

An Introduction to Server Based Computing

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Abstract: What is Server Based Computing? What is “The Cloud”, what is Utility Computing? What do these terms mean and how does the technology behind them intersect, compliment and contrast? This paper discusses some of these topics and outlines the styles of products and services that fall under the various labels and the pros and cons of each use case scenario.

Server Based Computing

Server Based Computing is a good label to describe a family of technologies that is floating about now. In essence it refers to systems that all share a common key design element; that the processing of data and the running of applications that modifies that data is run on large central servers and *not locally*.

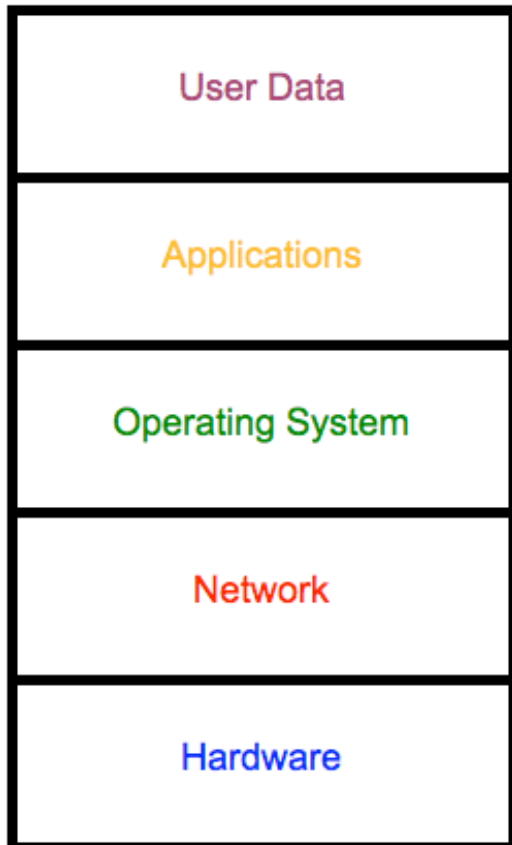
That is to say, what will follow are the various styles of technology and technology services that are available today to remove the need for one’s own infrastructure. Be it a PC for an end user or a server farm for a video or graphics rendering company.

The Styles

Much like traditional local computing, we can look at how a technology is used and who mainly uses it in order to classify it. A common term often referred to in IT is the “stack”. Like a stack of pancakes the layers needed to build a functioning system are placed one on top of the other. Each layer depends upon and builds on the layer below.

Following is a representation of what a typical stack looks like when used to illustrate the design and role of a personal computer and where those layers typically come from within an SME organization.

The Personal Computer – Client/Server Stack



In a traditional setup, the User Data is often stored on the local hard disk, though companies prefer that data is stored on a central server. The reality is that users seldom do for lack of a company prepared and enforced IT Usage Policy. And company data and information security is often left to the employee to manage.

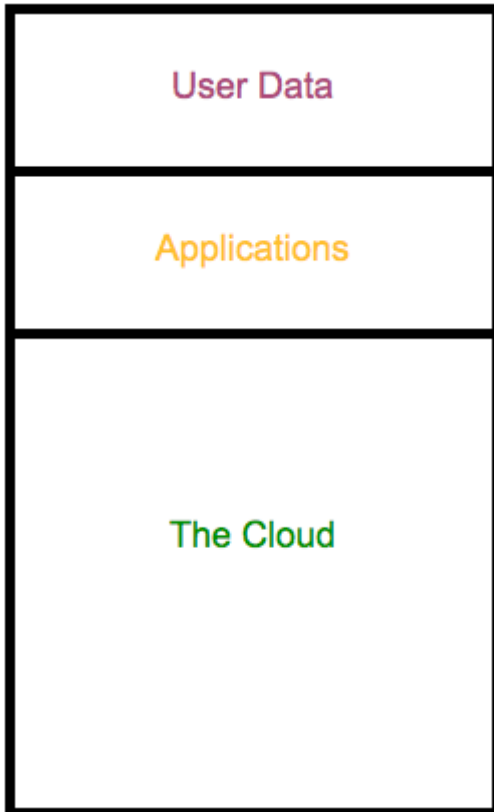
Applications are almost always installed on the local hard disk. This means that application license control, operation and installation are handled by IT staff on a per workstation basis. Repairs, patching, security, language customization and support are also handled on a per PC basis by a local IT technician, be they internal or outsourced.

The Operating System is always installed on the local hard disk. This means that Operating System license control, operation and installations are handled by IT staff on a per workstation basis. Repairs, patching, security, language customization and support are also handled on a per workstation basis by a local IT technician, be they internal or outsourced.

Network management is a complex and difficult task. The larger a network needs to be, the more complex the management of it becomes. Partitioning traffic for security or performance, knowing who is who and where they are. Tracking rogue devices and virus outbreaks and security holes are all a constant concern for network administrators. The Network is usually the place where businesses are most exposed and attacked from. Network Management usually requires a dedicated technician who may or may not be involved in other IT management roles.

Hardware is a big expense and is always managed by an onsite engineer, be they outsourced or internal. Hardware is always the responsibility of the organization that owns and uses it and when this hardware breaks or is not compatible with Operating Systems and Applications, it is the owning organization that must provide the solution.

The Server Based or Cloud Approach



In a Server Based Setup, the User Data is stored centrally on a large server cluster. The data is then protected against individual hardware failure and it is easy and quick for the applications to access. Also the IT policy of the company is enforced and can't be overlooked by users. In this setup, the security of the data is returned to the company. Backups, version control, access and audit logs can then also be easily provided. This control is essential for many organizations that must meet certain data management regulations and laws. It also helps protect an organization from legal threats where privacy and confidential information access is a sensitive topic.

Applications are now treated like TV channels. They are "On Demand" and are just there to be used. The installation, patching, security, support and operations are all handled by an Application Service Provider (ASP) or Software as a Service (SaaS) vendor. These providers are often the makers of the application too and thus have an intimate knowledge of how it functions and what users are requiring. Organizations simply need to identify the business logic tools that they need and then subscribe to the service. New applications can be added and removed with the click of a button without delay or concern for how it can or should be installed, licensed, powered and managed.

The Cloud is what replaces the rest of the traditional IT stack. Enterprises that move to the cloud, no longer have to worry about hardware, networks or operating systems when dealing with their IT issues. Their IT planning and focus becomes on the business logic of the applications they need and the security and usability of their corporate data. The Cloud provides a collection of services accessed over the Internet or private networks and experts in hardware, operating system and network management handle all of the work that is so often associated with IT for SMEs today.

Some Terminology Explained

Server Based Computing

Server Based Computing is a style of computing where computational workloads are carried out on central servers as opposed to on individual local workstations. This is in contrast to client/server designs where instead of connecting to a central system to retrieve data and then manipulating it locally, users connect to the central system and directly manipulate the data without needing to move it about or install applications on their personal workstation.

All of the below are different styles of Server Based Computing;

Utility Computing

Utility Computing is a form of Server Based Computing, where people are renting and using simple, raw processing power and storage systems that are then often used in the building and deployment of another system.

Utility Computing can be thought of in much the same way as any other utility service like electricity, natural gas and water. You use as much as you need and you are metered and billed on that basis.

Users of Utility Computing are organizations that need extra processing power or storage either temporarily or the amount they need fluctuates. In these circumstances an organization, like a bank that may have many end of year reports to calculate, can bring on line the extra resources needed to process the large amount of data in a shorter time. This is far more economical than investing in extra full time capacity that will only ever be used seasonally.

Grid Computing

Grid Computing is much like Utility Computing. In fact, Grid Computing can be rented much like any other Utility Computing Service. It is the linking of many individual systems together to share work loads. This way large and complex work loads, usually scientific or based around heavy calculations, can be broken down into smaller pieces and then farmed out to many nodes to quickly compute. When complete the results are sent back in and everything is reconstructed again. Grid Computing is a great way to share and make use of otherwise idle and computing capacity.

Thin Client

A Thin Client is a small box or PC system that contains no internal parts apart from a video card, a network card and connections for mouse, keyboard and USB devices. These Thin Clients are then connected to large Utility Computing systems to provide an interface and work space for users to interact with the central system and perform work tasks.

In most office environments the use of and look and feel of a Thin Client is 100% the same as a desktop computer. The difference being that the user has access to much more processing power and storage than they would have on a local PC and the administrators can better manage the system for the users.

Other devices used to access Utility Computing Services include mobile phones, desktop applications and web browsers. A Thin Client just goes that extra step by making the access device also part of the Utility Computing Service.

Software as a Service

Software as a Service or SaaS is a few levels above Utility Computing or Thin Clients. What it is dealing with is the access to and use of a software package as a service, as opposed to a product that one purchases, installs and then manages. This is in contrast to Utility Computing where raw power is rented and not an application.

SaaS works in much the same way as a restaurant does. You decide what you want and then it is delivered to you, ready to use. You do not need to worry about how it works, what makes it work, what needs to be done to keep it working or having to pay for upgrades every few years.

You simply 'subscribe' to the service and start using it. Many SaaS vendors rely on Utility Computing to power their SaaS offerings, because for the same reason an organization only wants to worry about using an application, the SaaS vendors only want to worry about what that application can do and how it works for their customers and not the backend that runs it.

Application Service Provider

Application Service Providers or ASP's are essentially the same thing as SaaS providers.

Web Application

Web Applications are very common these days. They are used for everything from email, to calendaring, office file editing, customer relationship management systems (CRM) and more. A Web Application can be any kind of application and it can be installed anywhere. What it does do though is require that end users only need access to a web browser. This makes deploying an application in a heterogeneous environment very simple. If a client device can run a web browser, it can run the Web Application.

Web Applications are also popular because they are the most common delivery method for SaaS and ASP vendors, though this is not a hard and fast rule. If a client is only going to rent an application, a vendor wants to ensure that it will work and they won't be bogged down in client support requests of an infrastructure operational nature.

Web Applications may or may not be powered by Utility Computing, they may also be powered by an organizations internal infrastructure or the makers infrastructure. Web Applications may still be used even if the end users have PC's or Thin Clients because they further simplify the delivery and support of the application.

Cloud Computing – putting it all together...

Cloud Computing is a phrase that has come about due to the traditional manner in which a complex item in an IT design is represented; ie: as a cloud. Because it is not possible to detail all the settings and connections of the Internet for example, a cloud is often drawn to represent it. This form of abstraction makes it easy to just accept that the cloud is the Internet and it does certain things and whatever is inside it, really doesn't matter for the purposes of the design being drawn up around it.

So for an organization that is going to adopt Cloud Computing, the abstraction is the same. You have business needs and a suite of applications that will fulfill them. How those applications are powered and delivered is of less concern or no concern depending on the final form of the deployment. The servers, networks, connections, IT staff, licenses, upgrades and the like is all "in the cloud". It is just there and it just works.

For example adding or removing employees or applications does not require any infrastructure changes or upgrades. You pay the associated monthly fee or usage fee that matches the current organizational requirements. And the organization is then able to consistently provide all employees will IT services regardless of geographical location or infrastructure.