**Course: Advance Bio Informatics**

**Module Title: virtualization**

**Module No: 142**

In computing, virtualization means to create a virtual version of a device or resource, such as a server, storage device, network or even an operating system where the framework divides the resource into one or more execution environments. Even something as simple as partitioning a hard drive is considered virtualization because you take one drive and partition it to create two separate hard drives. Devices, applications and human users are able to interact with the virtual resource as if it were a real single logical resource. The term virtualization has become somewhat of a buzzword, and as a result the term is now associated with a number of computing technologies including the following:

Storage virtualization: the amalgamation of multiple network storage devices into what appears to be a single storage unit. Storage virtualization is the amalgamation of multiple network storage devices into what appears to be a single storage unit. Storage virtualization is usually implemented via software applications and often used in SAN (storage area network), a high-speed sub-network of shared storage devices, and makes tasks such as archiving, back-up, and recovery easier and faster.

A similar phrase, virtualization-aware storage, facilitates management and monitoring of storage in virtualized environments. Learn more about virtualization-aware storage in this Webopedia definition.

Server virtualization: the partitioning a physical server into smaller virtual servers. Server virtualization is the partitioning of a physical server into smaller virtual servers to help maximize your server resources. In server virtualization the resources of the server itself are hidden, or masked, from users, and software is used to divide the physical server into multiple virtual environments, called virtual or private servers. This is in contrast to dedicating one server to a single application or task.

Common Uses of Server Virtualization

One common usage of this technology is in Web servers. Using virtual Web servers is a popular way to provide low-cost Web hosting services. Instead of requiring a separate computer for each Web server, dozens of virtual servers can co-reside on the same computer.

Benefits of Server Virtualization

Server virtualization has many benefits. For example, it lets each virtual server run its own operating system and each virtual server can also be independently rebooted of one another. Server virtualization also reduces costs because less hardware is required so that alone saves a business money.

Server virtualization also conserves space through consolidation as several machines can be consolidated into one server running multiple virtual environments. It also utilizes resources to the fullest so it can also save on operational costs (e.g. using a lower number of physical servers reduces hardware maintenance).

Operating system-level virtualization: a type of server virtualization technology which works at the operating system (kernel) layer. More commonly called OS-level virtualization. A type of server virtualization technology which works at the OS layer. The physical server and single instance of the operating system is virtualized into multiple isolated partitions, where each partition replicates a real server. The OS kernel will run a single operating system and provide that operating system functionality to each of the partitions. Not to be confused with operating system virtualization.

Network virtualization: using network resources through a logical segmentation of a single physical network. Network virtualization (NV) is using network resources through a logical segmentation of a single physical network. Network virtualization is achieved by installing software and services to manage the sharing of storage, computing cycles and applications. Network virtualization treats all servers and services in the network as a single pool of resources that can be accessed without regard for its physical components. The term network virtualization is often used to describe many things including network management, storage virtualization, and even grid computing.

Application virtualization: Also called application service virtualization. Application virtualization is layered on top of other virtualization technologies, such as storage virtualization or machine virtualization to allow computing resources to be distributed dynamically in real time. In standard computing, applications install their settings onto the host operating system, hard-coding the entire system to fit that application's needs. With application virtualization, each application brings down its own set of configurations on-demand, and executes in a way so that it sees only its own settings. This leaves the host operating system and existing settings unaltered.