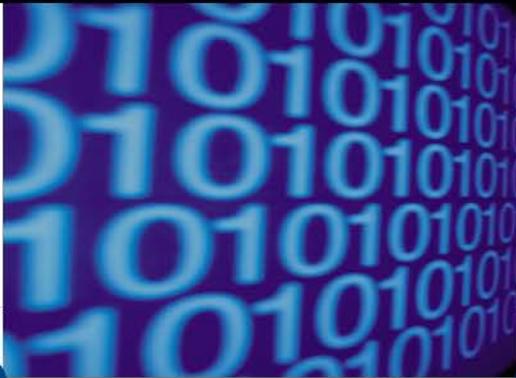




U.S. General Services Administration



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Office of Citizen Services and Innovative Technologies

Leveraging Cloud Services

Application Selection for Migration to a Cloud

September 30 2011



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1. Introduction

With twin mandates to consolidate data centers and move to the cloud, as well as intense budget pressures, federal government departments and agencies need to identify applications (or services) that are good candidates to migrate to a cloud. Cloud computing can help organizations to maximize resource usage; expand services provided to constituents; scale rapidly, based on demand; and minimize up-front investment costs for new and improved services. In addition, moving workloads out of a data center and into a cloud can accelerate data center closures. Furthermore, if those clouds are themselves served from eco-friendly “green” data centers, the government will also be closer to achieving its sustainability goals.

These advantages can ease the challenges of tight (and likely shrinking) budgets and increased expectations from constituents for speed, service, and transparency. Many departments and agencies are turning to the cloud for help with this dilemma, and it is a business approach combined with technology well suited to the challenges, if deployed correctly.

2. Description of Problem & Goals

Cloud computing can and should be transformational, enabling an organization to provide services more efficiently and to meet its mission objectives. However, technology alone cannot accomplish this; it is simply an enabler. The organization’s business model and culture must also evolve to realize the benefits of cloud computing. For example, a weeks-long approval process will negate any agility improvements that could accrue from the rapid provisioning capabilities of a cloud, which otherwise could provide a service (such as a virtual machine) to a requestor in 15 minutes or less. Similarly, an insistence on highly customized services will eliminate the cost savings that result from economies of scale, which in turn are made possible only by brutal standardization, although savings from virtualization and automation may still be achieved. Further, the selection of the right workloads to move is critical to the success of a cloud effort.

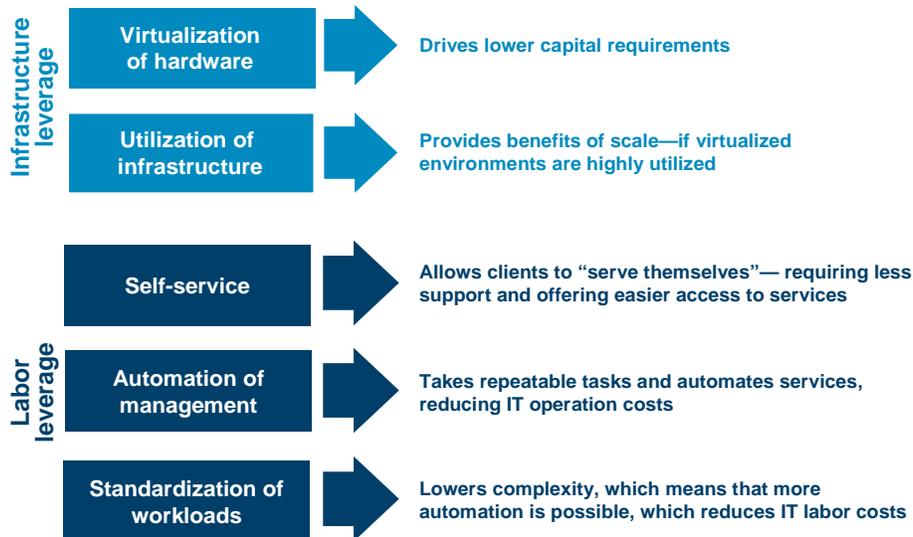
3. Description of Approach, Rationale, Results & Timeline

The widely-touted cost savings of migration to a cloud result from a series of steps, beginning with developing an organization’s cloud strategy, prioritizing service and delivery models, and eventually consolidating infrastructure. Consolidation and virtualization increase utilization and provide savings in hardware and (potentially) software licenses. Standardization, whether of virtual images or of applications themselves, provides additional savings through reduced complexity and enabled automation.

The following figure illustrates the possible savings that can be achieved by migrating to a cloud.

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Major factors driving cloud computing economics



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Figure 1: All of these contribute to the savings achievable from a move to cloud in varying degrees depending on the deployment model.

One of the greatest determinants of success in moving to the cloud is the careful selection of those services, or workloads, to be moved. It is easiest, of course, to begin with new workloads, those that have no legacy component, and to implement them in the cloud from the start. However, even with new workloads, not all are well suited to the cloud, so one must carefully consider the characteristics of each for suitability. For example, the most suitable applications are those that can be standardized, and that do not require any customization (other than perhaps the user interface, but not the underlying business logic). One must also test for risk: how secure must an application be, and how much protection does the data require?

In addition, government departments and agencies must address the requirements of the Federal Information Security Management Act (FISMA); the National Institute of Standards and Technology’s publication “*Guidelines on Security and Privacy in Public Cloud Computing*” provides helpful guidance for those moving to a public cloud. The levels of standardization and security are major determinants, both of the suitability for any cloud, and the deployment models to be considered. How tightly coupled a workload is with other applications will also affect its suitability for the cloud; database-centric applications must reside near the data they rely upon.

IBM has developed a methodology and tools for workload selection that applies a weighted set of motivators and inhibitors to the following common workloads:

- Analytics
- Collaboration
- Development and Test
- Desktop and Devices
- Compute
- Storage

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IBM has performed an analysis of selected cloud workload categories, using specialized techniques, to identify the “best place” to begin (or continue) the journey to cloud computing. In a one-day cloud exploration workshop, clients gain a common understanding of cloud computing and explore their unique environment and requirements, as they relate to workload categories, to determine which are ready for the cloud and which deployment model is most appropriate.

The workshop uses a series of structured education and analysis techniques to help a client increase their knowledge of cloud computing and where it may provide the most value to their business. The workshop:

- Explores the benefits and value proposition of each of the cloud computing models.
- Performs an analysis of selected workload categories, including the motivators and barriers to determine those suitable for public, community, or private cloud deployment.
- Reviews the IBM Cloud Computing Reference Architecture and an assessment of the key IT capabilities necessary for deploying a private cloud (optional).

After the workshop, the IBM team will present a report that includes assessment results, observations, and recommendations, and if the optional workshop modules are selected, the IBM team will also present an IT roadmap that provides a path to address any identified capability gaps.

Using this methodology with a number of clients has resulted in insights into likely candidates for cloud computing. The best place to start a move to the cloud is with workloads that can largely stand alone, that are easily virtualized, and where an agency can gain significant value (in agility, cost savings, or other business benefits). The following figure maps several workloads to a gain or pain matrix for movement to the cloud.

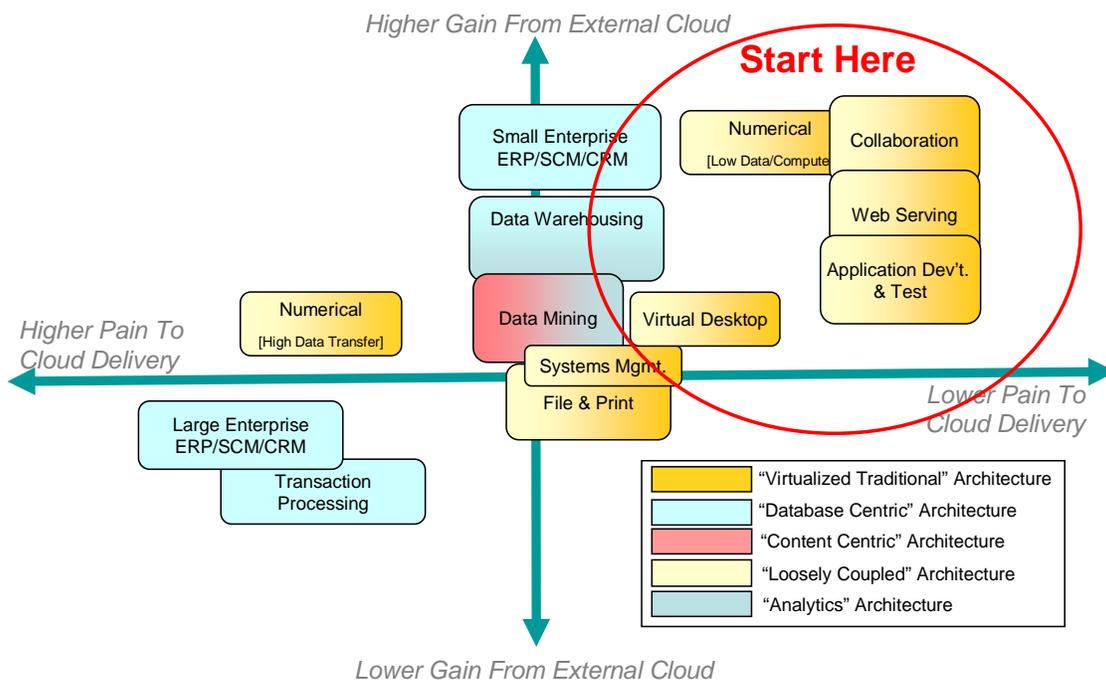


Figure 2: Agencies should adopt cloud computing based on workload affinity

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The Office of Management and Budget in May published a list of 78 services that agencies were planning to move to the cloud within a year.¹ The most common application identified was email and collaboration, followed by website hosting. As identified in the previous figure, both are excellent candidates for the cloud, as they offer both high gain and low pain.

Application development and test was not one of the frequently identified services. This finding is surprising, as 30% to 50% of all servers within a typical IT environment are dedicated to test, and most of those test servers run at less than 10% utilization, if they are running at all. The testing backlog is often very long and cited as the single largest factor in the delay of new application deployments, and IT staff report a top challenge is finding available resources to perform tests to move new applications into production. Perhaps worst of all, 30% of all defects are caused by wrongly configured test environments.² Given these challenges and the high cost of underutilized test environments, test and development environments should be prime candidates for a move to the cloud, especially as they are almost by definition not tightly coupled with on-premise legacy systems.

Case Study

The problem:

A Fortune 100 company needed to manage technology to drive innovation for internal transformation and growth. The challenges faced included:

- Difficulty responding to rapidly-changing business needs
- Slow, tedious, labor intensive, and error prone deployment of infrastructures
- Unavailable servers, which were costly to upgrade

The solution:

To address these issues, the company decided to deploy a collaborative development and test cloud for their innovation centers. The goal was to enable 2,500 innovators to quickly and easily prototype and deploy new technologies for 100,000 early adopters. The results were significant: systems administrator install and configuration time fell from three to five days, to less than an hour; hardware costs were reduced by a factor of four; and administrative costs were reduced by a factor of seven. Although the financial results are shown in the following figure, the intangibles, such as projects beginning immediately upon conception, were deemed “priceless.”

¹ “Agencies Have Identified 78 Systems Migrating to the Cloud Within One Year,” May 25, 2011

² “Industry Developments and Models – Global Testing Services: Coming of Age,” IDC, 2008 and IBM Internal Reports

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Results from moving a collaborative development environment to a private cloud

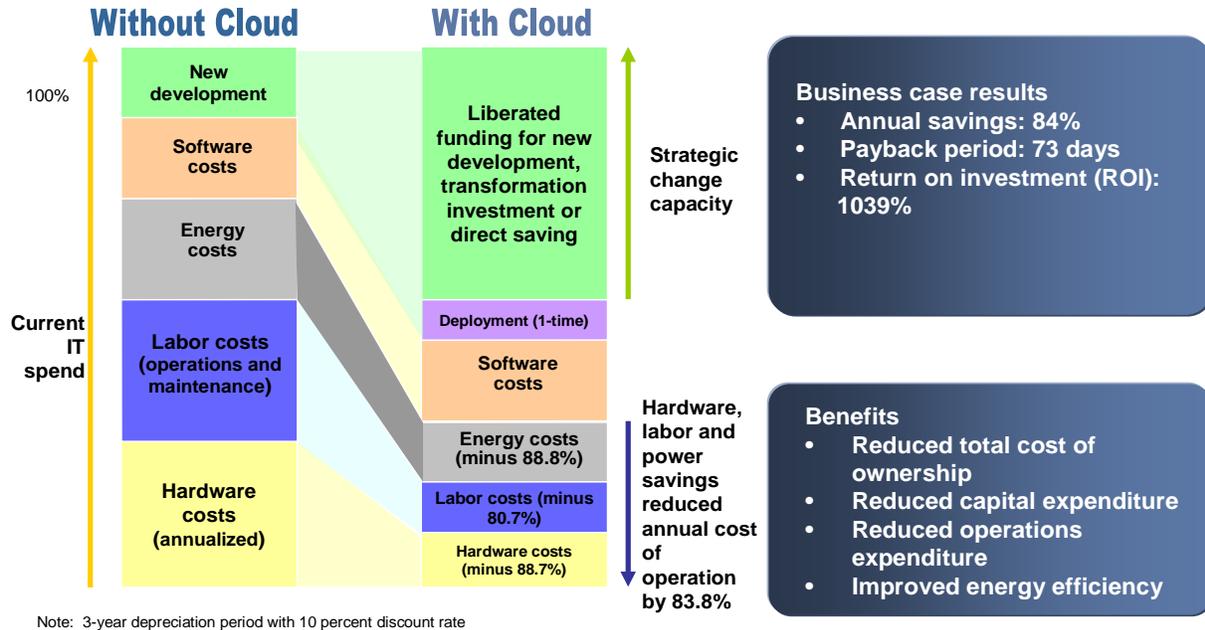


Figure 3: One enterprise saved 83.8%, with a payback period of 73 days, by moving a collaborative development environment to a private cloud.

After estimating the number of innovation projects per year, the duration of the average project, and the IT services needed for each, the company was able to project the annual costs of continuing to support their innovation center. As shown in the preceding figure, the cost benefits were significant, even without factoring in the reduction in defects and time to value.

Summary

Careful selection of the appropriate workloads, service models, and delivery methods for a move to the cloud are keys to any successful implementation, but careful attention must also be paid to reengineering business processes and changing a company's culture. Workshops and consulting services to build a roadmap to the cloud and a strategy to transform the organization will help agencies receive the greatest benefit from their move to the cloud.

4. POC and Vendor information

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