



Let's Talk Digital Series #4

# What is Cloud Computing?

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Have you ever stored your files on Google Drive or Drop Box? Used Google Docs or Office 365 to edit documents? Gmail or Yahoo mail to manage your email or Prezi to create presentations? Then congratulations, you have used Cloud Computing!

Quite simply, instead of having all the computer related hardware and software that you are using sitting in your office or somewhere else on your companies' computer network, Cloud Computing is about the delivery of computing hardware and software such as servers, storage, databases, networking, applications over the Internet i.e. the Cloud.



For companies, these business models offer some advantages.

## YOU PAY FOR WHAT YOU USE

Jeff Bezos, the CEO of Amazon famously said “You don’t generate your own electricity. Why generate your own Computing?”

What this means is that Cloud Computing essentially allows you to treat Computing like a utility. You only pay for what you use.

## REDUCED CAPITAL EXPENDITURES

Say you were a startup software company and you were in the business of developing applications for your customers. In the traditional model, the company would have to purchase all the computing resources required for the developers to build and test the applications. Cloud Computing allows these companies to use these resources over the Internet in a “pay as you use model”. Thus, reducing the initial capital expenses is required. The flipside to this, however, is that the ongoing operating costs go up, as well as the cost to ensure sufficient bandwidth and stability of networking services.

## SCALE UP OR DOWN AS REQUIRED

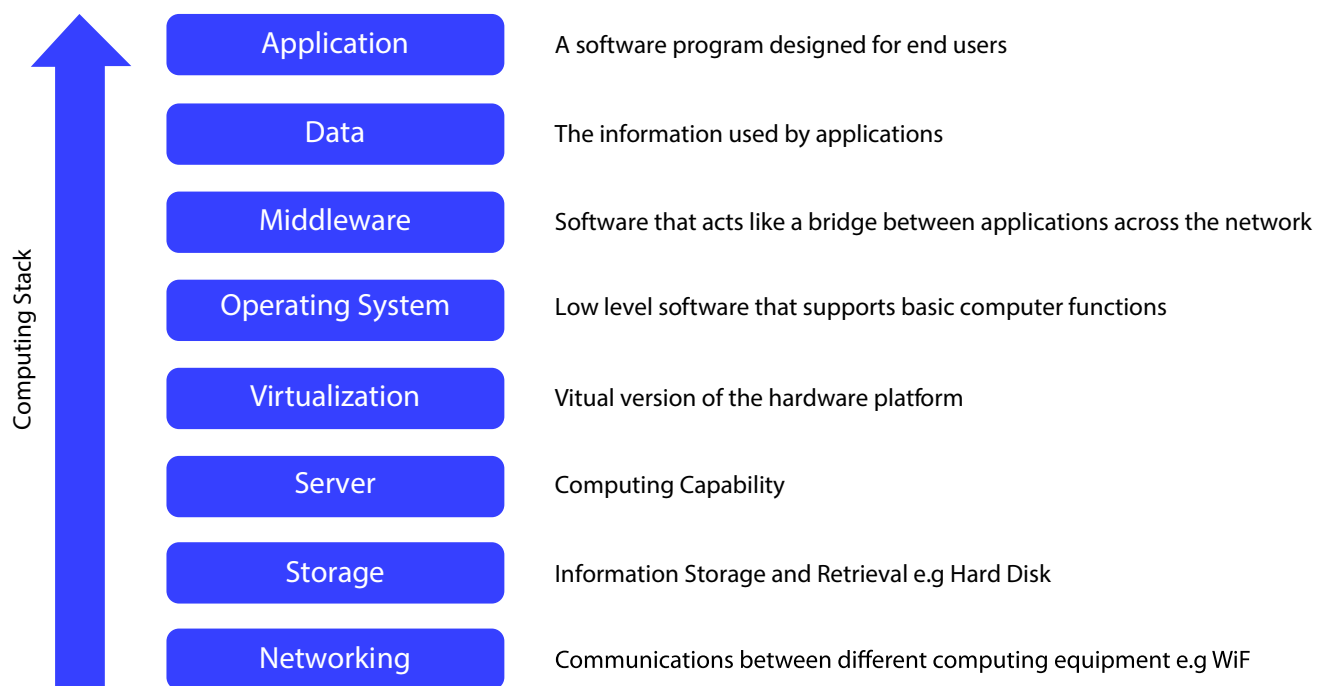
Traditionally, a company would have to purchase enough IT capacity to cater to the peaks in their traffic or processing volume. This means that for most of the time, this capacity is lying idle and underutilized. As Cloud works on a pay as you use model, a company can purchase as much processing capacity as they require to cater to their peak volumes and then scale back as the volume decreases.

## SCALE UP OR DOWN AS REQUIRED

We can think of the different types of cloud computing models in two dimensions – the deployment models – HOW we put things on the clouds and the Services or WHAT we put on the Cloud.

Let us discuss the WHAT first.

There are a series of things that need to be put in place for an application to work. When you double click on the Microsoft Excel icon and an excel spreadsheet comes to life, there are a series of services that need to be active for this to happen. We can visualize this as a stack of services as illustrated in Figure 1.



Source: <https://www.crucial.com.au/blog/2013/05/27/types-of-cloud-computing/>

Figure 1: A typical computing Stack

If you are using a cloud service, you can decide how much of this will be managed by the cloud service provider and how much of it will be managed internally by you. Figure 2 illustrates this concept.

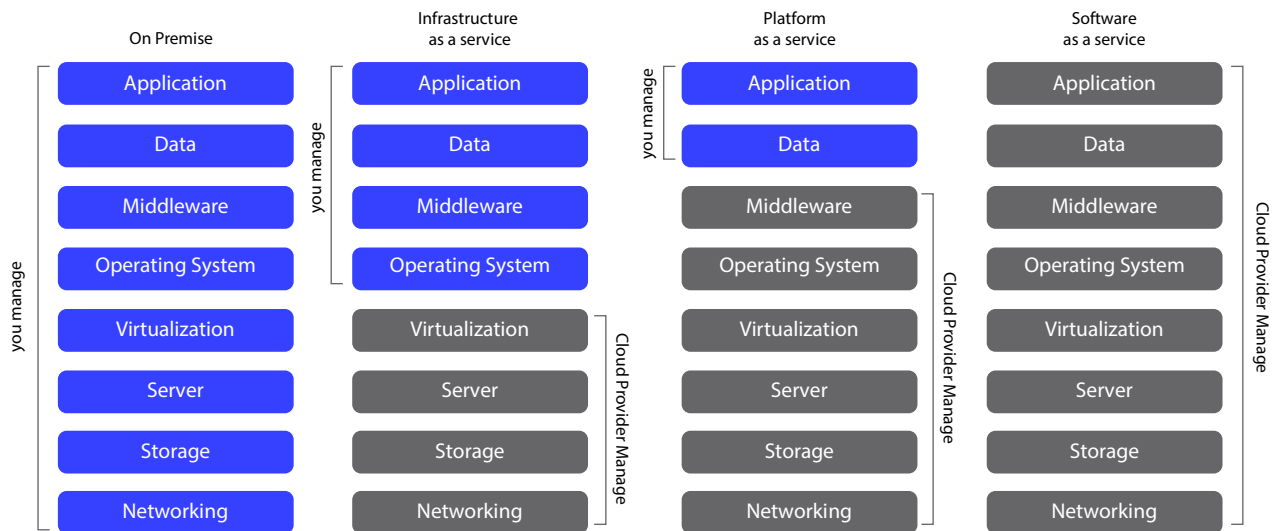


Figure 2: Cloud Services

This provides a degree of flexibility on the level of control that you have over the environments and applications.

## ON PREMISE

As the name suggests, this implies nothing is on the cloud. i.e. the traditional deployment model where all components of the computing stack are managed internally.

## INFRASTRUCTURE AS A SERVICE (IAAS)

As the name suggests in this model, the cloud service provider provides the basic computing resources such as data storage, (virtual) servers and networking. The rest of the stack must be managed by the customer themselves. Examples of IAAS include Amazon Web Services EC2, Rackspace Managed Infrastructure services, and Azure Virtual Machines.

## PLATFORM AS A SERVICE

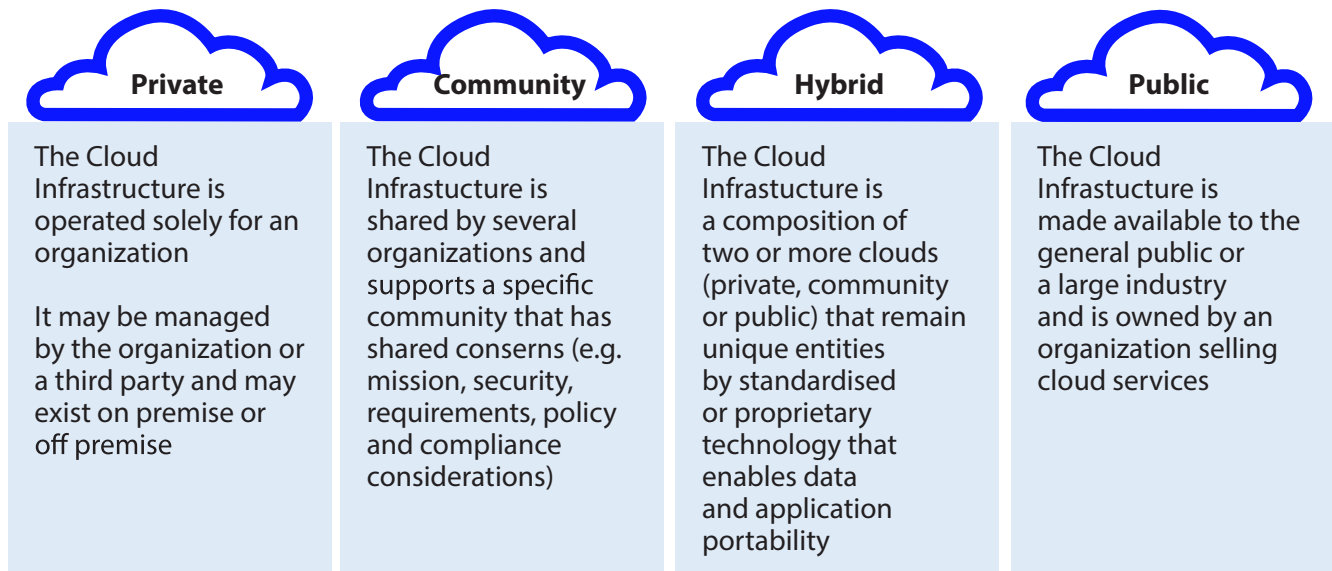
In some instances, companies need the flexibility to run and manage their own applications. However, they would rather leave the more “commodity” portion of computing stack to the cloud vendor. E.g. the Operating System, programming language, execution environments and databases. This model is known as ‘Platform as a Service’ (PAAS). Examples of these include Microsoft Azure PaaS, Google App Engine and Alibaba Cloud. A company might be interested in this model if, for example, they are utilizing applications from diverse sources, or application development is done within teams across multiple geographies.

## SOFTWARE AS A SERVICE (SAAS)

The SAAS model means software applications are utilized on a pay per use basis rather than the outright purchase of the software licenses. Typical examples of these are Microsoft Office 365 and Salesforce.com.

## INFRASTRUCTURE AS A SERVICE (IAAS)

There are several ways applications can be deployed to the Cloud as described in Figure 3



<https://sites.google.com/site/cloudwikipedia/home/types-of-services/deployment-models-in-cloud-computing>

Figure 3: Cloud Deployment Models

At the extreme ends of the spectrum are the Private and Public clouds.

With Public Cloud, the computing infrastructure is owned and operated by the cloud computing company. All resources are shared across their customer base, thus creating massive economies of scale. However, as a customer you have no physical control over the infrastructure.

As Public Clouds use shared resources, they do excel mostly in performance, but are also the most vulnerable to various attacks.

In the Private Cloud model, the entire cloud infrastructure is owned and used solely by one organization. While the security and control are high in this model, it does not enjoy the economies of scale (i.e. cost reductions) of the Public cloud. Community and Hybrid cloud models are essentially permutations of the Public and Private cloud models.

Apart from merely hosting customer applications, cloud service providers have now created offerings around services that can be difficult for a company to develop internally such as analytics, support for blockchain, machine learning and artificial intelligence, and augmented or virtual reality.

## CONCLUSION

Cloud Computing essentially offers a company more options on how it can leverage on technology in order to meet its business objectives. Its main value propositions are the benefits in scalability and the utility model. The use of cloud services also helps an organization improve agility by reducing the amount of time required to deploy new capabilities and services.

Concerns exist about the risks of using cloud services. Bank Negara has been cautious of cloud usage and while not outright disallowing FIs from using cloud services, have stated that FIs must notify BNM for non-critical systems and prior consultation with BNM is required for Critical systems (Risk Management in Technology, Bank Negara Malaysia 10.50,10.51)

Cloud computing will shift an organization's IT expenses model from one which is more Capital Expense focused to a more Operational Expense focused. So, depending on how your company views the capex/opex split, this may be a pro or a con.

While Cloud Computing does offer many benefits, it is not a magic pill. A company needs to be clear on its own objectives and strategies, and whether or not the cloud is the answer.





This article is part of the Digital Banking Learning Series, 'Let's Talk Digital', an initiative by the ABS Center for Digital Banking. It is written by industry practitioners and are aimed at educating the general public on the intricacies of digital applications in banking and other related industries, including the latest insights and trends of Digital Banking.

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