

# Challenges to Deploying Library Services in the Cloud: Data Issues Influencing IT, People, Costs, and Policy Challenges

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## ABSTRACT

This poster analyzes challenges to planning, deploying, and maintaining different types of library services in the cloud. We apply grounded theory principles to analyze 75 articles authored by library administrators, librarians with IT expertise, IT professionals, cybersecurity experts, and business consultants engaged in planning, deploying, and maintaining library services in the cloud. Data analysis reveals that a majority of the past literature reports challenges to implementing Software as a Service (SaaS) in libraries. The seven key areas critical to the successful implementation of SaaS in libraries are related to: (1) data, (2) authentication and privacy of patrons, (3) skills and knowledge of library staff and organizational culture, (4) IT infrastructure, (5) features of services, (6) fixed and operational costs associated with data and technology, and (7) policies and contracts.

## KEYWORDS

Libraries; Cloud; Software as a Service; Challenges

### ACM Reference format:

D. Potnis, Regenstreif-Harms, R., and D. Hunter. 2018. Challenges to Deploying Library Services in the Cloud: Data Issues Influencing IT, People, Costs, and Policy Challenges. In *Proceedings of ACM/IEEE Joint Conference on Digital Libraries (JCDL'18)*, Dallas, Texas USA, June 2018, 2 pages. <https://doi.org/10.1145/3197026.3203897>

## 1 GOAL

In the era of budget cuts, libraries need to rely less on external information technology (IT) vendors and train librarians to design, develop, and maintain IT solutions and services [1]. The goal of this poster is to identify the key barriers to planning,

deploying, and maintaining library services in the cloud and reveal the inter-relationships among these barriers, which would help libraries address the challenges to planning, deploying, and maintaining library services in the cloud. Study findings would better equip libraries for deploying services in the cloud, thereby reducing their reliance on external IT vendors and saving their scarce financial resources while better serving patrons.

## 2 METHODS

We used a “pearl seed” approach to retrieve relevant articles on the topic of cloud computing in libraries from the following sources: (a) peer-reviewed journals (e.g., *Journal of Academic Librarianship*, *IT and Libraries*, *Library Hi Tech*, *Online Information Review*); (b) practitioner-oriented magazines (e.g., *computers in libraries*, *ACM Transactions on Storage*); and (c) professional conferences (e.g., *ACM/IEEE JCDL*, *Computers in Libraries*, *Data Summit*, *ACRL*). We focused on the experiential guidance offered by practitioners. We considered articles published from 2005 to 2016 to ensure that we captured the evolving role of cloud in offering library services. We developed MS Excel summary sheets to code all the experiences and advice shared by practitioners. The coded data was read repeatedly to identify and name patterns and themes. Each relevant publication was analyzed individually and then compared across subjects to identify patterns and common categories.

## 3 RESULTS

We identified seven clusters consisting of 35 challenges critical to the planning, deployment, and maintenance of library services in the cloud (see Figure 1). Data, people (i.e. library staff and patrons), policies and contracts, IT (infrastructure and features of services), and various costs associated with data, IT, and policies and contracts are the key barriers to deploying library services in the cloud. Challenges such as *configuration* belong to IT Infrastructure, Costs, and Features of Cloud Service clusters. Similarly, *security* belongs to both the data and people clusters. Figure 1 depicts factors that are correlated to each other by a double arrow. For instance, there is a correlation between institutional practices and data loss; similarly, networking is correlated with migration, access, and storage of data.

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JCDL '18, June 3–7, 2018, Fort Worth, TX, USA

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ACM ISBN 978-1-4503-5178-2/18/06.

<https://doi.org/10.1145/3197026.3203897>

Challenges related to data seem to be correlated the most with the challenges from the remaining clusters.

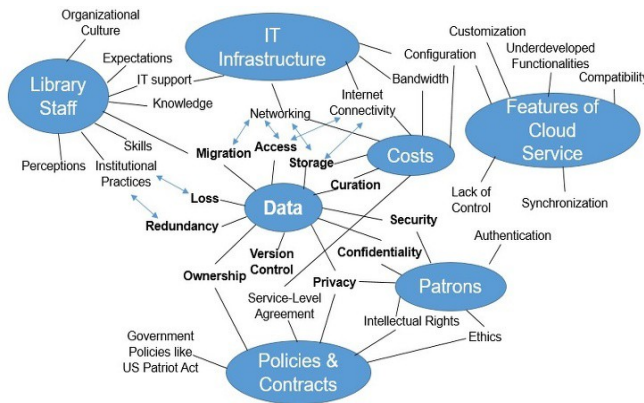


Figure 1.35 Challenges to Deploying Library Services in the Cloud

### 3.1 Data

Access, storage, ownership, security, curation, confidentiality, loss, privacy, migration, and redundancy of data create challenges to using data while serving patrons using the cloud. Security and privacy are the biggest concerns of libraries using cloud, especially if libraries collect individually identifiable information such as credit card information. Once libraries release data to the cloud through a third party, they hardly have any control over it. The availability and durability of data are important when data is stored on remote hosts, creating enormous risks for privacy [2].

### 3.2 Patrons

The issues of authentication, confidentiality, and privacy overlap with each other for the data and patrons clusters. Sometimes where the third-party vendor stores patron data at their physical facility, they might not even inform libraries that their patrons data have been released [3]. Questions related to jurisdiction might also be raised when storing data in the cloud, which could be related to the PATRIOT Act and its successor, the FREEDOM Act.

### 3.3 Library Staff

The skills and knowledge of library staff, their perceptions of and expectations from ILS implementation, soft issues related to migration, institutional norms of serving patrons using the cloud, and finally, organizational culture for adopting new technological solutions are some of the key factors influencing the planning and implementation of services in the cloud. There is a significant learning curve involved in learning and building a new vocabulary of concepts to serve patrons efficiently.

### 3.4 IT Infrastructure

Issues related to the Internet connectivity, networking, and configuration lead to IT infrastructure challenges. Cloud-based services cannot work on low-speed Internet connections [4].

### 3.5 Features of Cloud Services

Libraries' lack of control over cloud-based services, the inability of libraries to customize their services they wish, issues related to synchronization and configuration, incompatibility, and underdevelopment hinder the planning and implementation of services in the cloud. There could be a feeling among librarians that they are no longer in charge of technical services.

### 3.6 Costs

Cloud services are neither free nor cheap. The IT budget of libraries could be affected negatively by the maintenance of cloud-based services. The operating costs of cloud computing can be expensive, including the costs of bandwidth, transition, and backup storage.

### 3.7 Policies and Contracts

The PATRIOT Act had a chilling effect on libraries [5]. Security policies of academic institutes could apply to cloud computing and potentially protect academic libraries from the threats arising from these services [6]. Librarians consider service level agreements (SLAs) to be the biggest concern when evaluating a cloud provider [7].

## 4 CONCLUSION

Although some challenges reported before 2010 have been resolved using the advancement in technology, data issues continue dominating the planning, deployment, and maintenance of library services in the cloud. Each library is different in terms of their librarians' skills, existing SLAs and their IT infrastructure needs. Libraries should interpret our findings as per their unique context, for addressing the challenges to planning and implementing services in the cloud to better serve their patrons.

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