

Cloud Computing: An Overview

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Cloud 101

- * Cloud: network of servers in different locations where each server has a different function
- * Three types of cloud service:
 - * Infrastructure as a service (IaaS)
 - * Software as a service (SaaS)
 - * Platform as a service (PaaS)
- * When you *take* a picture on your smartphone, it is stored on the phone, but when you *upload* the photo to social media, it is stored on the cloud
- * The cloud can store:
1 Exabyte (1,000,000,000,000,000,000) which is equal to 1 BILLION Gigabytes (1 Gigabyte=1 billion bytes)

Cloud History

- * The cloud dates back to the 1950s, when mainframe computers were enormous and would fill rooms.
- * “Time sharing” allowed multiple users to share access to data and central processing time (CPU i.e., speed!) This is the premise for Cloud Computing today.
- * In 1969, JCR Licklider developed the Advanced Research Projects Agency Network (ARPANET)
- * Internet did not have enough bandwidth for large scale cloud availability until the 1990s.
- * “Cloud computing” coined in 1997.
- * In 1999, Salesforce became the first site to deliver applications and software over the Internet.

Cloud Security

- * #1 privacy and security issue= lack of visibility
- * Additionally, data may be lost if cloud service crashes or provider goes out of business
- * Unclear liability if there is a cyber attack and loss of data
- * Cloud controls, including authentication and encryption, must improve
- * Multi-tenant infrastructure means others may see my data ... competitors, governments, etc.

Policy Issues

* Law Enforcement

- * The 4th amendment protects against unreasonable search and seizure by the government. Generally, law enforcement officers need a warrant to perform a search if it would violate the person's reasonable expectation of privacy.
- * U.S. Supreme Court has also found that when a person turns over an object to a third party, the person loses the reasonable expectation or privacy.
- * So, does that mean when someone uploads photos onto the cloud, they lose their reasonable expectation of privacy?

Policy Issues

- * Perhaps...
- * In 2012, a New York City judge ruled against an Occupy Wall Street protestor who tried to block the district attorney's subpoena for all the tweets the protestor had written over the previous three months. The court found that the protestor "had no proprietary interest" in the tweets; Twitter Inc. did. (*People v. Harris*, 949 N.Y.S.2d 590 (2012)). Appeals courts have dismissed the subsequent attempts to appeal the court's ruling.

Policy Issues

- * ...or perhaps not...
- * In 2014, the Supreme Court held that a law enforcement officer must get a warrant to search data on a cell phone, regardless of whether the data is saved on the cloud or the phone's hard drive. (*Riley v. California*, 573 U.S. ___ (2014)). The court did not, however, specifically address whether information stored by the cloud is protected by the Fourth Amendment.

Policy Issues

* Tax Policy

- * Connecticut imposes sales and use taxes (generally 6.35%) on retail sales of tangible personal property (TPP).
 - * Sales tax: TPP purchased in Connecticut
 - * Use tax: TPP purchased outside Connecticut for use here
- * State also applies 6.35% tax on certain services by companies doing business in Connecticut, regardless of whether they are located here.
- * Exceptions to 6.35% sales and use tax rate for certain goods and services, *including* 1% rate for computer and data processing services...

Policy Issues

Computer and data processing services include:

“ time, programming, code writing, modification of existing programs, feasibility studies and installation and implementation of software programs and systems even where such services are rendered in connection with the development, creation or production of canned or custom software or the license of custom software, and exclusive of services rendered in connection with the creation, development hosting or maintenance of all or part of a web site which is part of the graphical, hypertext portion of the Internet, commonly referred to as the World Wide Web. ”

[CGS § 12-407\(a\)\(37\)\(A\)](#)

Policy Issues

- * John purchased one version of the Microsoft Office Suite at Best Buy. He paid 6.35% sales tax for the package, which included several CDs that he used to install the programs to his computer.
- * John decides to purchase the newest version Microsoft Office Suite and, instead of going back to Best Buy, he downloads it directly onto his computer from the Microsoft website. Should he still pay the 6.35% sales tax?

Nonpartisan Resources

- * Office of Legislative Research (OLR)
- * Legislative Library
- * Legislative Commissioners Office (LCO)
- * Office of Fiscal Analysis (OFA)
- * Program Review and Investigations (PRI)

OLR

- * The Connecticut General Assembly's nonpartisan research arm
- * Staffs all non-fiscal Legislative committees
- * Writes reports annually for legislators and committees
- * Analyzes bills and summarizes public acts
- * Prepares reports summarizing acts affecting particular occupations, industries, and segments of the population
- * Summarizes major acts passed each session
- * Performs other services for the Legislature

Legislative Library

- * Organizationally part of OLR
- * Provides legislative, legal and general research services, including legislative histories, journal and article searches, and historical research
- * The library staff collects and maintain a large collection of print and electronic documents and databases, such as board appointments and mandated reports.

LCO

- * Drafts bills and amendments
- * Provides nonpartisan legal counsel to committee chairs and members concerning rules and procedures, state and federal statutes and regulations, and relevant case law
- * Reviews all bills and resolutions favorably reported by the legislative committees in order to provide counsel to members on issues of statutory consistency, clarity and constitutionality before they are voted on by either chamber of the General Assembly
- * Performs a detailed legal analysis of each regulation submitted to the General Assembly by any state agency and recommends approval or rejection of the regulation

OFA

- * Provides technical support to the Committee on Appropriations and the Committee on Finance, Revenue and Bonding, as well as the other committees and members of the legislature.
- * Reviews department and program operating budget requests and checks executive revenue estimates for accuracy
- * Analyzes and prepares critiques of the Governor's proposed budget
- * Prepares the fiscal notes for favorably reported bills that require expenditure of state or municipal funds or affect state or municipal revenue

PRI

- * Supports the oversight work of the bipartisan Legislative Program Review and Investigations Committee
- * At the direction of the committee, PRI staff examine state programs and systems to determine efficiency, effectiveness, compliance with legislative purposes, and whether corrective actions, modification, or elimination are necessary

Cloud Computing:

What are the biggest challenges?