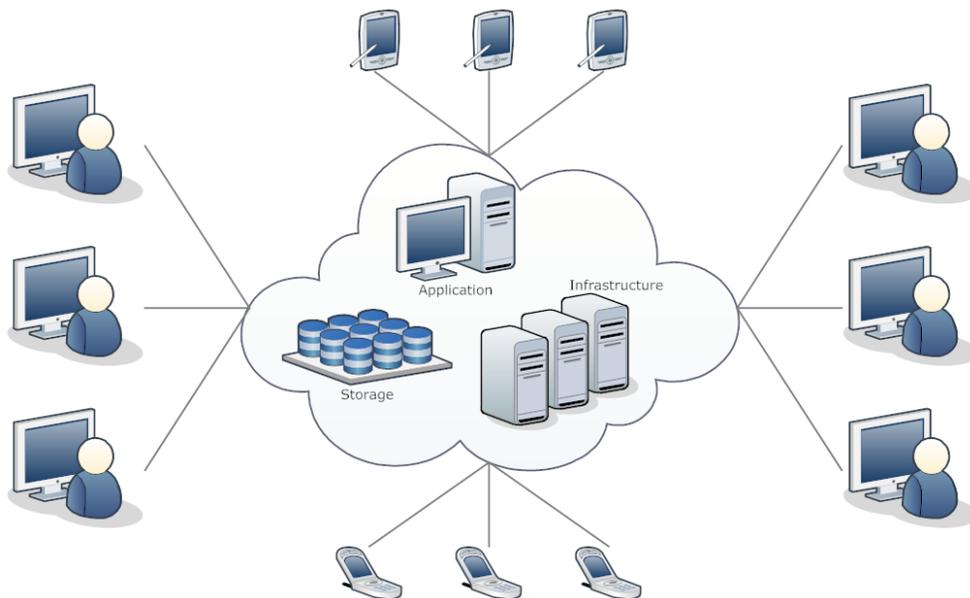


## Cloud Computing: How It Works and Why It Helps

**Introduction** – Cloud computing may sound magical, but is in fact, quite a natural concept. We can access a pool of common computing resources through a network to get our tasks done. This model is very similar to the way electricity works where a single source generates power and is distributed via a grid based on demand. Cloud computing has been around for a while but with the recent advances in technology, its outreach has increased. The increase in variety in what a Cloud can now deliver has made it possible for organizations in various domains of various sizes to all find use for it. This article will begin with a brief explanation of what the Cloud can deliver today and why every organization has reason to tap into its resources. We then discuss the basic Cloud Computing models – namely IaaS, PaaS and SaaS which would help an organization identify their architectural requirement. We then explore the Windows Azure PaaS offering – a rich set of resources to easily maintain an infrastructure which is becoming increasingly popular among mid-sized organizations. Finally, we look at some other players in this cloud industry and some unique solutions provided by them.

### 1) Purpose of the Cloud

As mentioned in the introduction, the main purpose of cloud computing is to provide access to shared computing resources. These resources can then be accessed via the Internet and used “on-demand”. The image gives a good explanation of how we can have a pool of application, infrastructure and storage resources all accessible by multiple users from the Internet.



The advantages of having such a model are very clear. To start with, this means that an organization need not invest in procuring and maintain its own hardware, that is huge servers to manage their data. For example, an organization looking

to launch its web application would have to at least think about two resources – servers to host the application and a database to store the data. This means the hardware must be first thought out and purchased on which this infrastructure can be built. Alternatively, the organization may simply lease out these resources from the cloud and avoid the extra effort of building it themselves.

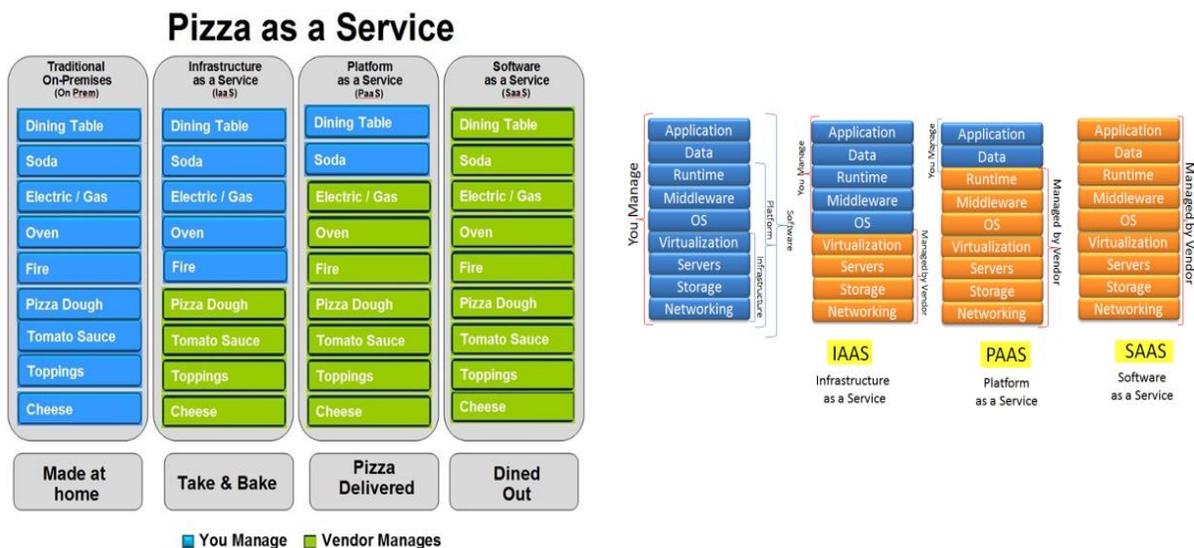
This leads us to the second crucial advantage of “on demand” resource allocation. An organization building their own resources is caught guessing their demand and may end up either allocating too many idle resources, or fall short during peak times leading to poor customer satisfaction. With cloud resources, the leasing is done on demand. The provider dynamically allocates more resources during peak times and ensures availability, and automatically scales down the idle resources when they are not needed.

As a consequence of these advantages, we come to the third one which is of course, reduced costs. Costs are reduced at all stages of infrastructure deployment and maintenance. We avoid the hardware costs by simply leasing out what we need. At the same time, we also pay only for resources that are being used. Which means that the cost of hosting a web application would depend only on its amount of use.

At Datamatix, as a group that specializes in deploying your web and solutions for you, we have often encountered these problems. We recognize the advantages our partners would have by employing the services of the cloud. At the same time, we also find it an exciting paradigm as an organization that hosts its own applications. It means reduced maintenance costs for us and ease in updating our infrastructure as needed by our users. It also means that this pricing benefit can be passed on to our users as they can pay as per their usage only. This makes it a win-win situation for all the stakeholders involved.

## 2) Cloud Computing Models

The three popular cloud computing models are Infrastructure-as-a-Service, Platform-as-a-Service and Software-as-a-Service abbreviated as IaaS, PaaS and SaaS respectively. We use this extremely popular image to understand these models which would help any organization decide what the best model would be for them.



The parallel drawn with a pizza place would help a reader with lesser technical knowledge to understand these paradigms. For an on premise infrastructure which an organization builds entirely on its own, the entire architecture stack ranging from the servers, networking among them to the application hosted on them, has to be managed by the organization workforce. This incurs considerable setup and maintenance cost both in terms of time and money. Think about making every bit of a pizza from scratch at home.

Moving to the cloud, the first step is IaaS. This is the offering where an organization need not worry about the hardware which is leased by the cloud provider. However, various teams at the organization must maintain the software stack. Starting from the OS that runs on these “virtual machines” up to the application deployed on them is maintained by the organization. Think about taking pizza raw materials home and baking it there. The primary users would be larger solution providers that need considerable control on their infrastructure in order to provide their products, but at the same time would not want to heavily invest in it. The advantage in this method is extensive control on the VM configuration. The disadvantage remains the same – a considerable maintenance overhead.

Second up is PaaS. PaaS completely removes the overhead of any sort of management other than the application itself and its data. This model is very conducive for organizations that provide solutions rapidly. It also helps their clients go global instantaneously without having to equip themselves with datacenters from scratch and then worry about maintaining their infrastructure. We look closely at Azure PaaS in the next section, as a viable model to adopt in order to deliver our solutions. For now, we think of it as ordering the pizza home and using only our dining table.

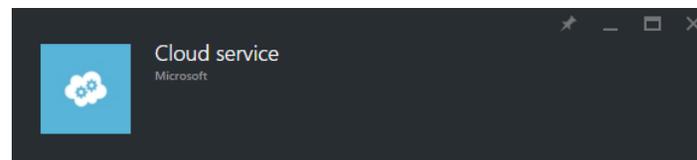
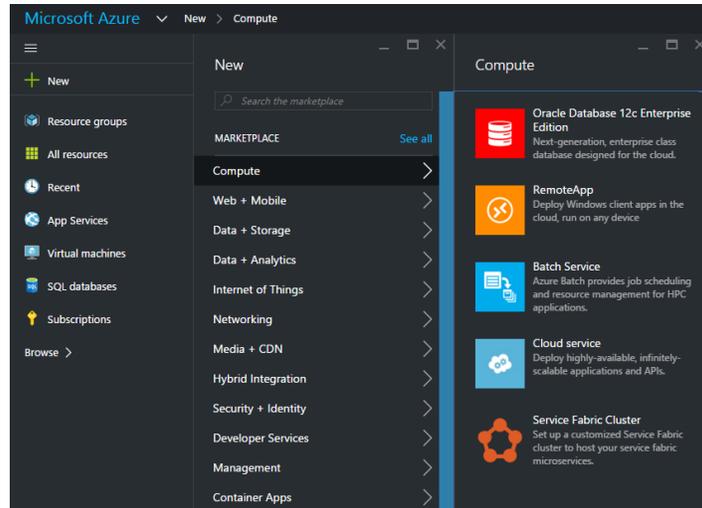
Rounding up the models is SaaS, which most of us have been using since quite a while but would not have identified it. In SaaS, the organization need not worry about the entire stack. In effect, we would be using an application on the cloud. Google Drive is a popular example to relate with, where everything from the storage to the text editor itself is provided as a service where we need not worry about anything. This is equivalent to simply dropping into your favorite pizza place for a quick snack!

### **3) Windows Azure PaaS**

The image shows how simple it is to create a cloud service on Windows Azure. This is a set of fully managed VMs that can be used to host your application. Their configurations such as RAM and OS can be easily managed through the portal. They also scale automatically when the requests to their endpoints increase or decrease. This is great for administrators as they can achieve with just one click what would otherwise need tons of complex scripting and monitoring in an on premise architecture.

Platform-as-a-Service (PaaS) gives developers the luxury to focus on their solutions and not worry about the platform of development. This would include the application server OS, networking, data servers such as relational and non relational stores, etc. This enables developers to increase development speed and reduce time to market. Once again, this set of features provides advantages to developers but at the same time, the benefits are clearly passed on to the clients. Apart from cloud services, Azure has a SQL Service offering which is entirely managed on the cloud while all the organization needs to do is use it as a service. The data can be managed via an Internet portal as well as through SQL Server. PaaS is not the only model offered by Azure. It has a wide range of offerings in IaaS and SaaS as well but to cover all the features is beyond the scope of the article. We can list a few services here that would be commonly used by most organizations to deliver effective web application solutions for complex problems. There are managed offerings for NoSQL and data analytics to extend your data models, IoT asset management to redefine your business, CDN and external cache

management to improve performance and user experience, DNS and VPN management to organize the network better, active directories for Identity management among a host of other features. Datamatix possesses the talent and the skill set to leverage these offerings and bring the power of the cloud to the solutions it delivers.



Quickly deploy and manage powerful applications and services. Simply upload your application, and Microsoft Azure handles the deployment details. From provisioning and load balancing to health monitoring for continuous availability. Your application is backed by an industry leading 99.95% monthly SLA. You just focus on the application and not the infrastructure. It's that good.

Use Azure Cloud Services to:

- Focus on your application, not the infrastructure
- Develop internet-scale API's for a world of devices
- Build modern, cloud architectures
- Monitor and alert (preview)
- Auto scale to optimize cost and performance



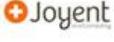
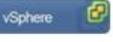
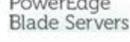
Select a deployment model

Classic

Create

#### 4) The Cloud Computing Market

Amazon Web Services is another popular cloud computing platform. While a majority of cloud adopters are using one of these platforms, various other giants have offerings in cloud computing as well.

Cloud Marketplace	    ...
Cloud Broker Platform	  ...
Cloud Management	      ...
SaaS	    ...
PaaS	    ...
IaaS	      ...
Cloud Platform	       ...
Virtualization Software/Mgmt	         ...
Hardware	     ...

The above image shows the various types of cloud solutions out there and it is not an exhaustive list. At the bottom of the table, we have the usual suspects dealing with the hardware and virtualization systems. These are the technologies that have truly given a boost to the cloud computing platforms. Apart from the low level technologies, what is interesting is the way the industry has branched in other directions such as marketplace, broker platform and management. At the time of writing this article, there have been major acquisitions of cloud management companies further highlighting the rise in adoption of cloud computing. This simply reinforces our vision at Datamatix to employ these tools and technologies to further enhance the quality provided by our software.

**Conclusion** – Cloud computing has always been around. A simple client server interaction is also a version of SaaS. However, the prominence of IaaS and PaaS today is due to the advances in technology over the last few decades. Today, cloud computing is not only a feasible option for an organization to adopt, it is in fact the more advisable way to go in order to deliver cost effective software solutions in a shorter time span. Datamatix looks forward to adopting the cloud model in order to ensure our clients with much better scalability, availability, performance and cost efficiency in the solutions. It would enable our developers to rapidly adapt to advances in underlying technologies and leverage them in web applications thus, upholding the high overall quality of our solutions.

#### List of References –

- 1) AWS documentation - <https://aws.amazon.com/>
- 2) Azure portal - <https://portal.azure.com/>
- 3) Windows Azure documentation - <https://azure.microsoft.com/en-us/get-started/>

