Computer Architecture Microsoft Cloud Computing

Introduction

In the more recent history of Information Technology a new field of services has emerged. Cloud computing is an all encompassing practical business solution to 90% of business enterprises worldwide, Companies that rely on the latest data, data storage and up to the minute online services.

Third party cloud vendors can supply computer power & data storage far more cost effectively than nearly all internal IT departments. By switching to cloud computing companies can make large savings in lots of areas and still remain competitive.

The best comparable development in the business world can be drawn from the early 20th Century. In the early 1900’s businesses had on site generators to power their factories and offices. By the mid 1930’s the turn over was complete and nearly all business relied on the national grid for their electricity. Initially many companies had been worried about switching to an external supplier however it soon became obvious that in house generation was no longer a practical and cost efficient means of getting electricity.

Cloud computing has been made possible by advances in many fields of technology. In most part it has been down to the emergence of a strong reliable Internet network world wide but also the operating systems and virtualization software that manage data flow and storage in data centers globally.

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Virtualization

Virtualization and cloud computing are two terms synonymous with each other. Sometimes these words are used interchangeably as if they both mean the same thing. The fact is that they do not. Although they do work hand in hand, virtualization is a component of cloud computing.

Virtualization is the separation of a computers operating system from the under lying hardware. Before virtualization when an OS was installed on to a physical piece of hardware like a hard drive, it became interconnected to that specific piece of hardware. If you wished to move the OS from this machine it became a tedious and time consuming affair as the OS and Hard Drive were “coupled”.

In order for virtualization to take place, a very important piece of software is needed to separate the hardware from the operating systems sitting on top of it. This is where Hypervisors are introduced. Hypervisors are a virtual layer inside a computer that sit above the hardware and beneath the operating systems running on the computer. Hypervisors are a tremendously important part of virtualization and they allow an instance on an OS to be installed on the computer without adversely affecting the hardware or becoming interconnected to the specific Hard Drive it is running on. The most important thing to understand here is that the OS becomes “coupled” with the hypervisor rather than the hardware.

If you now wish to move an instance of your OS to a new drive on different hardware, all you need to do is have the same hypervisor installed on the new piece of hardware you wish to migrate to and it becomes as easy as moving a file between to drives. You no longer have to install migration software that is tedious and time consuming.

Instead of one organization having numerous servers to run numerous tasks. They can now consolidate their information on to one server that can dynamically grow and shrink depending on data needed at any given time. The organization can cut costs by having just one high end spec computer that can handle large work loads efficiently rather than having numerous computers that may not be spreading the work load evenly due to the rigidness of the old system.

This is such a massive part of cloud computing because it no longer ties down a piece of hardware to one OS. The hardware is now a flexible and elastic server, which can run multiple operating systems when needs be or can run none if the work load is not needed. This is made possible by a management OS that runs on the hypervisor and can delegate out running configurations for the computer at any given time. The automated management OS can even switch off the unit if there is no data storage or work required of it.

There are two types of hypervisor.

TYPE 1: A hypervisor can be installed directly on to a computer with no OS beneath it and then installing the instances of OS required on top of that.

* HARDWARE / HYPERVISOR / INSTANCE OF OS

TYPE 2: An OS can be already installed on the computer before installing the hypervisor. Then from there, further instances of OS can be installed on top of the hypervisor.

* HARDWARE / OS / HYPERVISOR/ INSTANCE OF OS