LEGISLATIVE BUDGET BOARD

CLOUD COMPUTING

Overview of Use, Benefits, and Risks of Commercial Cloud Computing

PRESENTED TO HOUSE COMMITTEE ON GOVERNMENT TRANSPARENCY & OPERATION

LEGISLATIVE BUDGET BOARD STAFF

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Statement of Interim Charge

This presentation is an overview of current and potential uses of cloud computing by Texas state agencies and institutions of higher education. It identifies efficiencies and cost savings along with potential problematic issues related to security or management of the cloud.

1. Cloud computing consists of different types of service models, each with their own benefits and risks.
2. State agencies are already using cloud computing for many tasks and that use is growing.
3. The use of cloud computing by state agencies will continue to grow, but as with most issues in information technology, judgment must be applied. Agencies must understand both the benefits and the challenges of using cloud computing so that costs and risks can be minimized as they implement these still emerging technologies.

Basic Types of Cloud Services

- Infrastructure as a service
  - Basic computing resources such as processing power, storage and network access are provided.
  - This approach works like a utility, where the client only pays for what is used.
  - While the consumer does not manage or control the underlying infrastructure, the user does have control over the operating system, storage, and the applications.
- Platform as a service
  - The vendor provides not only hardware, but a software platform with tools the customer can use to develop solutions that are hosted by the cloud provider.
  - The user does not manage the infrastructure, network, operating systems, or storage. The customer does build, maintain, and control the hosted applications.
- Software as a service
  - The cloud vendor not only handles management of the hardware and background software tasks, but also provides specialized application software and databases.
  - The consumer does not manage or control the infrastructure, operating systems, or storage. They also do not build or maintain the code used in the hosted applications.

Current Use of Cloud Computing Texas State Agencies

- Over 74% of state agencies are already using cloud services, probably 100% of larger state agencies.
- Agency departments may not be aware of all the ways an agency is using cloud based services.
    - A study of cloud adoption involving 200,000 government users in North America at the end of 2014 found the average public sector organization is using 10-20 times as many cloud services than what the IT department thinks are being used, commonly referred to as shadow IT (Examples would include Netflix, Skype, and various social media sites).
    - This shadow use of cloud computing brings benefits and risks.
- Texas is currently using all three types of cloud computing, Outcomes have varied.

Benefits of Using Cloud Services

- Scalability and elasticity
  - Instead of a large project beginning with the purchasing and configuring of hardware, resources can be made available in dramatically shorter time-frames.
  - Additional resources can also be made available immediately for instances of spikes in load and use.
- Device and location independence
  - Employees of state agencies can access data and systems using a web browser regardless of their location. This is especially useful for employees whose job involves significant time away from their office.
  - Cloud services allow additional flexibility for the type of devices that can be used. Employees can use any kind of device at any location that has access to the internet, including tablets, laptops, and smart phones.
- Cost
  - Some of the larger cloud infrastructure providers have tens of thousands of servers and commensurate economies of scale.
  - The Quality Assurance Team, made up of representatives from the LBB, DIR, and SAO, has observed that generally agencies have fewer cost and time overruns when purchasing third-party applications than developing custom applications. Software as a service is a type of third-party application which may be cheaper because the costs of development of the application are being shared among multiple customers.

Considerations in Using Cloud Services

- Security
  - The level of security varies enormously among different cloud providers. A survey in the first quarter of 2015 of thousands of cloud providers and 17 million users found that 8% of the cloud providers were high risk and only 37% were low risk.
  - Records that include either health or criminal justice related information may be required to be stored using special care. Not all cloud providers are compliant with those special requirements. Microsoft and Amazon are examples of cloud vendors that adhere to the Criminal Justice Information Security requirements as defined by the Federal Bureau of Investigation.
- Control
  - In the case of software as a service, the consumer often relinquishes all or considerable ability to customize the screens for individual use. A request for an enhancement or an ad hoc report might go in a queue rather than the client being able to prioritize when an enhancement or report is made available.
  - An agency may lose the ability to have input on when data is released or what types of data are released. The agency may have less ability to control confidential or privileged data.
  - If the cloud provider is located in a foreign country, the laws governing confidentiality for that provider may differ significantly from what would be expected from a provider in North America.
  - Some cloud providers explicitly declare that legally they own the data that lives on their servers. If the agency desired to terminate the contract with the cloud provider, issues of data ownership would need to be addressed.

Considerations in Using Cloud Services (continued)

- Shadow IT
  - Individuals or departments in agencies will often turn to using cloud services without the involvement of IT staff, often because the service is provided for free. Vendors sometimes make their service free for home users, but charge for other uses. Employees who bring these free cloud offerings to work may without realizing it be incurring licensing costs that were not planned and budgeted for by the agency.
  - Often, vendors provide the cloud service for free because they are using alternative sources of revenue generation such as advertising or mining of data.
  - Often only the basic service is free, additional capabilities must be paid for. An agency may end up with a service becoming important to the enterprise, without sufficient planning or evaluation of alternatives.
- Restriction of Ability to Change Approach in the Future
  - Since the agency no longer has the hardware, software, or maintenance experience locally, it can require considerable effort addressing issues related to an organization stopping use of a cloud service once it has become commonly used.
  - Even if the organization was willing to spend significant time and money to try and switch to something else, the fact that the data may live in a proprietary format, may make such an effort challenging.
- Management of the cloud
  - The use of all cloud services requires some planning and management on the part of the agencies to realize the potential efficiencies and some analysis of what kinds of cloud use are appropriate.
  - It can be challenging to hire the needed experience for this management, since this is a rapidly growing area, where the needed resources are difficult to find and costly to hire.

Contact the LBB

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