Hello and welcome to one and all.

Unit 1 operating systems overview module name characteristics

of modern operating systems module #4 presented by Mr

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Outline characteristics of modern operating systems in

which we are going to study

microkernel architecture.Multithreading, symmetric

multiprocessing, distributed OSand object oriented design.

Learning outcomes the student will be able to explain the

characteristics of modern operating systems.

Over the years there has been a gradual evolution of OS

structure and capabilities.

We have seen in the previous modules what are the reasons

for evolution of OS

In recent years a number of new design elements have been

introduced into both new operating systems and the new

releases of existing operating systems that create

a major change in the nature of operating systems.

These modern operating systems respond to new developments in

hardware, new applications, and new security threads.

Among the key hardware drivers are multiprocessor systems.

Greatly increased processor

speed. High speed network

attachments. An increasing size and variety of memory

storage devices.

In the application arena,multimedia applications,

Internet and web access, client server computing have influenced

the design of the OS greatly.

With respect to security,Internet access to computers

have greatly increased the potential threat and

increasingly sophisticated attacks such as viruses,

worms, hacking techniques,and these have profound

impact on the OS design.

The rate of change in the demands of OS requires not

just modifications. And Enhancement to the existing

architectures, but the new way of organizing the operating

system.

A wide range of different approaches and design elements

have been tried experimentally as well as commercially, but

much of the work fits into the following categories.

Microkernel architecture,multithreading, symmetric

multiprocessing, distributed operating systems and object oriented design. Let's Look at this one by one.

Microkernel architecture. Most Operating systems until recently featured a monolithic kernel.

Most of what is thought of as OS and the functions of OS is provided in this large kernels,which includes scheduling, file system, networking device drivers, memory management and more. So all in one type of approach. Typically a monolithic kernel is implemented as single process with all elements sharing the same address space.

What microkernel architecture is : a microkernel Architecture assigns only few essential functions to the kernel.

Including address space,interprocess communication, and basic scheduling. So very very essential functions are brought together as a microkernel. The Other services are provided by process is sometimes called servers that run in the user mode and treated like any other application by the microkernel.

This approach decouples kernel and server development.

Servers may be customized to specific application or environment requirements because they are developed separately apart from the microkernel. The Microkernel approach simplifies

implementation, provides flexibility, and is well suited

to distributed environment.

In essence, a microkernel interacts with local and remote

server processes in the sameway, facilitating construction

of distributed systems.

Multithreading. It is a technique in which a process.

executing an application is divided into threads that can

run concurrently. What is a thread? A sequential

dispatchable unit of work.

A single sequence is a thread.What it includes. It includes a

processor context. Its Own data area for stack.

You can imagine a Carpenter Making a table. A table has a

top and four legs. Now 4 legs can be done independent of the

top. So these are two parallel processes. Or these are two

threads. You can analyze, you can apply this analogy in software.

Arena. A thread execute sequentially and is

interruptible, so that the

processor can turn to another thread. You can interrupt the

thread in between.

A processes is look now as a collection of one or many

threads, sometimes in a program there may not be

concurrency. There may not be sections which can run concurrently. Then we say that the program is of a single thread.

By breaking a simple application single application into multiple threads, the programmer has a great control over the modularity of the application and timing of the application related events. Multithreading Is useful for applications that perform a number of essentially independent tasks that do not need to be serialized.

An example is a database server that listens for and processes numerous client requests.

Symmetric multiprocessing

Another achievement. until recently, virtually all single user PC's and workstations contain a single general purpose microprocessor.

As demands for performance increase and as the cost of microprocessors continue to drop, vendors have introduced computers with multiple multiprocessors.

To achieve greater efficiency and reliability, one technique is to employ symmetric multiprocessing.

Symmetric multiprocessing can be defined as a standalone computer

system with these characteristics. Number one,

there are multiple processors.

Two, these processors share the same main memory and IO

facilities. Interconnected by communication bus or internal

connection schemes. And very important point, all processors

can perform the same functions.

So nobody is a master. Nobody slave, all are equal.

Therefore the name symmetric multiprocessing.

Symmetric multiprocessing. What Are the advantages?

Symmetric multiprocessing has many advantages over

uniprocessor architecture.

Performance: if the work tobe done by a computer can

be organized so that some portions of the work can be

done in parallel, then a system with multiple

processors will have greater performance than the one

with a single processor of the same time.

With multi programming, only one process can execute at a time.

Meanwhile all other processes are waiting for the processor.

With multi processing. Please See the different

multiprogramming means UNIprocessor and many programs

taking turns multi processing means there are more than one

processors. So more than one process can be running simultaneously on each of the different processor. So this speeds up the operation.

Availability is another advantage in symmetric multiprocessing because all the processors can perform the same functions, they are equal in functionality a failure of single processor does not halt the system. The system continues to run, continues to function at the reduced performance of course. Incremental growth the user can enhance the performance of a system by adding an additional processor.

Scaling: vendors can offer a range of products with different price and performance characteristics based on the number of processors configured in the system.

It is important to note that these are potential advantages, not guaranteed benefits.

When they will be guaranteed,we should have OS which has tools and functions to exploit the parallelism in the symmetric multiprocessor system.

Distributed operating systems:distributed operating system

provides the illusion of a single main memory space.

Actually, the main memory will be distributed over many

computers in the cluster, but it will show as if a single memory

space and a single secondary memory space plus other unified

access facilities are provided,such as a distributed file system.

Although clusters are becoming increasingly popular and there

are many cluster products on the market or in the market, the

state of art for distributed operating system lags, that of a unit processor,

an SMP operating systems.

Object oriented design.

Another innovation in the OS design is the use of object

oriented technologies. Such a

design, lends the discipline to the process of adding modular

extensions to a small kernel. So we take a microkernel and go on

adding extensions to it.

In the form of objects.

As the OS level at the OS level,an object based structure

enables programmers to customize an OS without disrupting the

system integrity. So particular module can be developed to cater

to the different or changing

needs. Object orientation also eases the development of

distributed tools and full blown distributed operating systems.

So these were the five areas that we dealt with today. The

content was done with reference to this particular textbook.

Thank you.