



This paper discusses the cloud from the business executive perspective. Cloud computing has become a broad term and our focus will be to:

- Provide a definition of the cloud to set context for the paper.
- Discuss why businesses should be aware of the impacts of the cloud computing paradigm.

# Optimizing IT Operations Through Cloud Computing

## What is Cloud Computing?

Cloud computing has become a broadly used term to the point where simply saying “cloud computing” does not provide sufficient context for an unambiguous discussion. This section provides context through a brief overview of the various forms of cloud computing.

Cloud computing refers to services that are provided to a business by a third party. The National Institute of Standards and Technology (NIST)<sup>1</sup> defines cloud computing as “a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction.”

These third-party managed services are provided off-site. Cloud computing services are typically divided into three areas: Infrastructure as a Service (IaaS), Software as a Service (SaaS) and Platform as a Service (PaaS).

**1 Infrastructure Services** refer to pools of hardware resources (CPU capacity, disk space, network bandwidth) that are made available in an on-demand fashion by service providers. Cloud services make these resources available while reducing the requirements for infrastructure management resources.

**2 Software Services** refer to applications that are made available by service providers that require no, or minimal, hardware resources on the user premises. Issues such as scalability and reliability are dealt with through contractual requirements; meeting these requirements is the responsibility of the software service provider rather than the in-house IT department.

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**3 Platform Services** refer to development platforms that are specifically designed to lever the architectural paradigms that are present when implementing applications for the cloud. Platform services are typically hosted off-site and managed by a third party, reducing the needs for in-house hardware resources and management staff.

These three service areas can satisfy an array of business requirements ranging from basic hardware services to highly scalable development platforms suitable for implementation of new applications.

### Why Does it Matter?

Why should businesses be concerned with the trend towards cloud-based services? Depending on the size of the enterprise, there may already be significant investment in measures designed to ensure that the IT infrastructure can meet performance needs. A well-run IT department can be managed in a reliable way through monitoring tools, resource allocation strategies, backup and recovery capabilities and business continuity measures.

Smaller organizations can lever cloud services to achieve these capabilities with lower start-up costs, and larger organizations can consider whether savings can be achieved through transitioning to cloud services. Other cloud benefits include:

- Responding more quickly to changes in demand. Changes in business conditions can result in reduced or greater demand for IT services. Capacity can be adjusted through the cloud providers without making changes to in-house capacity.
- Accessing next generation services and composite applications made up from multiple service types. Mapping applications, specialized data stores, and specialized capabilities are becoming increasingly available through the cloud.
- Dedicating internal resources to core business problems where the familiarity with the business domain allows the addition of greater amounts of business value.
- Provisioning applications that are not core to the business by turnkey cloud providers.
- Filling in the gaps in current IT practices through the use of external service providers. This approach is potentially quicker and more cost effective than building up internal capabilities. Server virtualization and business continuity capability are two areas that are implicitly provided by cloud technologies.

“The use of cloud services within the enterprise can provide significant benefits; even organizations with established IT infrastructures may see sufficient benefits in reduced budget and staff resources to justify piloting cloud projects.”

- Responding quickly in deployment steps of new applications. Allocation of infrastructure and management processes, and potentially the application installation, may be performed quickly by a cloud service provider than by internal IT.
- Reducing the physical infrastructure needs for space, power, and cooling in internal premises.

As is the case with all new technologies there are potential challenges:

- Lack of control on the location where computing and data storage takes place. Technically, the distribution of compute and storage locations adds to the resiliency of the cloud fabric. The lack of control of storage location can result in legal issues for some types of data and certain lines of business.
- The effective use of cloud services requires the use of architectural and design patterns that are somewhat different than those that would be used for a localized data centre. The use of inappropriate designs may result in poorer performance, reduced resiliency and greater cost than would otherwise be achievable.
- Cloud services must offer some degree of manageability and diagnostic capability to ensure that services are performing as required.
- Legacy technologies may not be supported in the cloud.
- Deployment procedures may be more complex than those required for deployment to in-house infrastructure.
- Management procedures for development and quality assurance environments may be more complex than those required for in-house infrastructure.
- Added complexity to identity management, resulting in less effective strategies for single sign on and consolidated user identity security.
- The use of cloud services requires a high degree of confidence in the maturity and stability of the cloud service partner. The nature of cloud services requires the pooling and sharing of hardware resources to satisfy multiple clients. Therefore, security measures to protect data must be of a high level. Consideration must also be given to the possibility of the cloud service provider going out of business. What impact would this have on business processing and data recovery?

## About Quadrus

Quadrus is a recognized leader in IT professional services and solutions. Headquartered in Calgary, Alberta, Quadrus has delivered hundreds of successful projects across Western Canada since 1993. We are committed to providing the highest quality service to our valued clients.

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These challenges can be addressed through a variety of mechanisms:

#### 1 Follow an IT compliance selection process when selecting a cloud vendor.

Ensure that the project requirements are clearly understood and encompass both functional and non-functional requirements including regulatory requirements, manageability requirements, technology support, and provisions for development, quality assurance, and production environments. Vendors offer various capabilities, and these capabilities must be matched against business requirements. As cloud services are a relatively new offering, care must be taken in selecting a partner to ensure that the cloud infrastructure is reliable, secure and around for the long term.

#### 2 Ensure that application architectures lever the cloud paradigm to the extent required by your applications.

Platform services have the potential for scalability and availability that exceed the capabilities offered by typical in-house hardware infrastructures, but achieving this potential requires an architecture that is cloud-aware and levers the potential of distributed hardware services.

#### 3 Ensure that identity management facilities fit within the needs of your organization.

A hybrid approach (cloud services supplementing in-house services) results in the greatest complexity as in-house directory services must be integrated with cloud directory services.

The use of cloud services within the enterprise can provide significant benefits; even organizations with established IT infrastructures may see sufficient benefits in reduced budget and staff resources to justify piloting cloud projects. These potential benefits are most likely to be realized when sufficient due diligence is applied in selecting both the business functionality to move to the cloud and the appropriate cloud service providers.

<sup>1</sup>Mell, P., & Grance, T. (2009). The NIST Definition of Cloud Computing. NIST.