**Unit 1**

**Virtualization Techniques**: virtualization technology, overview of x86 virtualization, types of virtualizations, concept of VLAN, SLAN and VSAN and benefits

**Overview of Distributed Computing**: parallel and distributed systems, parallel computing, parallel computer architecture, distributed systems, differences, and similarities among different types of computing

**Unit 2**

**Introduction to Cloud Computing**: cloud computing in a nutshell, roots of cloud computing, layers and types of clouds, desired features of a clouds, cloud infrastructure management, examining the characteristics of cloud computing, cloud types.

**Migrating into a Cloud**: broad approaches to migrating into the cloud, the seven-step model of migration into a cloud VM migration, cloud middleware and best practices, concept and need of cloud middleware, QoS issues in cloud, data migration and streaming in cloud, interoperability.

**Unit 3**

**Understanding cloud architecture**: exploring the cloud computing stack, workload distribution architecture, capacity planning, cloud bursting architecture, disk provisioning architecture, dynamic failure detection and recovery architecture, cloud computing architecture, service level agreements, service-oriented architecture

**Unit 4**

**Cloud Computing Technologies and Applications:** cloud content delivery network services, multi-CDN, features of meta CDN, mobile cloud computing, intercloud issues, machine learning in the cloud, benefits, and limitations of machine learning in the cloud, types of cloud-based machine learning services, AIaaS, GPUaaS, key benefits and applications of using GaaS, parameters for selecting cloud GPU providers.

**Cloud Economics:** developing an economic strategy, exploring the costs, laws of cloudonomics, cost estimation, economics of cloud.

**Unit 5**

**Cloud Security:** cloud security fundamentals, cloud risk, cloud risk division, policy and organizational risks, technical risks, other risks, cloud computing security architecture, VM security challenges

**Cloud Database:** operational model for cloud database, types of cloud database, cloud file system, distributed file system basics, concept of GFS and HDFS, comparison of features

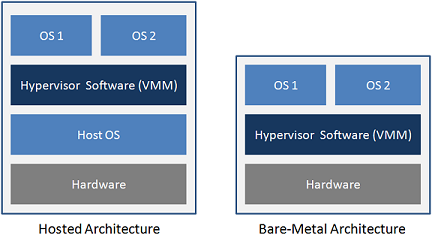
**Unit 6**

**Container Technology:** introduction to containers, container architectures, docker containers, Kubernetes

**Cloud Platforms in Industry:** Amazon Web Services, Google App Engine, Microsoft Azure, case studies

**Other Aspects of Cloud:** edge computing, fog computing, IIoT, green cloud computing practices, complexity in cloud-native systems.

Virtualization, creates virtual hardware, by cloning physical hardware, hypervisor, uses virtual hardware, create VM, VM, set of files, hypervisor and VM, one pc, can run multiple OS simultaneously, virtual machine, virtualized instance, of computer, can perform, all same functions, as computer, can run apps and OS. VM, runs on physical machine, access computing resources, from HV, host OS, OS via, the VM is run, Type 1 HV, Hyper-V, HV itself, host OS, schedules VM, allocates memory, type 2 HV, the OS on which, HV application run, is the host OS, guest OS, the OS, uses virtualized HW, can be, fully virtualized, para virtualized, guest OS knows, it is virtualized, improves itself, virtual machine monitor, application, virtualization HW for VM, executes, guest OS, with virtualized HW, virtualization, technology, allows to, create multiple, simulated environments, known as VMs, HV, a process, or function, isolate OS, and apps, from underlying hardware, VMs operate on same physical hardware, separate from each other, if one VM crashes, other remains unaffected, VMs are mobile, don’t depend on underlying HW, type 1 HV, operates directly, on host HW, monitors HW and guest VM, also called, bare metal, type 2 HV, also called, hosted HV, usually installed, on existing OS, not much capable, for complex virtual tasks, used for, basic development, testing, emulation,



Virtualization, technology, separates functions, from hardware, cloud computing, solution, relies on that split, x86 virtualization, refers to, HW & SW-based mechanisms, to support, virtualization, for processors, based on x86 architecture,