# Moving Applications to the Cloud

Often, when an organization thinks they want to deploy Cloud technology, what they really mean is they want to move their applications and data to the Cloud. Their motivation is cost reduction because they see less investment requirements for hardware and IT resources. By leveraging Cloud services, they expect to have instant scalability because requests for more hardware usage would come from a larger pool of resources than what might be available in their data center.   These advantages can be realized, but there are many things to consider before any IT resources should be moved to the Cloud—starting with how Cloud technology works.
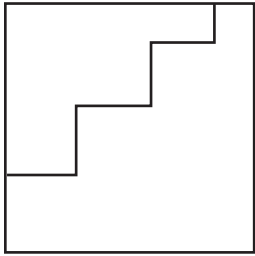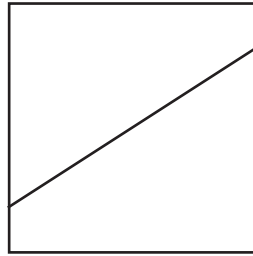
There are really three things that computers do with applications: calculate using CPUs, sort using RAM, and store using disk. Cloud technology does all of these things—calculate, sort, and store—with fewer resources.

The Cloud Technology Stack

The two most significant components of Cloud services architecture are "the front end" and "the back end." The front end is the software application used by an end user through a web browser. The back end is the 'Cloud' itself that is compromised of various computers, servers, and data storage devices. Once an Internet connection is established between the front end and the back end, it is possible to share applications through the Cloud Technology Stack (see table.)

THE CLOUD TECHNOLOGY STACK

CLIENT	A Cloud client consists of computer hardware and/or software that rely on Cloud computing for application delivery.
APPLICATION	Cloud applications deliver software-as-a-service (SaaS) over the Internet, eliminating the need to install and run the application on the customer's own computers and simplifying maintenance and support.
PLATFORM	Cloud Platform-as-a-Service (PaaS) solutions facilitate deployment of applications without the cost and complexity of buying and managing the underlying hardware and software layers.
INFRASTRUCTURE	Infrastructure-as-a-Service (IaaS) means that equipment is outsourced so rather than purchasing servers, software, data center space, or network equipment, enterprises purchase resources as a fully outsourced service.
SERVER	The server layer consists of computer hardware and/or computer software products that are specifically designed for the delivery of Cloud services, including multicore processors, Cloud-specific operating systems, and combined offerings.

Cloud technology differs from the way that the Internet originally worked in an evolutionary rather than revolutionary way. Much of the initial hardware on the Internet involve storage devices used for data and applications. These devices are shared by end users in multiple locations and are scalable. Cloud technology offers this too, with technology especially created to take advantage of Internet connectivity because software has been developed specifically for Cloud computing. Cloud technology is also available at multiple price points so that more organizations—regardless of their budget or size—can leverage it via a utility-based, pay-for-what-you-use model.

Moving Applications to the Cloud

When an enterprise—especially one in Financial Services—looks at which applications can be moved to the Cloud, several factors need to be considered, starting with the type of application. Some applications are custom-built, some are bought from a vendor and customized, and others are used "straight out of the box." Of all the software applications used, only about 20% contain core intellectual property (IP) for the business.

IT managers need to work with managers across the organization to determine:

» Which applications are core to the business?

» Which applications provide differentiation?

» Which applications get the business up and running quickly?

» Which acquired applications will work for me better than anything we can develop in-house?

» How often does data need to be updated?

» How protected is the data?

» What are the legal requirements for managing data?

The answers to these questions should determine which applications are best moved to the Cloud. For example, some Financial Services organizations have software that needs constant updating—like a specialized trading system at an investment bank. This type of application is not a good candidate for the Cloud because the amount of hands-on work could be difficult and expensive when outsourced.

The following are applications that can be moved to the Cloud:

» PRODUCTIVITY TOOLS
E-mail is one application that can be readily moved to the Cloud. With security measures applied to e-mail, already accessed through multiple devices throughout the organization, immediate cost savings can be realized as part of a quickly implemented, low-risk project.

» DEPARTMENTAL APPLICATIONS
CRM systems, payroll, image archiving, business intelligence, and sales force automation are available as software-as-a-service. Moving these applications and their data to Cloud solutions offers cost savings and standardization across an organization.

» CORE APPLICATIONS
Software that is being used "off the shelf" or in a "customized" version can be moved to a Private Cloud where it can be used securely while being hosted in a remote data center.

Is the Cloud Always Better?

Moving applications to a Cloud services provider isn't better if the Cloud solution is not highly reliable or always available. If, for example, the hardware used by a Cloud solution is under a lot more load and used by more people than the hardware in your own data center is used, the amount of time needed to retrieve data may be unacceptable.

As part of the IT service level agreements (SLAs), many IT organizations have recovery point objectives (RPOs). These are the points in time in which the provider must recover data. They also have recovery time objectives (RTOs) that define how quickly the provider must restore the data to the RPOs. With Cloud services, it is necessary for IT to contractually agree on data backup and recovery requirements with their Cloud providers. If Cloud agreements are signed without clearly specifying RPO and RTO metrics, and a disruption occurs, many folks learn the hard way that their Cloud provider is operating under a much less stringent RPO and RTO than was expected.

In addition, there are service level agreements (SLAs) in place that define the availability and performance of the application. These SLAs depend on the performance of the underlying CPU, memory, and storage I/O operations. IT organizations need finer granularity on these performance parameters, potentially including contractual requirements for multiple classes of service at the Cloud provider. Without these guarantees, while system availability may be acceptable, the performance of the system may not be. New and emerging tools are available to help bridge this gap.

Legal Considerations for Applications in the Cloud

The architecture of Cloud applications can differ significantly from traditional application models, such as SaaS applications that may not even be installed or run on an employee's computer. The changes within application models require a different way of thinking about purchasing, application usage and licensing. For example, some software licenses may not cover off-site use. Moving these applications to a Cloud server could lead to an audit, fines, and bad publicity. Other licenses might prohibit virtualization (where many different applications run on a single server.)

There are many legal considerations for the storing and processing of customer data using Cloud technology that have to be addressed in order to avoid breaching local, Federal, and international regulations.

» E-MAIL ARCHIVING_ Regulations like Sarbanes-Oxley require that public companies store e-mail for seven years and have it accessible for audit in a timely manner. That may not be possible with a distant vendor.

» DATA EXPORT RESTRICTIONS_ In many jurisdictions, the export of data to other locations is prohibited or subject to multiple restrictions.
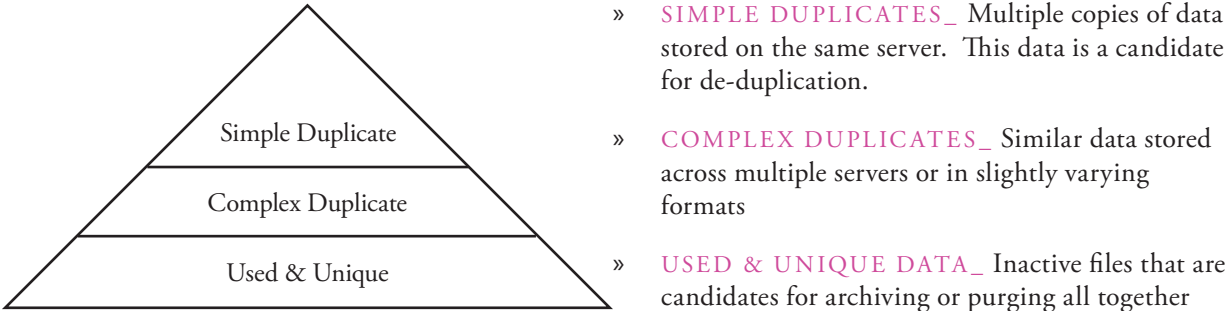
» COMPLIANCE_ Data protection regulations may require that personal data be stored in the Cloud, in accordance with the customer's instructions, and that appropriate measures are taken to keep the data secure.

» REMOTE DATA STORAGE_ When customer data is split up and stored in different data centers globally, complying with data protection regulations is further complicated by the data protection laws of each location that it is stored in. It's important to note that these regulations aren't specific to Cloud computing and also apply to paper records stored in warehouses in multiple locations as well.

Does Scalability Equal Efficiency?

One of the biggest misconceptions of Cloud computing is that simply moving data to the Cloud for scalability leads to greater efficiency. Storing data and applications that used to be run in the data center aren't going to be more efficient just because they were moved to a Public or Private Cloud.

No matter where applications and data reside, good data management begins with good metrics. Managers throughout the organization, from the procurement manager to the system administrator, need to establish the appropriate performance metrics at each level. By looking at file system/database overhead plus unwritten capacity, it becomes clear that only a small percentage of data is unique or of current value.

» SIMPLE DUPLICATES_ Multiple copies of data stored on the same server. This data is a candidate for de-duplication.

» COMPLEX DUPLICATES_ Similar data stored across multiple servers or in slightly varying formats

» USED & UNIQUE DATA_ Inactive files that are candidates for archiving or purging all together

METRIC	OWNER	EXPLANATION
Protection Efficiency	Architect	Based on policy-driven performance, availability, and protection standards
Demand/ Deployment Efficiency	Administrator	Ensures storage is claimed. Requires consistent, repeatable process with validation
Platform Efficiency	System Administrators	Deploys assigned storage efficiently. Requires consistent, repeatable process with validation
Application Efficiency	Application Owners	Manages true data utilization

Summary

As CIO's look to free up valuable application resources by utilizing Cloud technology, it's important to first have a plan. Using clear objectives and metrics, conventional business models can be compared to those using Cloud-based services. There are many cost-cutting gains in operational and capital expenditures realized by deploying Cloud-based services that can not only improve service quality to internal customers but also the bottom line.

About Us

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