also recommended that collaboration occurs between IT departments and records managers, although this is not touched upon as frequently in the literature. Barnes places the record and information professional as one of the key figures in determining whether to go to the cloud; however, this is in "conjunction with the IT group and any other key decision makers" (2010, p.26). Barnes believes that the two are increasingly expected to work together to determine "the organization's needs and requirements" (p.26). Gatewood (2009) also suggests that records managers, IT and legal staff work together in order to minimise the risks of cloud computing. This collaboration between departments should also be occurring early in the process "so that understanding of what is being planned and the implications for information retention can be ascertained" (Blair, 2010, p.3). However, if studies of cloud computing in other industries accurately reflect the current situation in the records

management profession, it is possible that this collaboration is not always occurring. A 2011 ISC2 study found that "IT staff did not have complete knowledge of what was being used by their organizations" (as cited in Kabachinski, 2011, p.148), while a 2013 Ponemon Institute study found that only fifty percent of IT and IT security practitioners were confident that they knew "all cloud computing services in use in their organization" (p.1).

Although there are no set standards for recordkeeping in the cloud, guidelines are available from multiple institutions. In New Zealand, recommended guidelines for public sector records managers have been collected and made available online by Archives New Zealand. Although Archives New Zealand have not published their own guidelines, their official position is that "keeping information 'in the cloud' does not in itself breach the Public Records Act 2005" and have provided resources to help New Zealand organisations cope with the challenges of recordkeeping in the cloud (Archives New Zealand, 2013). These guidelines are authored by Inland Revenue, the Institute of IT Professionals, the Office of the Privacy Commissioner, the State Services Commission of New Zealand, the Australian Digital Recordkeeping Initiative, the National Archives of Australia, and the Archives and Records Association of the UK and Ireland. These guidelines support the viewpoints of the records management literature by advising that the registered location of the service provider is obtained, a contract is created that clearly defines the rights of the service provider and the organisation in regards to access of material during and after storage, and the possibility of vendor lock-in, and its potential effects on migration of data, is considered (Institute of IT Professionals, 2012).

There is also a strong emphasis on privacy and security issues in these guidelines. The guidelines recommend that the organisation has knowledge of what personal information has been stored in the cloud, the security of the provider has been evaluated (with the provider ideally being registered in the Cloud Security Alliance STAR registry), a response plan is created in order to handle any potential security breaches and the organisation is aware of the potential security risks of storing data in the cloud (Office of the Privacy Commissioner, 2013). Public service organisations must also determine the likely response of a service provider to a government request for information. Offsite storage is considered acceptable as long as information remains accessible and does not impede compliance activities (Inland Revenue, 2013). There is an overlying view in the guidelines that the organisation is ultimately responsible for "what happens to the information", not the vendor (Office of the

Privacy Commissioner, p.7). However, there is no evidence in the literature as to how these guidelines are being used by records managers.

There has also been a lack of research regarding records managers' awareness of these issues. This is problematic because cloud computing is a tool that needs to be "understood and managed" and it is unclear whether this is currently the case (Gatewood, 2009, p.36). However, Scale believes that "records managers are … wary of the issues and concerns of the technology", which suggests that there is knowledge of the implications amongst records managers (2010, p.936). However, since this assertion is not backed up by data or other evidence, it is difficult to know how truthful this statement may be.

Although studies solely focused on records management professionals have not been conducted, there has been research conducted by independent researchers on awareness of privacy and security issues throughout a wide cross-section of organisations. One of the major studies conducted on the security of cloud computing has been undertaken by the Ponemon Institute, on behalf of CA Technologies. The latest 2013 study surveyed 748 IT and IT security practitioners in the United States who were mostly all "responsible for setting priorities, selecting vendors and contractors and managing budgets" (p.1). The survey found that cloud computing services were being chosen by "end-users and business unit managers", but security risks were not always being considered. The 2013 study found that only half of organisations surveyed were "evaluating these services in terms of security prior to deployment" (p.1). 48% of IT security respondents surveyed said that they were concerned about the security of the cloud computing services in use (Ponemon, 2013). This survey highlights that a lack of awareness remains towards cloud computing risks in organisations. This study aims to determine if a similar situation is occurring in the records management profession, especially since there is such a large gap surrounding this area in the records management literature.

7. METHODOLOGY

7.1. Research population

The research design used was a cross-sectional study, with a research population consisting of New Zealand records managers. Since a cross-sectional research design is specifically aimed at "finding out the prevalence of a phenomenon, situation, problem, attitude or issues", this design was appropriate for a research study whose goal was to ascertain the current level of involvement by record managers and their awareness of the potential implications of cloud computing (Kumar, 2005, p.107). The records managers targeted for this study were members of the NZRecords (NZR) mailing list, an e-mail list for the New Zealand recordkeeping community (NZRecords, n.d.). Although it is unlikely that every records manager working in New Zealand would have been able to be reached in this way, it would have been too time-consuming and expensive for a project of this size to seek out current record managers from every organisation in New Zealand. Nevertheless, the size of this research population still ensured that a large cross-section of the profession was targeted.

7.2. Data collection

An online web survey was chosen for data collection in order to ensure that a large number of records managers in New Zealand could be targeted. This was preferable to the smaller sample size of interviews and focus groups, and also allowed for greater coverage that would not be possible with interviews or focus groups (Tanner, 2013).

7.3. Survey design

The online survey was designed using the survey software Qualtrics. Closed questions were favoured over open-ended questions in order to receive a greater number of completed surveys, and therefore a greater amount of data (Punch, 2005). However, the majority of questions in the survey provided the option for respondents to elaborate further if desired. Many of the questions also allowed respondents to select more than one of the options available to them if applicable. Finally, a free response question at the end of the survey was

provided to all survey respondents so that they could have the opportunity to add any additional comments they might have had about the subject of records management and cloud computing.

The first page of the survey on the Qualtrics website displayed a participant information sheet, with all respondents required to give their consent before proceeding with the survey. Survey participants who were not using cloud computing only answered eight questions, while survey participants using cloud computing answered 17 to 20 questions (depending on answers given to certain questions). This was made possible by the survey software, which allowed questions to be skipped or hidden based on respondents' answers.

The survey was pre-tested by three individuals with knowledge of either cloud computing and/or records management. The feedback received resulted in improvements being made to the wording of questions and to the selection options made available to survey respondents. These testers also suggested that definitions for certain cloud computing terms should be added to the survey. However, the lack of definitions provided throughout the survey was a deliberate choice so that records managers' knowledge of cloud computing concepts could be accurately gauged.

7.4. Survey distribution

Human Ethics Approval was obtained from the School of Information Management at Victoria University of Wellington prior to data collection.

An email containing a link to the survey was distributed on 19 December 2013 via the NZRecords mailing list. The timing was chosen to target records managers who were experiencing light workloads due to the impending holiday period shutdown. Since the data collection period coincided with the holiday break, a reminder email was sent on 7 January 2013 in order to remind records managers of the survey. A final reminder email was sent on 14 January 2013. This final reminder also informed potential participants that the survey link would remain active until 20 January 2013, giving records managers who had not yet completed the survey six days to do so. The data collected was then examined throughout January and early February.

7.5. Data analysis

The reporting function of Qualtrics was used to generate descriptive statistics that would summarise and describe the quantitative data collected (Punch, 2005). The qualitative data collected was also analysed to identify any emerging themes. These were sorted into the following major themes: records managers' attitudes towards cloud computing, current usage of cloud computing in organisations, future plans for cloud computing in organisations, knowledge of potential implications, and discussions of records managers' involvement in the cloud computing process.

8. DELIMITATIONS

- The study was confined to records managers currently working in New Zealand organisations.

9. LIMITATIONS

- The study only targeted members of the NZ Records mailing list as a research population, which means that there is no certainty that all records managers active in New Zealand have been reached.

- The study only targeted records managers in New Zealand, despite the fact that it is possible for online surveys to have a global reach.

10. RESULTS

A total of 43 responses were received, five of which were incomplete. Seven people began the survey, but did not complete any questions. These responses were therefore invalid and were discounted from the data analysis.

The data from this survey has been presented in graph format with data displayed and measured by number of respondents. However, graphs comparing records managers using cloud computing against records managers not using cloud computing have been measured in percentages so that a more accurate comparison between the two can be made.

10.1. Preliminary data

As can be seen in figure 2, 39 respondents are currently employed in the public sector (91%), while 4 respondents are currently employed in the private sector (9%). Figure 3 highlights the length of time these records managers have been working in their organisation. This data was collected to determine whether the length of employment might affect the rest of the data collected from the survey respondents (since it is unlikely that new employees would be heavily involved in cloud computing decisions in their organisations). However, 29 respondents answering the survey have been employed for more than 2 years (67%), 10 records managers have worked in their organisation for one to two years (23%) and only 4 records managers have worked in their organisation for less than a year (9%).

Do you work for the public or private sector?
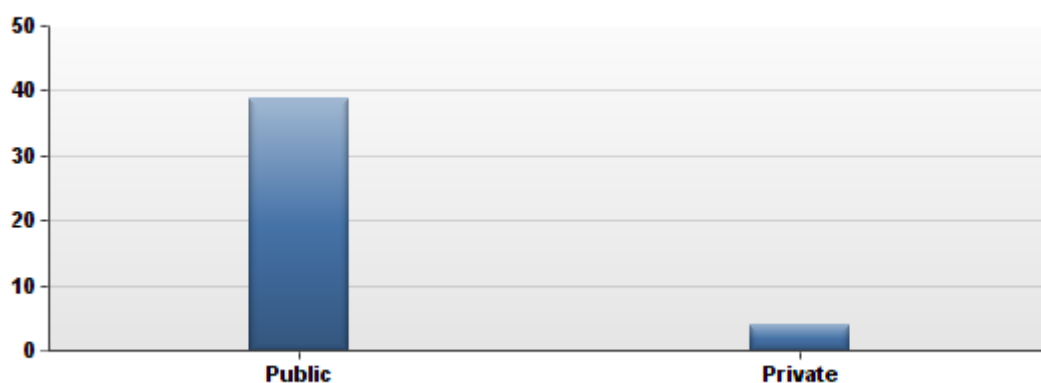
Figure 2: Breakdown of sector in which survey respondents are employed

How long have you held this position in your organisation?
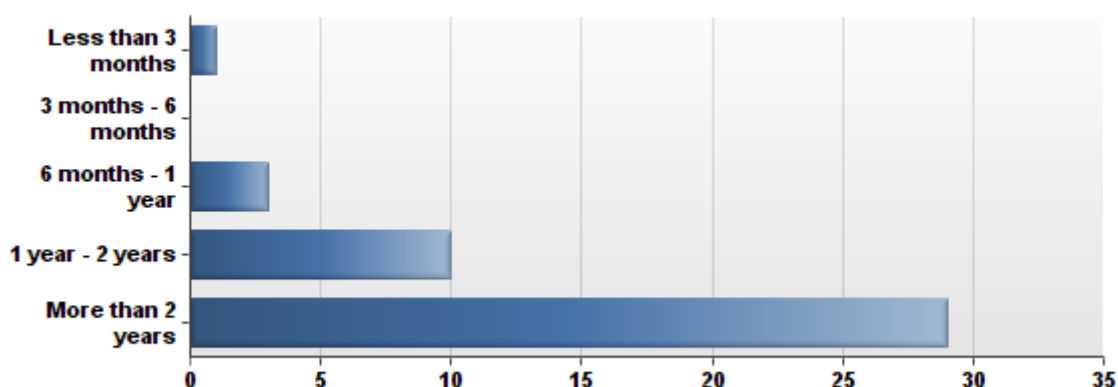
Figure 3: Length of time employed as records manager in organisation

Out of 43 responses received, 16 record managers were using cloud computing in their organisation for records storage (37%), while 27 were not (63%). No respondents answered that they were unaware of cloud computing being used in their organisation for records storage. These numbers are shown in figure 4. Unfortunately, five respondents did not continue with the survey following this question. This means that the rest of the survey

questions were only answered by 12 records managers using cloud computing and 26 records managers not currently using cloud computing.

Is your organisation using cloud computing for records storage?
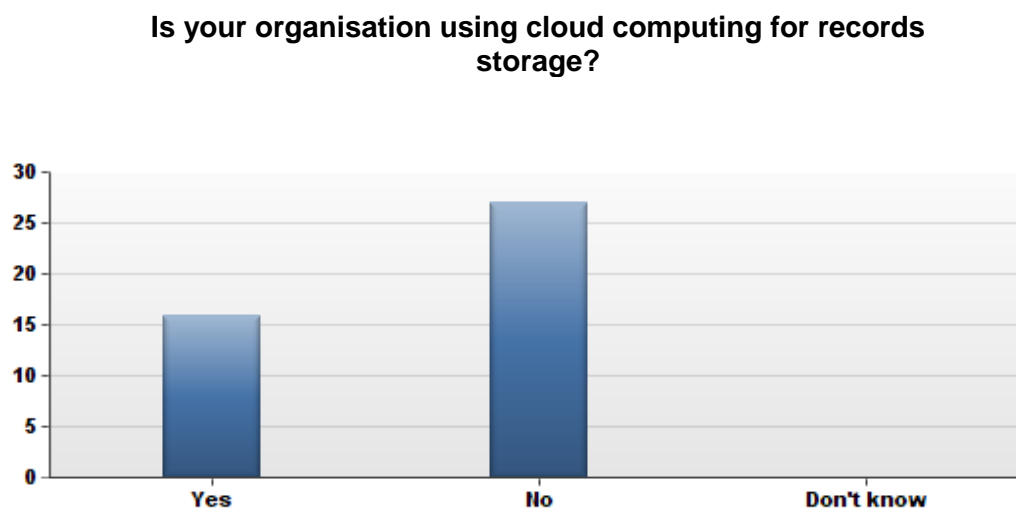
Figure 4: Number of organisations using cloud computing for records storage

10.2. Results: records managers not using cloud computing

Records managers who were not using cloud computing were asked whether they believed cloud computing should be implemented in their organisation and how likely they thought it would be that implementation of cloud computing would occur in the future. As figure 5 shows, five records managers thought that their organisation should use cloud computing for records storage (19%), ten records managers did not believe this should happen (38%) and eleven were undecided (42%). Figure 6 shows that when asked if they thought their organisation was likely to use cloud computing in the future, sixteen records managers believed this was likely to happen (62%), four records managers did not believe this was likely to happen (15%) and six were unsure (23%). This suggests that these records managers are not confident that their input will be considered in the decision to use cloud computing.

Do you think your organisation should use cloud computing for records storage?
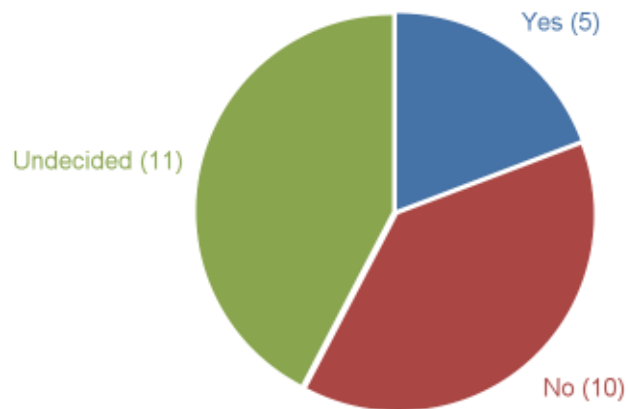

Figure 5: Records managers' views on use of cloud computing for records storage

Do you think your organisation is likely to use cloud computing for records storage in the future?
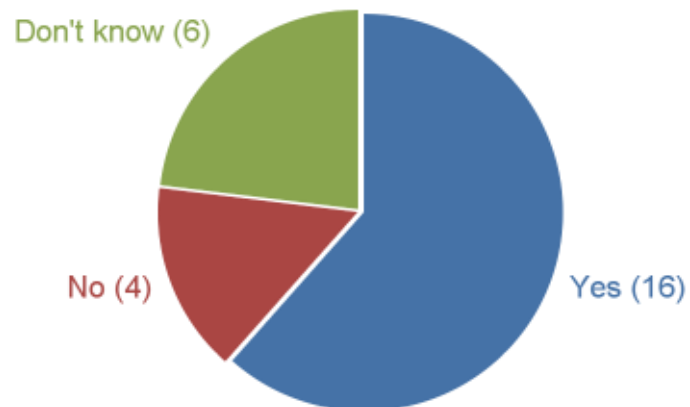
Figure 6: Records managers' views on future plans for cloud computing

10.3. Involvement of records managers in decision-making related to cloud computing

Records managers using cloud computing received a greater number of questions to answer than their non-cloud computing counterparts. These records managers were first asked whether they were aware of the cloud service model and cloud deployment model in use in their organisation. These questions allowed respondents to select multiple service models and/or deployment models in use, since it was likely that an organisation might currently use more than one service or deployment model. A 'don't know' option was also included to ascertain how familiar records managers were with this terminology.

Data received for the question about cloud service models in use found that SaaS is currently being used by nine organisations (75%), PaaS is being used by four organisations (33%) and IaaS is being used by five organisations (42%). However, three respondents were not aware which cloud service model was being used by their organisation (25%). Data received for the question about cloud deployment models in use found that private clouds are being used by eight organisations (67%), community clouds are in use in one organisation (8%), public clouds are being used by six organisations (50%) and hybrid clouds are being used by two organisations (17%). Only one records manager was unsure about which cloud deployment model was being used (8%). This information is shown in figures 7 and 8.

Which cloud service model is your organisation using?
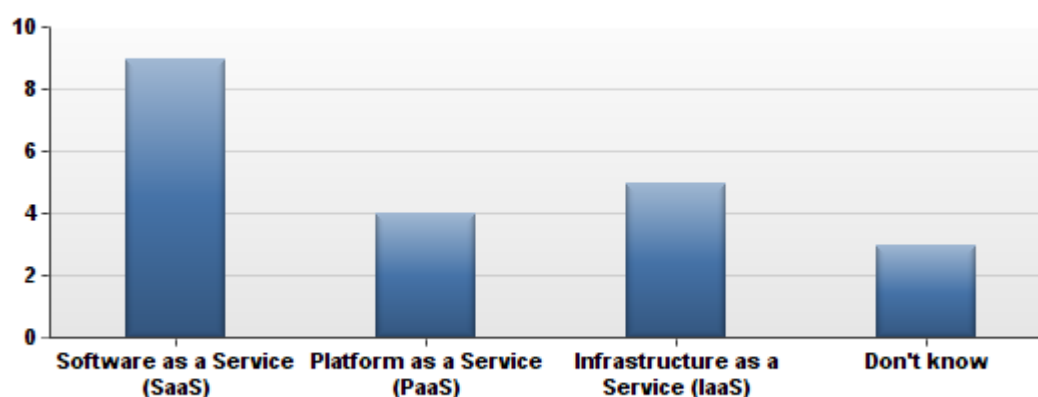
Figure 7: Cloud service models in use

Which cloud deployment model is your organisation using?
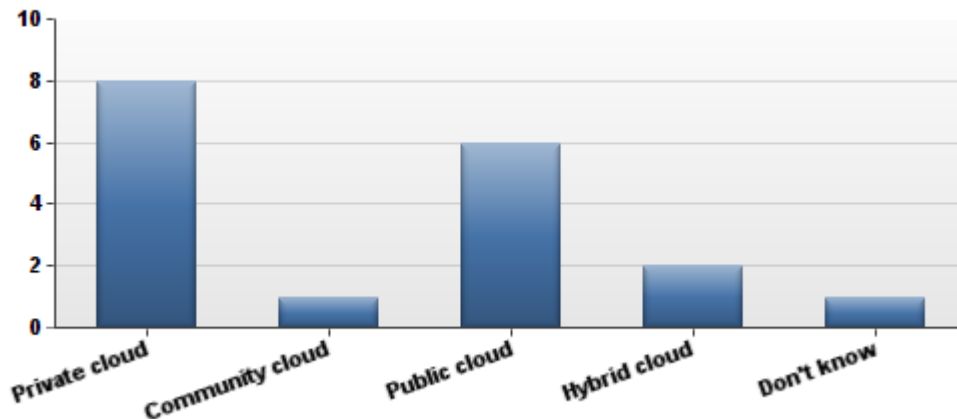
Figure 8: Cloud deployment models in use

Records managers were asked who were the key parties involved with two major cloud computing decisions: the decision about whether to go to the cloud for records storage and the decision about which cloud computing service to use for records storage. Multiple choice answers were again made available to respondents to allow them to select all of the parties involved in these decisions, instead of just the key decision maker. Figure 9 compares the data received for these two questions. The results found that the most likely parties to be involved in the decision to go to the cloud were a records or information manager (selected by 6 respondents), an IT professional or department (selected by 8 respondents) and executive management (selected by 7 respondents). Other parties who were also involved in this decision making process were the Chief Financial Officer, outside organisations and individual business units. There were similar responses to the question of who was involved in deciding which cloud computing service to use. The most likely parties to be involved were a records or information manager (selected by 5 respondents), an IT professional or department (selected by 7 respondents) and business unit management (selected by 5 respondents). Again, the Chief Financial Officer was listed as another party involved in this decision. The second respondent who selected 'other' used the text box to comment that they were usually involved "after the fact" since "the business buy, expect IT to implement and RM to manage the mess". However, overall the data highlights the collaborative nature of these decisions.

Records or information manager	6	5
IT professional/department	8	7
Executive management	7	4
Business unit management	4	5
Other	3	2
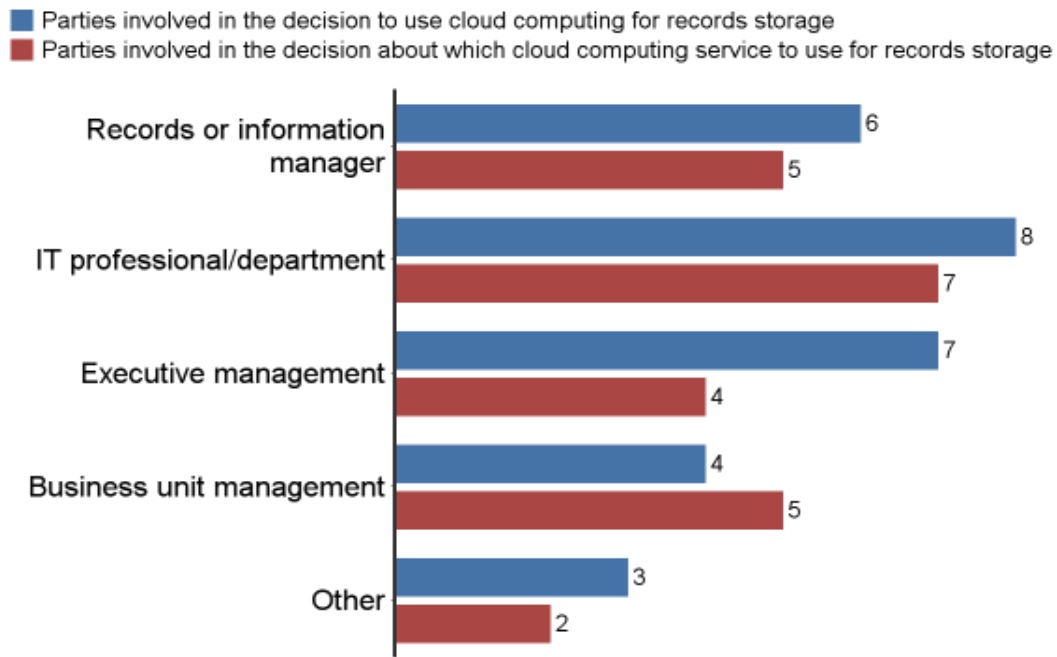
Figure 9: Parties involved in cloud computing decisions

Respondents were also asked to assess how much influence they believed they would have on cloud computing decisions in their organisation. As figure 10 shows, results were mixed. Four records managers thought it would be likely or very likely that their opinion would influence cloud computing decisions (34%). However, half of survey respondents displayed much less confidence in their potential influence. Three respondents thought it would be somewhat likely (25%) and three were undecided (25%).

How likely is it that your opinion will influence decisions about cloud computing in your organisation?

Very Unlikely	1
Unlikely	
Somewhat Unlikely	1
Undecided	3
Somewhat Likely	3
Likely	2
Very Likely	2
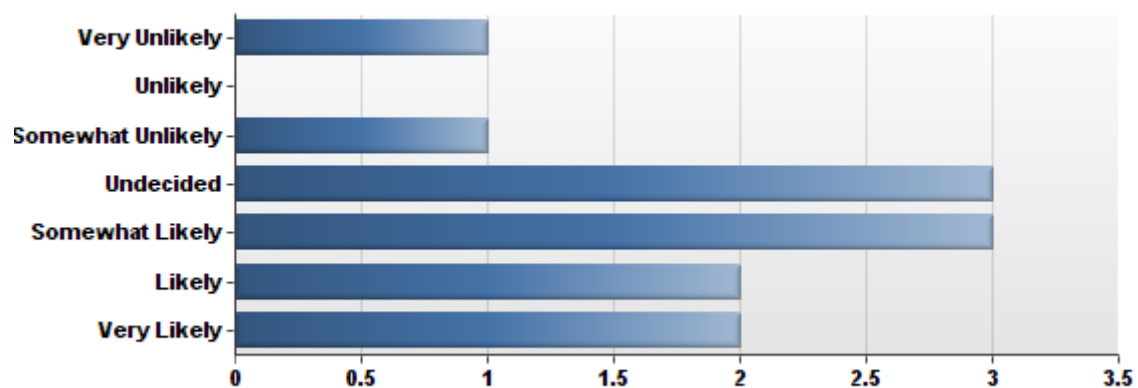
Figure 10: Perceived influence on cloud computing decisions

The results of the survey show that records managers do not have high levels of involvement with many aspects of cloud computing. Generally, the listed aspects of preparing for the cloud (as seen in figure 11) were undertaken by less than half of the survey respondents. The one exception to this was risk assessment, which was selected by seven respondents (58%). The lowest scoring aspect of preparing for the cloud was the negotiation of a contract or service agreement with the cloud provider, which was only selected by one survey respondent (8%). Respondents were also offered the opportunity to list other areas or tasks with which they had been involved, but there were only two responses received. One respondent said that they had been involved in the "Enterprise Content Management selection team", while another said they had been involved in "process design and integration assessment". Four respondents said they had not being involved with any aspects of preparing for the cloud at all (33%).

Have you been involved with any of these aspects of cloud computing (preparing for the cloud)?
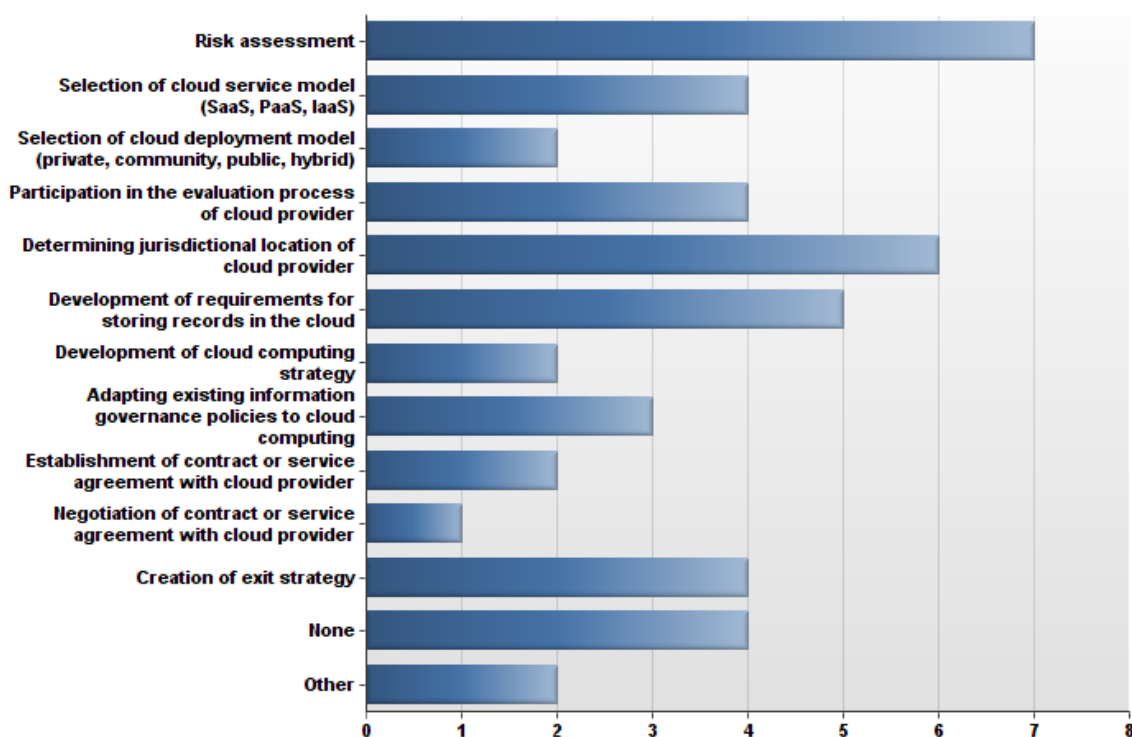
Figure 11: Records managers' involvement in preparation for the cloud

There were similarly low numbers for records managers' involvement in managing or operating in the cloud (as seen in figure 12). None of the aspects of managing or operating in

the cloud listed scored higher than 50%. The areas with the most involvement were in the classification of records stored in the cloud (six respondents), closely followed by the identification of records to be stored in the cloud (five respondents). Again, records managers were offered the opportunity to list other areas with which they had been involved. Only one respondent replied, stating that they had been involved with "some of the above, but always after the fact". As well as these low numbers, five respondents said that they had had no involvement with operating in or managing the cloud at all (42%).

Have you been involved with any of these aspects of cloud computing (managing or operating in the cloud)?
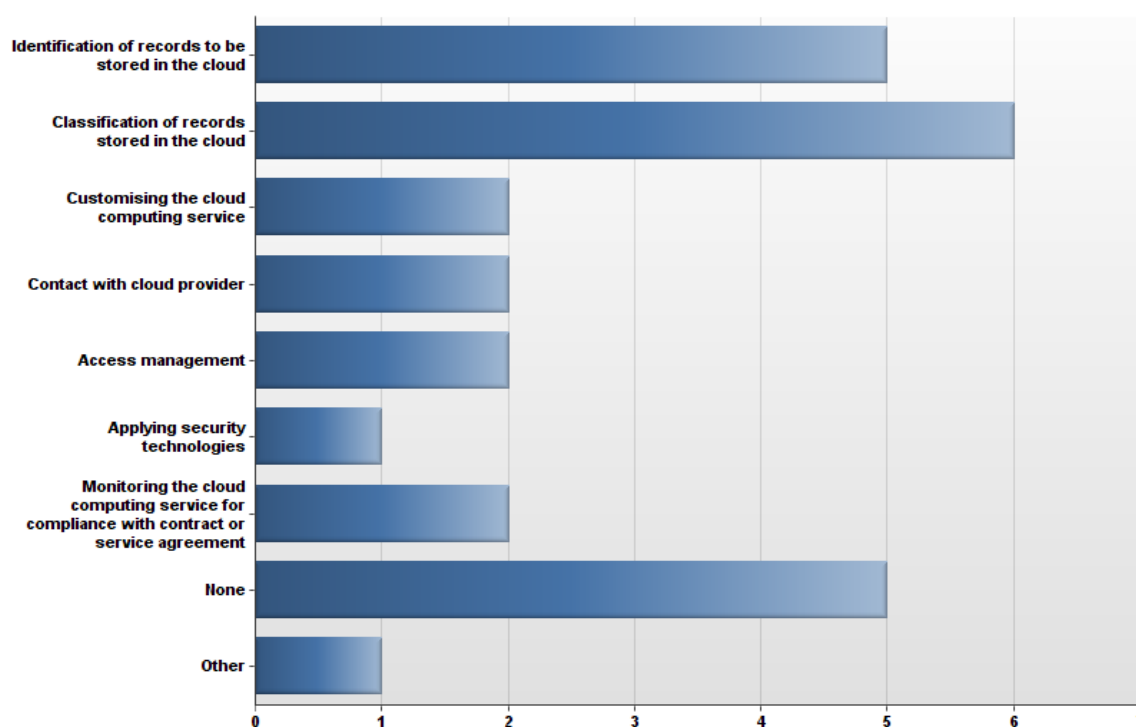
Figure 12: Records managers' involvement in managing or operating in the cloud

10.4. Collaboration between IT departments and records managers

As shown in figure 13, the majority of records managers collaborate with their IT department (83%). This level of collaboration is believed to be quite high, since over half of these respondents say that they collaborate with their IT department a lot (as can be seen in figure 14).

Do you collaborate with your IT department on cloud computing?

No (2)

Yes (10)
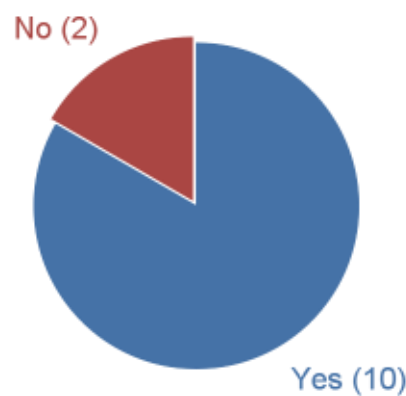
Figure 13: Collaboration with IT departments

What level of collaboration has occurred between yourself and your organisation's IT department?
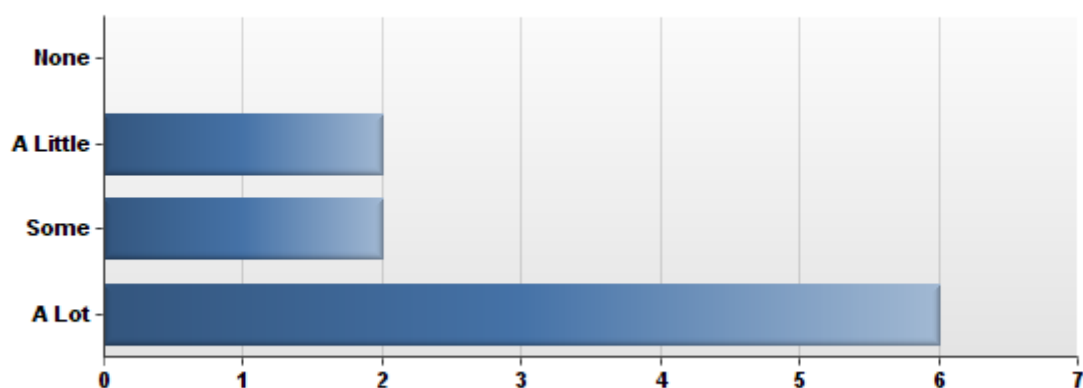
Figure 14: Level of collaboration between records managers and IT departments

Figure 15 expands on what type of collaboration has occurred between records managers and IT departments. All of the activities listed were selected by 40% or more of survey respondents, with the most frequent area of collaboration being invitations to meetings (selected by seven respondents, or 70%). However, this collaboration between departments is still quite low in the early stages of the cloud computing process. Potential areas of collaboration such as selecting the cloud computing service, planning the implementation of the cloud computing service and deployment of the cloud computing service only occur 40% to 50% of the time between records managers and IT departments. Two other respondents also described other forms of collaboration that had occurred, which both involved a low level of participation from the records manager. One survey respondent said that "company newsletters indicate that something is going on but I'm not involved other than as an afterthought at the end of the decision-making process, to provide feedback on the policy document". Another respondent said that they "work closely with solution architects" who "cover off a lot of the same sorts of concerns so we don't have to get involved in everything". This respondent also stated that they have "a security specialist" who is solely responsible for security issues.

What type of collaboration has occurred between yourself and your organisation's IT department?
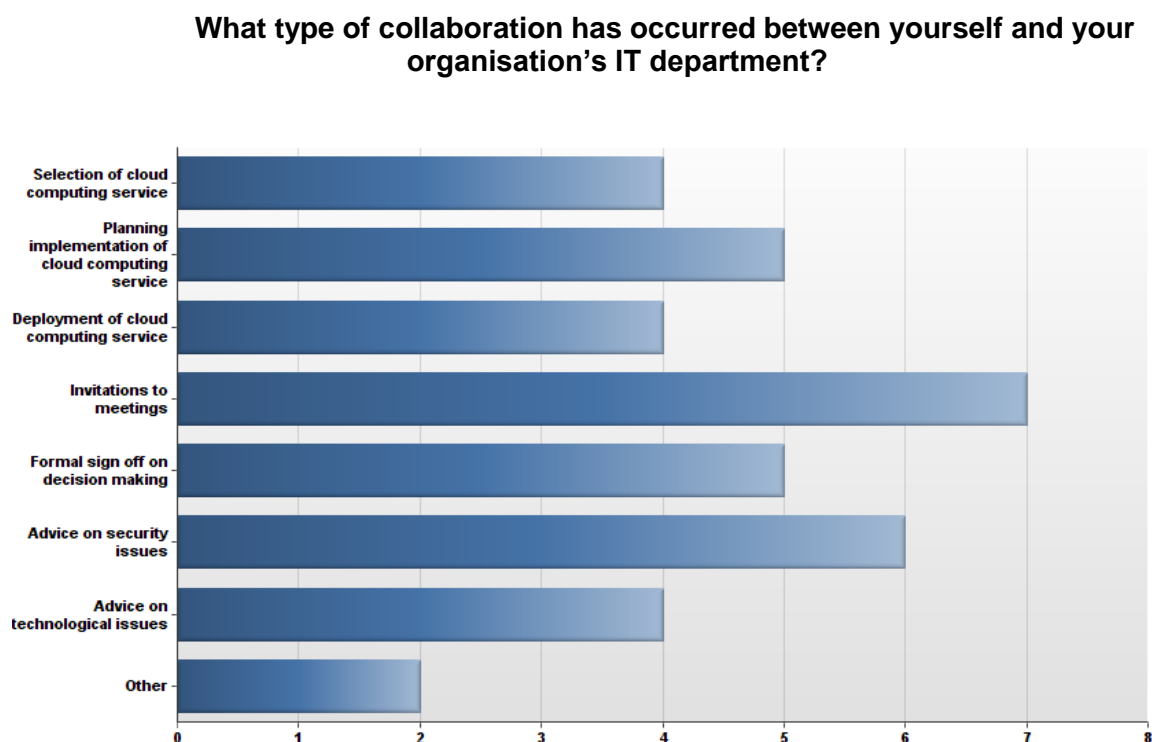
Figure 15: Types of collaboration occurring between records managers and IT departments

10.5. Records managers' awareness of the potential implications of cloud computing

All records managers were asked about their awareness of the potential implications of cloud computing. As can be seen in figure 16, records managers using cloud computing have a higher level of awareness of these implications than records managers who are not currently using cloud computing. However, there is still a high level of awareness in general, with all potential implications listed being selected by 60% or more of respondents. Overall, the impact of cloud computing on privacy and confidentiality of information has the highest level of awareness amongst records managers, while the impact of cloud computing on portability and interoperability has the lowest level of awareness. The full breakdown of these numbers can be seen in table 1. Records managers also listed other potential implications of which they are aware. These are:

- "Issues about notification of loss of host services or closure of host business"
- "Long term management/access to records of archival value, and the ability (or otherwise) to bring these items back on premise if and when required"
- "Potential loss of data altogether, aka Megaupload. Likelihood/ability of another government taking data"
- "Track and trace copies of content from single-source to multiple publications and/or repositories"
- "Integration would be the other big one, if information is across multiple systems, and one of them is cloud based, how does that affect the information flows across the organisation? Can everyone who needs access get access?"
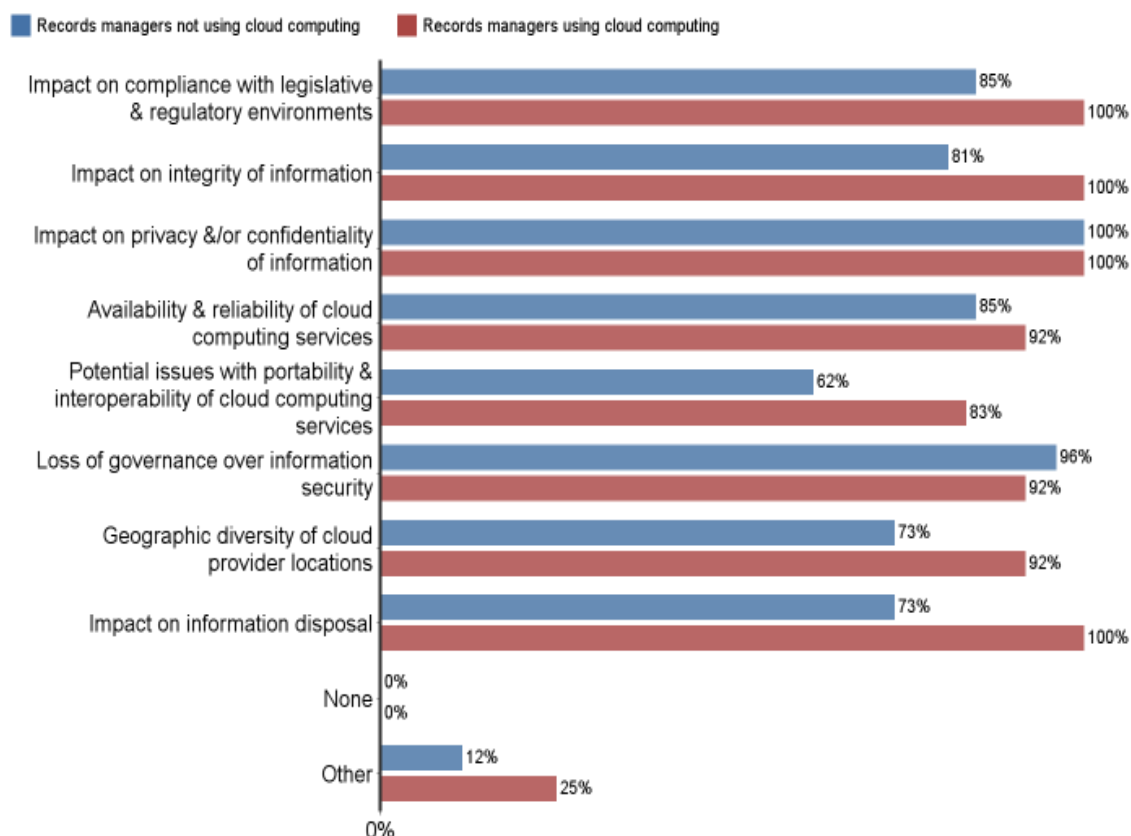
Figure 16: Awareness of potential implications by percentage of respondents

Potential implication	Awareness of implication - non-cloud computing records managers	Awareness of implication - cloud computing records managers
Impact on compliance with legislative and regulatory environments	12	22
Impact on integrity of information	12	21
Impact on privacy and/or confidentiality of information	12	26
Availability and reliability of cloud computing services	11	22
Potential issues with portability and interoperability of cloud computing services	10	16
Loss of governance over information security	11	25
Geographic diversity of cloud provider locations	11	19
Impact on information disposal	12	19
None	-	-
Other	3	3

Table 1: Awareness of potential implications by number of respondents

Knowledge of these potential implications has had some effect on cloud computing decisions made by records managers, but not to a large degree (as can be seen in figure 17). None of the respondents had decided to stop implementation of cloud computing, and only two records managers have made the decision to slow implementation (17%). The survey did find that four records managers have made the decision not to store commercially sensitive records in the cloud (33%), while three have made the decision not to store personal records in the cloud (25%). Other responses as to how these potential implications had affected cloud computing decisions include:

- "Careful consideration in selection of cloud provider because of the jurisdiction they operate under, particularly around potential unauthorised [by us] removal of data"
- "Monetary issues – do not want to spend money on Large File Transfer (secure software)"
- "If the information put on the cloud does not contain an individual's personal/personnel details then it is not given due weight in the decision making process"
- "We do independent security testing to understand how secure an external service is [and they] make recommendations based on the findings. Often services will fix security issues found"

Have any of the implications selected above affected the following decisions related to cloud computing?
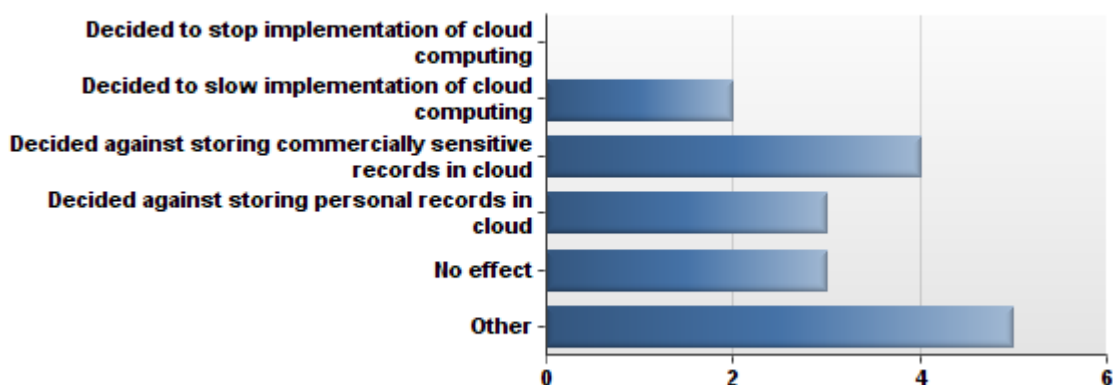
Figure 17: Effect of potential implications on cloud computing decisions

10.6. Guidelines usage

Usage of the publically available guidelines on the Archives New Zealand website is relatively low (as can be seen in figure 18). Each guide has only been used by less than half of the survey respondents using cloud computing, with four respondents not using any of these guidelines at all (25%). The areas of interest which seem to arise most often are learning how to manage privacy risks and storage of offshore information.

Have you used any of these publically available guidelines on cloud computing?
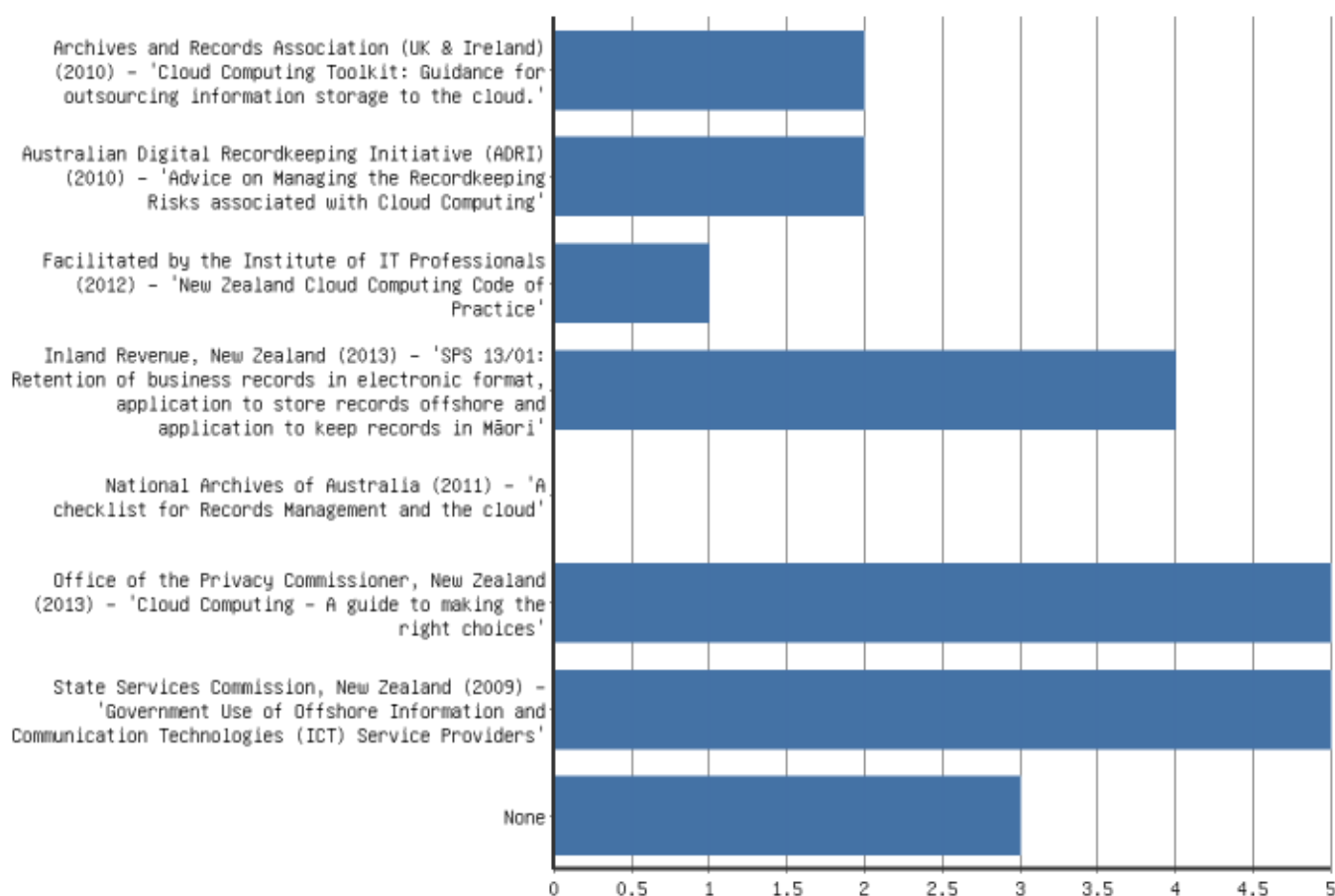
Figure 18: Use of publically available guidelines

10.7. Training received

Records managers using cloud computing were also asked about training received. Responses indicate that training on this subject is not widespread. As can be seen in figure 19,

only three records managers have received any training about cloud computing (25%). This training was provided internally for two records managers and externally for one records manager.

Have you received any training about cloud computing?
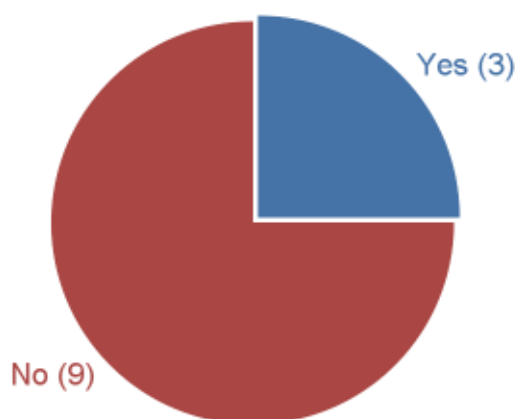
Figure 19: Training on cloud computing

All records managers currently using cloud computing were asked whether they would like more training (and were offered the opportunity to select as many options as applied). The results can be seen in figure 20. Records managers who had already received training were mostly confident that they did not need further training. Although each of the options listed were selected by at least one survey respondent, further analysis of the data reveals that these were all chosen by the survey respondent who had only been employed for less than three months. By taking this into account, there was not much interest expressed in further training. However, one survey respondent did comment that they did not think they would need further training, "just keeping on top of policy and technology developments". Records managers who had not received any training expressed a greater interest, with each option listed chosen by over half of the survey respondents. Comments were also received from the two records managers who selected the 'other' option. These comments were:

- "Would like to see Archives NZ promoting this kind of training to all records and information/knowledge [managers] on their website as part of professional development"

33

- "I have zero budget for any training and therefore only freely available courses will be considered useful"

Would you like to receive further training in any of these areas?

Figure 20: Further training desired

11. DISCUSSION

11.1. How involved are records managers in decision-making relating to cloud computing?

The literature highlights the importance of records managers remaining closely involved with decisions relating to cloud computing. However, this involvement is not reflected in the data collected. Blair's (2010) suggestion that records managers should be involved as early in the process as possible does not appear to be the case with the majority of records managers surveyed. There is only a middling level of involvement from records managers in deciding whether to go to the cloud for records storage, and also in deciding which cloud computing service to use. Survey responses do indicate that records or information managers are one of the parties most likely to be involved in the decision to use cloud computing, along with IT professionals and executive management. These same groups are also likely to be involved in the decision about which cloud computing service to use (except with business unit management replacing executive management as one of the main parties involved). This does seem to confirm that these major cloud computing decisions are likely to be a collaborative process among key parties (Barnes, 2010). However, although it is to be expected that these decisions will involve multiple stakeholders, ideally there should still be a higher percentage of records managers involved in this decision-making process. This should especially be the case when continuum-based thinking and practice emphasises records managers taking an active role in designing "recordkeeping systems and implementation strategies" (McKemmish, 1997).

Other areas where records managers might possibly be involved in preparing for the cloud also do not show high levels of involvement. The most frequently occurring aspect of preparing for the cloud amongst those surveyed was risk assessment, and this only happened amongst just over a half of respondents. Involvement in addressing "information governance requirements early in the process" was also low (Blair, 2010, p.4). Many of the aspects recommended by Blair did not score highly amongst those surveyed. Only a third of records managers were involved in the review process of cloud providers, two records managers were involved with establishing a cloud computing contract or service agreement (with only one record manager having involvement with the negotiation of a cloud computing contract) and a quarter of record managers were involved with adapting existing information governance

policies to cloud computing. Respondents were given the opportunity to list other areas they had been involved in when preparing for the cloud, but this did not elicit many responses. One respondent said that they had been involved with "process design and integration assessment". Another respondent said that they had been involved with the "Enterprise Content Management selection team". However, this respondent also said that "the executives and project manager know next to nothing about records management and my voice was disregarded". This early involvement, especially in choosing a provider, would make it easier for records managers to implement a cloud service that is suited to "records management principles" (Cunningham & Wilkins, 2009, p.30). It would also allow records managers to ensure that records are appropriately managed from their creation so that these records can "fulfil their multiple purposes contemporaneously and over time" (McKemmish, 1997). However, this involvement does not appear to be happening.

Overall, involvement in managing and operating in the cloud is also quite low. None of the options given were selected by more than half of survey respondents. The areas with the highest levels of involvement were the identification and classification of records to be stored in the cloud, suggesting that records managers have greater involvement in the day to day tasks of managing records in the cloud, rather than being actively involved with customising and/or improving the security of the cloud computing service. Just under half of records managers said that they had not been involved with operating or managing in the cloud at all. It would be interesting to further research what factors are affecting this involvement, and whether records managers even have the choice to be involved in these decisions. The responses to the survey suggest that some records managers are treated as an afterthought in the decision-making process. For example, one respondent said they were involved in some of the aspects of managing and operating in the cloud, but "always after the fact". Another respondent describes the process as "the business buy, expect IT to implement and records management to manage the mess". A further respondent says that "it is very rare for information management or records management staff to have the opportunity to comment on potential issues before IT make the cloud decision". Unfortunately, it does appear that records managers are not "actively involved or encouraged to be", and most of their involvement will lessen after the initial implementation of cloud computing services (Reed, 2009, p.11). This lack of involvement will again have a detrimental effect on records managers, as it will prevent them from "establishing, managing and monitoring coherent regimes of integrated recordkeeping and archiving processes" in line with the continuum

(McKemmish, 1997)

It does appear that a few records managers believe that their opinion will influence decisions about cloud computing in their organisation. Just over a third of records managers using cloud computing believe it would be likely or very likely that their opinion would have influence in their organisation. However, a quarter of respondents thought it would only be somewhat likely that they would have influence on cloud computing decisions and a further quarter of respondents were undecided. One respondent stated that it was "not unusual for records management recommendations to be under-weighted and/or risks under-quantified in public sector agencies". Another respondent added that in their organisation "the perception is currently that storage of information is an IT issue". This lack of confidence also seems to be reflected amongst records managers who are not currently using cloud computing. The small amount of data collected seems to indicate that these records managers do not believe their opinion will influence decisions about cloud computing in the future. Just under 20% of these records managers believe their organisation should use cloud computing for records storage, but over 60% believe their organisation is likely to use cloud computing in the future. Just under a quarter of respondents were also not sure whether their organisation was likely to use cloud computing in the future. There was also a high level of respondents who were undecided about whether cloud computing should be used in their organisation, with just over 40% of non-cloud computing records managers selecting this option in the survey. The data collected does seem to support the idea that records managers are risk averse. One response to the free response question stated that cloud computing has "got a long way to go before I trust it" and another response was that cloud computing is "a massive and scary challenge". However, other records managers were more positive, with one respondent stating "I have a strong view that information managers need to embrace the opportunities offered by cloud computing" and that "information managers need to make sure they are ready and have made the appropriate connections within their agencies so they are able to influence how cloud is adopted in their agency." The view expressed by this respondent is consistent with McKemmish's view that records managers need to be able "to build partnerships with a broad range of stakeholders" so that they can accomplish their goals under the continuum (1997).

The data collected from this survey shows that collaboration between records managers and IT departments is occurring. This information appears to be good news, since IT professionals are consistently mentioned as key figures that records managers should work

with in order to achieve continuum objectives in an electronic environment (McKemmish, 1997). However, this collaboration is still quite low in the early stages of the cloud computing process. Potential areas of collaboration such as selecting the cloud computing service, planning the implementation of the cloud computing service and deployment of the cloud computing service only occur 40% to 50% of the time. This means there are fewer opportunities early in the process for each department to understand what is being planned and its potential effect on recordkeeping requirements (Blair, 2010). Responses to this question also suggest that some records managers often do not have a high level of involvement when collaborating with an IT department. One respondent mentions that they employ solution architects who "cover off a lot of the same sorts of concerns, so [the records manager] doesn't have to get involved in everything". Another respondent mentions being consulted as an "afterthought at the end of the decision making process to provide feedback on the policy document". This same respondent mentions that they provide relevant material, which is all "seemingly ignored". In this survey, IT departments seem to have substantially more involvement in major cloud computing decisions than records managers themselves. This information is disappointing to hear, since better collaboration between these departments would help to increase the likelihood that services supportive of "recordkeeping requirements" are adopted in organisations. This collaboration would also help to minimise the risks of cloud computing for organisations (Gatewood, 2009).

11.2. How informed are records managers about the implications of cloud computing?

There are many potential control issues that are presented to records managers using cloud computing. However, overall, it appears that records managers are very well informed about the potential implications of cloud computing. Records managers showed high awareness of potential security issues, such as loss of governance over information security (just over 95% of records managers not using cloud computing vs just over 90% of records managers using cloud computing). They were also aware of the issues that might arise from this potential implication. There was high awareness of the potential impact on integrity of information (just over 80% of records managers not using cloud computing vs 100% of records managers using cloud computing) and the potential impact on privacy and/or confidentiality of information (100% of cloud computing and non-cloud computing records managers). However, this only resulted in a third of records managers deciding against storing

commercially sensitive records in the cloud and a quarter of records managers deciding against storing personal records in the cloud. It would be interesting to know whether these low figures are due to records managers choosing to focus on externally or internally vetting cloud computing services instead. For example, one respondent said that their organisation undertook "independent security testing to understand how secure an external service is" and that "often services will fix security issues found". Regardless, awareness of potential security, privacy and confidentiality issues is very high amongst records managers. This means that records managers have the background knowledge necessary in order to successfully "store and secure records through time" and "retain" the evidentiary value of any records stored in the cloud (McKemmish, 1997).

Records managers are also generally well informed about cloud computing's potential impact on the location of records. Just under three-quarters of non-cloud computing records managers were aware of the geographic diversity of cloud provider locations, compared to just over 90% of cloud computing records managers. However, 85% of non-cloud computing records managers were aware of the potential impact of cloud computing on compliance with legislative and regulatory environments, and all records managers using cloud computing were aware of this potential implication. The slight difference in these numbers is interesting to note since the geographic diversity of cloud provider locations is one of the reasons that an organisation might not be able to comply with its legislative and regulatory requirements. As previously mentioned in the literature review, cloud-based information might be subject to the laws of another jurisdiction if it is "physically stored" in that jurisdiction (Inland Revenue, 2013). Yet, records managers do not seem to be as aware of this fact. Since this information is important for the recordkeeping profession to know, there would be a great benefit in promoting this knowledge to records managers more frequently.

Furthermore, records managers currently using cloud computing are more aware of its potential impact on accessibility and retention of information than their non-cloud computing counterparts. 85% of records managers not currently using cloud computing were aware that availability and reliability of cloud computing services might be an issue, while just under three-quarters were aware of cloud computing's potential impact on information disposal. In comparison, just over 90% of records managers using cloud computing were aware that availability and reliability of cloud computing could be a potential issue, while 100% of records managers were aware of cloud computing's potential impact on information disposal.

Records managers using cloud computing also listed other potential implications of which they were aware, such as the "potential loss of data altogether", the "likelihood/ability of another government taking data" and "issues about notification of loss of host services or closure of host business". The differences in awareness level shown here might potentially be due to the greater levels of experience that these records managers have with cloud computing. Although awareness levels are relatively high for records managers not using cloud computing, this information still should be promoted to records managers before implementation of cloud computing so that potential problems are understood and managed. A vital part of continuum thinking is that records managers must be able to control, monitor and audit records from their creation, and for as long as these records are of continuing value (McKemmish, 1997).

The potential problems of portability and interoperability of information stored in the cloud was the area where records managers were the least informed. This area scored the lowest level of awareness amongst both groups of records managers. Just over 60% of records managers not using cloud computing were aware of this implication, while just over 80% of records managers using cloud computing were aware of this implication. Although the latter percentage is high, this potential implication still had the lowest level of awareness amongst records managers using cloud computing. It also appeared as an area of concern for some of the records managers taking the survey. One response to the survey was that "integration" was another potential implication, with the respondent asking "if information is across multiple systems, and one of them is cloud based, how does that affect the information flows across the organisation?" This respondent is seeking guidance about how to ensure that cloud-based records can be placed "in relation to other records" and linked to "their context of activity" as required by the continuum (McKemmish, 1997). Another respondent said that an issue was "long term management/access to records of archival value, and the ability to bring these items back on premise if and when required." This means that portability and interoperability in the cloud should be an area where more resources and information are made available to records managers, especially since their job is to ensure that records remain "reliable, accessible, authentic and accurate" (Stuart & Bromage, 2010, p.220). If records managers had more resources available to them on how to preserve metadata when migrating from the cloud and how to prevent vendor lock-in, this would allow them to combat any potential issues that might affect exporting data from the cloud. This knowledge would also help records managers to operate in the organise and pluralise dimensions of the recordkeeping continuum by

allowing them to establish "migration strategies that carry records through and beyond the life of an organisation or person" (McKemmish).

One of the survey questions asked records managers whether any of these known implications had affected their decisions related to cloud computing. None of the survey respondents said that it had caused them to stop implementation of cloud computing, although two records managers said that they had decided to slow implementation. As mentioned previously, a third of records managers said that they had decided against storing commercially sensitive records in the cloud and a quarter said that they had decided against storing personal records in the cloud. A quarter of records managers said that these implications had had no effect on cloud computing decisions. Records managers were also able to elaborate on other decisions that had been affected by their knowledge of the potential implications of cloud computing. No mention was made of records managers choosing not to go to the cloud in the first place because of these implications. However, reference was made to these potential implications determining which cloud provider should be used. One respondent stated that there had been "careful consideration in [the] selection of [a] cloud provider because of the jurisdiction they operate under" and "potential unauthorised removal of data". Another response received highlighted these implications as having an effect on monetary issues, with one respondent saying that they "do not want to spend money on Large File Transfer (secure software)." Lastly, one respondent said that knowledge of these implications had made them more proactive in finding and fixing security issues of potential cloud services.

Overall, the findings from the survey show that records managers are highly informed about the potential implications of cloud computing. The high level of awareness shown by cloud computing records managers is pleasing since it highlights that they have a good understanding of the potential risks that could affect management of records in the cloud (McKemmish, 1997). The high level of awareness amongst non-cloud computing records managers is also positive, as it highlights that that they possess the knowledge necessary "to make informed decisions" and appropriately manage cloud based documents from their creation (Gatewood, 2009, p.32; McKemmish). However, although it does appear that records managers are aware of the potential risks of cloud computing, there also seem to be areas where more information is wanted.

The recommended guidelines collected and made available online by Archives New Zealand are not heavily used, but their usage levels do highlight certain areas where records managers have been seeking guidance. This has tended to be in the areas of privacy and offshore storage, as the guidelines that have received the most use are the Office of the Privacy Commissioner's guide to cloud computing, the State Services Commission guide to government use of offshore information and Inland Revenue's guidance on storing records offshore. The low usage of many of these guidelines might mean that they are not being promoted to records managers, or it could mean that guidance on cloud computing is being gained from other sources (or not being sought at all). For example, one respondent stated they had been "responsible for reviewing and drafting our 'Use of an Offshore/Cloud Computing Process or Provider Policy and Guide' and accompanying 'Provider Risk Assessment Matrix' for the assessment process for any cloud/offshore services". It is also possible that records managers are seeking information about cloud computing that has been specifically tailored to their jurisdiction, since the guidelines receiving the most use have been authored by New Zealand organisations. One respondent to the survey's free response question even stated that they hoped that there would be "some legislation [or] standards that set out requirements more clearly in future". If this is the case, New Zealand records managers should request a greater number of resources applicable to their jurisdiction to be made available by Archives New Zealand.

As mentioned previously, the survey has highlighted portability and interoperability as areas where records managers could benefit from greater awareness and clarity. The data collected from this survey reveals that SaaS is in use by three-quarters of organisations, compared to a third of organisations using PaaS and just over 40% of organisations using IaaS. Since SaaS is software "offered by a third-party provider", it does not allow the customer to "control the underlying cloud infrastructure" and potentially presents greater portability and interoperability issues than PaaS and IaaS (Archives & Records Association, 2010, p.8). An answer given to the free response question at the end of the survey shows that "issues arise with integration between different systems which share references to documents" and that this has meant that records "may need to be kept in multiple copies to enable systems to work which creates problems of authenticity and consistent disposal". The creation and promotion of guidelines on this topic would likely prove to be of great benefit to records managers, especially since this information has not been extensively covered by the other publically available guidelines promoted by Archives New Zealand. This could also be an

area where records managers work with other key stakeholders (such as other information professionals) in order to develop specifications that support document management in the cloud (McKemmish, 1997).

The survey also revealed a noticeable interest in training from records managers who have not received any to date. Just under 80% of respondents indicated that they would like more training on handling the migration of records stored in the cloud, while all of the other options listed were selected by more than half of the survey respondents. This shows that there are a sizeable number of records managers currently operating in the cloud who believe they could benefit from more knowledge about cloud computing. One respondent also said that they "would like to see Archives New Zealand promoting this kind of training to all records and information/knowledge [managers] on their website as part of professional development". Since continuum thinking places the "archival authority" as the "regulator of accountable public recordkeeping", it would make sense for Archives New Zealand to play a more active role in training New Zealand records managers on cloud computing through courses or freely available resources in order to promote accountable records management (McKemmish, 1997).

12. DIRECTIONS FOR FUTURE RESEARCH

The next step in this area of research should be to conduct a study determining what factors are affecting records managers' involvement in preparing, managing and operating in the cloud. The data collected from this survey has revealed that records managers' involvement in cloud computing decisions has been incredibly low overall, and the reasons for this should be ascertained. This research will become more significant as cloud computing becomes more important in New Zealand organisations.

This survey also only briefly touched upon how records managers are receiving their information about cloud computing, but this is a potential area that could benefit from more research. Survey respondents displayed a high level of awareness of the potential implications of cloud computing, but the main guidelines promoted through Archives New Zealand were not heavily used. This raises the question of what sources of information about cloud computing are being consulted by records managers, and why. It would be incredibly

beneficial to the recordkeeping profession to determine what information sources are currently shaping records managers' knowledge of cloud computing.

13. CONCLUSIONS

The results of this study have shown that involvement by records managers in regards to cloud computing is at a low level - both when it comes to preparing for the cloud and when it comes to managing and operating in the cloud. This lack of involvement in cloud computing decisions is detrimental to New Zealand records managers, as it prevents them from establishing and monitoring recordkeeping processes in line with the recordkeeping continuum. The records managers surveyed also appear to lack confidence that their opinions will influence cloud computing decisions in their organisation. Although collaboration between records managers and IT departments is currently quite high (with just under 85% of respondents stating that they collaborate with their IT department), the research has also revealed that the input of IT professionals often appears to be favoured over the input of records managers. It is recommended that records managers attempt to build a broad range of relationships with stakeholders in their organisation, so that they have more opportunities to influence the direction of cloud computing in their organisation.

Records managers should be actively seeking to increase this involvement, since the data collected has revealed that records managers have a high awareness of the potential implications of cloud computing. All of the records managers surveyed were aware of each of the listed implications at least 60% or more of the time. Although this awareness amongst records managers is quite high, it is still recommended that records managers seek the guidance of Archives New Zealand for any areas of cloud computing in which they would like to receive more information and training. It is especially recommended that more information is made available about managing the portability and interoperability of data stored in the cloud, since this is one of the areas in which records managers would benefit from having more information made available to them. Again, it is recommended that records managers pursue any opportunities available to become involved in cloud computing decisions, so that they can use their knowledge to help reduce the potential risks of recordkeeping in the cloud and increase the likelihood that cloud services implemented will meet recordkeeping requirements.

14. REFERENCES

Ahuja, S. P., Mani, S. & Zambrano, J. (2012). A survey of the state of cloud computing in healthcare. *Network and Communication Technologies, 1*(2), 12-19.

Archives & Records Association (2010). *Cloud computing toolkit: Guidance for outsourcing information storage in the cloud.* Retrieved from http://www.archives.org.uk/images/documents/Cloud_Computing_Toolkit-2.pdf

Archives New Zealand. (2008). *Create and Maintain Recordkeeping Standard.* Retrieved May 30, 2013 from http://archives.govt.nz/advice/continuum-resource-kit/publications-publication-type#standards

Archives New Zealand. (2013). *Glossary continuum definitions.* Retrieved January 25 from: http://archives.govt.nz/advice/continuum-resource-kit/glossary/continuum-definitions

Archives New Zealand. (2013). *What are the recordkeeping implications of cloud computing?* Retrieved May 25 from: http://archives.govt.nz/advice/public-offices/digital-recordkeeping/what-are-recordkeeping-implications-cloud-computing

ARMA International. (n.d.). *Glossary of records and information management terms.* Retrieved September 26, 2013, from http://archive.arma.org/standards/glossaryw2/index.cfm?id_term=373

Barnes, F.R. (2010). Putting a lock on cloud-based information. *Information Management Journal, 44*(4), 26-30.

Blair, B.T. (2010). Governance for protecting information in the cloud. *Information Management Journal, 44*(5), HT1-HT4.

Coutinho, R. (2012). Cloud computing or cloudy computing. *Public Management*, 23.

Cunningham, P. & Wilkins, J. (2009). A walk in the cloud. *Information Management, 43*(1), 22-30.

Ferguson-Boucher, K. (2011). Cloud computing: A records and information management perspective. *IEEE Security & Privacy Magazine, 9*(6), 63-66.

Gatewood, B. (2009). Clouds on the information horizon: How to avoid the storm. *Information Management, 43*(4), 32-36.

Inland Revenue (2013). *SPS 13/01: Retention of business records in electronic format, application to store records offshore and application to keep records in Māori*. Retrieved June 6, 2013 from http://www.ird.govt.nz/technical-tax/standard-practice/general/sps-1301-retention-of-business.html

Institute of IT Professionals. (2012). *New Zealand cloud computing code of practice*. Retrieved from: http://www.nzcloudcode.org.nz/wp-content/uploads/2012/05/NZCloudCode.pdf

James, R. (2010). Records management in the Cloud? Records management IS the Cloud. *Business Information Review, 27*(3), 179-189.

Kabachinski, J. (2011). What's the forecast for cloud computing in healthcare? *Biomedical Instrumentation & Technology, 45*(2), 146-150.

Kumar, R. (2005). *Research methodology: a step-by-step guide for beginners* (2nd ed). Frenchs Forest, NSW: Pearson Longman.

McKemmish, S. (1997). *Yesterday, today and tomorrow: A continuum of responsibility.* Retrieved February 9 from: http://www.infotech.monash.edu.au/research/groups/rcrg/publications/recordscontinuum-smckp2.html

Mell, P. & Grance, T. (2011). *The NIST definition of cloud computing.* Retrieved from
National Institute of Standards and Technology:
http://csrc.nist.gov/publications/nistpubs/800-145/SP800-145.pdf

NZRecords. (n.d.). *nzrecords - A list for the New Zealand recordkeeping community.*
Retrieved September 24, 2013, from http://lists.vuw.ac.nz/mailman/listinfo/nzrecords

Office of the Privacy Commissioner. (2013). *Cloud computing: A guide to making the right
choices.* Retrieved from Office of the Privacy Commissioner:
http://privacy.org.nz/assets/Files/Brochures-and-pamphlets-and-pubs/OPC-Cloud-
Computing-guidance-February-2013.pdf

Ponemon Institute (2011). *Security of cloud computing providers study.* Retrieved from
http://www.ca.com/~/media/Files/IndustryResearch/security-of-cloud-computing-
providers-final-april-2011.pdf

Ponemon Institute (2013). *Security of cloud computing providers study.* Retrieved from
http://www.ca.com/~/media/E7A969F22F88432EB84F95B30CDDCF3C.pdf

Punch, K.F. (2005). *Introduction to social research: quantitative and qualitative approaches*
(2nd ed). London: Sage.

Reed, B. (2009). *Project 9 report: Preservation of Web 2.0 content.* NSW: Recordkeeping
Innovation. Retrieved from: http://gov2.net.au/files/2009/12/Project-9-Final-
Report.doc#_Toc248025982

Sahandi, R., Alkhalil, A. & Opara-Martins, J. (2013). Cloud computing from SMEs
perspective: A survey-based investigation. *Journal of Information Technology
Management, 24*(1), 1-12.

Scale, M.-S. E. (2010). Assessing the impact of cloud computing and web collaboration on
the work of distance library services. *Journal of Library Administration, 50*, 933-950.

Stuart, K. & Bromage, D. (2010). Current state of play: Records management and the cloud. *Records Management Journal, 20*(2), 217-225.

Tanner, K. (2013). Survey designs. In K. Williamson & G. Johanson (Eds.). *Research methods: Information, systems and contexts*. Prahan, VIC: Tilde.

Upward, F. (1997). *Structuring the records continuum, part two: Structuration theory and recordkeeping.* Retrieved February 12 from: http://www.infotech.monash.edu.au/research/groups/rcrg/publications/recordscontinuu m-fupp2.html

Upward, F. (2000). Modelling the continuum as paradigm shift in recordkeeping and archiving process, and beyond - a personal reflection. *Records Management Journal, 10*(3), 115-139.

Upward, F. & McKemmish, S. (2006). Teaching recordkeeping and archiving continuum style. *Arch Sci, 6*, 219-230

Appendix A: Email invitation

Email subject: Survey of records managers and cloud computing

An investigation into the involvement of records managers in cloud computing decisions

This email is an invitation to participate in a short, anonymous survey exploring the level of involvement records managers have in relation to cloud computing decisions, as well as their knowledge about the potential implications of cloud computing.

Are you in a records management role within a New Zealand organisation?

Cloud computing has become an important topic in many organisations, due to the benefits it can provide to businesses and their operations. This increased interest in cloud computing is also reflected in the records management profession, with an increasing body of literature appearing on the potential benefits of using cloud computing. However, this same body of literature also strongly emphasises the potential implications of using cloud computing for records management.

Yet, there has been very little research into the level of involvement that records managers have in cloud computing decisions. Findings from this survey will provide New Zealand's records management community with a better understanding of the issues records managers face when implementing and managing cloud computing in their organisations.

.
I am a student at Victoria University of Wellington and this research is being conducted in partial fulfillment of a Master of Information Studies. Your participation is very much appreciated.

The survey will remain open until **DD Month 2013**.

Please click this link for further information and to begin the survey:
[Insert survey link]

Appendix B: Information sheet (to be provided within the online surveys)

An investigation into the involvement of records managers in cloud computing decisions

Cloud computing has become an important topic in many organisations, due to the benefits it can provide to businesses and their operations. This increased interest in cloud computing is also reflected in the records management profession, with an increasing body of literature appearing on the potential benefits of using cloud computing. However, this same body of literature also strongly emphasises the potential implications of using cloud computing for records management.

Yet, there has been very little research into the level of involvement that records managers have in cloud computing decisions. I have developed a short survey to explore the level of involvement records managers have in relation to cloud computing decisions, as well as their knowledge about the potential implications of cloud computing. Findings from this survey will provide New Zealand's records management community with a better understanding of the issues records managers face when implementing and managing cloud computing in their organisations.

I am a student at Victoria University of Wellington and this research is being conducted in partial fulfillment of a Master of Information Studies.

The survey should only take **10 minutes** to complete, and will remain open until **DD Month 2013**.

- Responses are strictly anonymous and no identifying information is collected. All opinions and data will be reported in an aggregated form in such a way that individual persons or organisations are not identifiable.
- Participation is voluntary and you are implying consent to participate by completing and submitting this online survey. The survey has received ethical approval from the School of Information Management Human Ethics Committee at Victoria University of Wellington.
- The data collected from this survey will be stored in a password-protected file for up to two years, after which it will be deleted. Access to the data will be restricted to the researcher and their supervisor.

Participants who would like to be informed of the results of the research can contact the researcher at the email address provided.

If you have any questions please contact:
Emily Duis / duisemil@myvuw.ac.nz or **Gillian Oliver** / gillian.oliver@vuw.ac.nz

Appendix C: Survey questions

Preliminary questions:

1. **Do you work for the public or private sector?**

   - Public
   - Private

2. **What is your job title?**

3. **How long have you held this position in your organisation?**

   - Less than 3 months
   - 3 months – 6 months
   - 6 months – 1 year
   - 1 year – 2 years
   - More than 2 years

Main survey questions:

1. **Is your organisation using cloud computing for records storage?**

   - Yes
   - No
   - Don't Know

2. **If you answered yes to question one, which service model is your organisation using?**

   - Software as a Service (SaaS)
   - Platform as a Service (PaaS)
   - Infrastructure as a Service (IaaS)
   - Don't know

3. **If you answered yes to question one, which deployment model is your organisation using?**

   - Private cloud
   - Community cloud
   - Public cloud
   - Hybrid cloud
   - Don't know

4. **If you answered yes to question one, who was involved in the decision to use cloud computing for records storage? (Please tick all that apply)**

   - Records or information manager
   - IT professional/department
   - Executive management
   - Business unit management
   - Other

5. **If you answered yes to question one, who was involved in deciding which cloud computing service to use? (Please tick all that apply)**

   - Records or information manager
   - IT professional/department
   - Executive management
   - Business unit management
   - Other

6. **If you answered no to question one, do you think your organisation should use cloud computing for records storage?**

   - Yes
   - No
   - Undecided

7. **If you answered no to question one, do you think your organisation is likely to use cloud computing in the future?**

   - Yes
   - No
   - Unsure

8. **How likely is it that your opinion will influence decisions about cloud computing in your organisation?**

   - [Likert scale responses]

9. **Have you been involved with any of these aspects of cloud computing (preparing for the cloud)?**

   - Risk assessment

   - Selection of cloud services model

   - Selection of cloud deployment model

   - Participation in the evaluation process of cloud provider

   - Determining jurisdictional location of cloud provider

- Development of requirements for storing information in the cloud

- Development of cloud computing strategy

- Adapting existing information governance policies to cloud computing

- Establishment of contract or service agreement with provider

- Negotiation of contract or service agreement with provider

- Creation of exit strategy

- Other

10. Have you been involved with any of these aspects of cloud computing (managing or operating in the cloud)?

- Identification of material to be stored in the cloud

- Classification of material stored in the cloud

- Customising cloud services

- Contact with cloud computing vendor

- Access management

- Enabling security technologies

- Monitoring the service for compliance with service agreements

- Other

11. Do you collaborate with your IT department on cloud computing?

- Yes
- No

12. If you answered yes to the above question, what level of collaboration has occurred between yourself and your organisation's IT department?

- [Likert scale responses]

13. If you answered yes to the above question, what type of collaboration occurs?

- Selection of cloud computing services

- Planning implementation of cloud computing services

- Cloud service deployment

- Invitations to meetings

- Formal sign off on decision making

- Advice on security issues

- Advice on technological issues

- Other

14. Before beginning this survey, were you aware of any of these implications of cloud computing? (Please tick all that apply)

- Impact on compliance with legislative and regulatory environments

- Impact on integrity of information

- Impact on confidentiality of information

- Availability and reliability of services

- Potential issues with portability and interoperability of cloud services

- Loss of governance over information security

- Geographic diversity of provider locations

- Impact on information disposal

- Other

15. Have these implications affected any of these decisions related to cloud computing? (Please tick all that apply)

- Decided to stop implementation of cloud computing

- Decided to slow implementation of cloud computing

- Decided against storing commercially sensitive information in cloud

- Decided against storing personal information in cloud

- Other

16. Have you used any of these publicly available guidelines on cloud computing? (Please tick all that apply)

- Inland Revenue, New Zealand (2013) – *'SPS 13/01: Retention of business records in electronic format, application to store records offshore and application to keep records in Māori'*

- Facilitated by the Institute of IT Professionals (2012) – *'New Zealand Cloud Computing Code of Practice'*

- Office of the Privacy Commissioner, New Zealand (2013) – *'Cloud Computing - A guide to making the right choices'*

- State Services Commission - New Zealand (2009) – *'Government Use of Offshore Information and Communication Technologies (ICT) Service Providers'*

- Australian Digital Recordkeeping Initiative (ADRI) (2010) - *'Advice on Managing the Recordkeeping Risks associated with Cloud Computing'*

- National Archives of Australia (2011) – *'A checklist for Records Management and the cloud'*

- Archives and Records Association (UK & Ireland) (2010)- '*Cloud Computing Toolkit: Guidance for outsourcing information storage to the cloud.'*

17. Have you received any training about cloud computing?

- Yes
- No

18. If you answered yes to the above question, was this training provided internally or externally?

- Internally
- Externally

19. Would you like to receive training in any of these areas? (Please tick all that apply).

- Maintaining security of information stored in the cloud
- Maintaining privacy of information stored in the cloud
- Disposal of information stored in the cloud
- Migration of information stored in the cloud
- Jurisdictional issues of storing information in the cloud
- None
- Other

20. Do you have any other comments about the use of cloud computing for records management?

Appendix D: Survey responses – free response question

Records managers not using cloud computing

- Issues arise with integration between different systems which share references to documents - may need to be kept in multiple copies to enable systems to work which creates problems of authenticity and consistent disposal

- Principal concern is the loss of control and direct management of information stored in cloud, and that the information might be held outside NZ jurisdiction - unproven reliability - people (decision-makers) being led my IT empire builders - fasion and fad rather than caution and longer-term business and heritage prudence.

- It is very rare for information management or records management staff to have the opportunity to comment on potential issues before IT make the cloud decision.

- Concern over the accountability of recovering the records if something goes wrong. Technical issues are not within your control to fix

- It's got a long way to go before I will trust it. I see it's usefulness in an exclusively national Public Service or Local Authorities cloud. There are possibilities for national digital repository of public information also.

-

- There are certainly a number of issues around using Software as a Service (SaaS) but I am only just looking into this as IS are possibly planning to implement some cloud based initiatives within the next 12-18 months.

-

- In my experience users have concerns about the security and privacy of information stored in this way

- I have a strong view that information managers need to embrace the opportunities offered by cloud computing. The Enterprise Content Management Service was recently launched by DIA as a new common capability service. This is a cloud based service - while its not mandated, agencies are encouraged to consider it as part of their 4 year plans. The cloud is coming soon to many departments - information managers need to make sure they are ready and have made the appropriate connections within their agencies so they are able to influence how cloud is adopted in their agency.

- I think this is one of those emerging 'grey areas' and we'll probably/hopefully see some changes in how cloud computing is offered, as well as some legislation/standards that set out requirements more clearly in future. An increasing number of people are using cloud computing in their daily lives, whether they realise it or not, so it's not about to go away!

- It's a massive and scary challenge.

- Also what about cost issues? Good luck and I hope you get lots of useful replies.

- I am aware of multiparty agreements and endorsements where the recommending party had not performed due diligence on vendor agreements, overlooking one or some of the above potential implications, opening partners and/or parties to risk of non-compliance with legislation. It is not unusual for records management recommendations to be under-weighted and/or risks under-quantified in public sector agencies.

- Government agencies will be required to use the future "Government Cloud". We will not have an option. My key concerns are the potential security risk and the loss of management control over our information storage respositories.

- We won't be using a true cloud solution, but we may develop our own 'internal cloud'...

Records managers using cloud computing

- I think the professional generally does not understand the cloud model as it relates to storage of records and the legislative implications that apply. For example: I recently consulted for a government department whose policy was not to use cloud because of the perceived legsilative requirements. I discovered that their IT provider was in fact hosting the department's servers on their [the IT provider] premises. In principle this is the same as cloud computing yet was not perceived to be so by the records people. To make matter worse the IT provider was an Australian based organisation so it would have been entirely possible for their data to actually be resident in Sydney. Because the IT person who negotiated the contract not having knowledge of records legislation , and because the records people were not involved, and even if they were they would not have the technical knowledge about the cloud infrastructure to make a call, it is very easy for these sorts of projects to be implemented without anyone within the organisation knowing they exposure to risks of loss of data and in not meeting the legislative requirements. Furthermore, Archives NZ and their appointed auditors also lack this in depth knowledge of infrastructural architecture to know whether an agency is in fact compliant.

- Yes - we are not as such storing records in the cloud - but we do use the free software dropbox - to share large file transfers. Our website is based offsite (internet) and we use this service -app (bigtincan hub) we are using for electronic agendas for our councillors and EMT - http://www.bigtincan.com/en/products/bigtincan-hub

- May be very appropriate depending on where what data/records are held, access and security arrangements and DR management

- We find that the business find a product and then ask IT to implement EG Acconnex or Sharefile to name a couple - Records Management is an afterthought. We need a

focus on Information Governance (including access security). This has become a big issue for our organisation with many consultants, contractors and external providers having access. The way round it has been to set up cloud applications for sharing with no thought to the implications and they get really annoyed when we tell them there are issues to consider such has do they guarantee ownership, security, NZ or overseas. It is not until you point out that legitimate business owners lost data in the Dotcomm saga.

- I was responsible for reviewing and drafting our "Use of an Offshore/Cloud Computing Process or Provider Policy and Guide" and accompanying "Provider Risk Assessment Matrix" documentation for the assessment process for any cloud/offshore services and the Information management function is one of a number of functions that are required to sign-off on an application for these services. On-shore cloud provision is managed differently and our IT team is responsible for IaaS and other 3rd party storage provision the IM function has less influence on this aspect.

- Due to the lack of a scope definition for your term 'cloud-computing' I have answered your question using the following criteria: Included: Any information available via a web-browser to agencies other than the content owner (my agency) - especially re sites capable of receiving files or comments. Any information published to or transferred via a web-link. Excluded: In-house network drives and email.

- Whether systems are internally or externally hosted, the issues are the same; have you thought about information flows, audience, access rights, availability requirements, local support partners etc. Either way you need to do thorough analysis and make sure you set yourself up for success. All information is a record (mostly anyway), so all systems need records consideration, it then comes down to the the value and retention of that particular record. If it will end up lodged with Archives and kept forever then spend more time getting it right than if it is only kept for 2 years then disposed.

- In my organisation the perception is currently that storage of information is an IT issue. The contract with the cloud provider was signed before the records department even knew it was occurring.When I founf out, I asked what sort of risk assessment had been done before signing up and I raised concerns re integrity, security and jurisdiction with my manager but never heard back.

Name: Emily Duis

Word count: approx. 10,500 words