


Chapter 25

Quantum Computers Based on Distributed Computing Systems for the Next Generation: Overview and Applications

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ABSTRACT

OS gives life to the computer system. OS will provide managing all resources inside the computer. It will take care of memory management, process scheduling, device managing, managing files and folders, provide user interface, manage applications, etc. Network OS will provide build-in networking capability, multiple system images one per node, managing the resources, scheduling the processes, and sharing the resources. UNIX and Windows NT are good examples for Network OS. Distributed OS manages a group of autonomous computers and makes them appear to the users of the system as if it were a single computer. Distributed OS will provide transparency and networking capability. DOS has control over all the nodes in the system. It will support load balancing using scheduling policies and sharing the resources.

DOI: 10.4018/978-1-6684-6697-1.ch025

INTRODUCTION

We can divide the past of modern operating system into the different ages:

1950s: No specific operating system (Assembly languages and low level languages)

1970s: Timesharing operating system (single computer system is shared by many users)

1970s-90s: Distributed operating system (multiple independent users working on different projects)

1980s: Personal operating system (single computer system per user)

1980s: Real time operating system (timely respond to user)

1985s: Network operating system (multiuser)

1990s: Parallel operating system (multiuser)

2000s: Mobile operating system (single smart phone per user)

Many Research and Development efforts (Hamela 2019 a and b) began in earnest in the 1970s and continued through 1990s, with focused interest peaking in the late 1980s. A number of distributed operating systems were introduced during this period given in Voulgaris (2016); however, very few of these implementations achieved even modest commercial success. Some examples of Distributed Operating Systems includes Windows server 2003, Windows server 2008, Windows server 2012, Ubuntu, Linux (Apache Server), AEGIS, AMOEBA and Arachne.

Early personal computer operating systems such as CP/M, Disk Operating System (DOS) and common Mac OS were designed for individual computers (Adelstein et. al, 2005). During the 1980s the need to integrate divergent computers with computer network abilities was grew and the number of networked devices grew quickly. Some examples of network operating systems include Microsoft Windows Server 2003, Microsoft Windows Server 2008, UNIX, Linux, Mac OS X, Novell NetWare, and BSD.

A RTOS (Real Time Operating System) is an operating system anticipated to assist real time applications. It must be fast, timely and quickly responsive, to the schedule tasks and manage allowed limited resources and also process data as it comes in, usually without data buffer interruptions. RTOS should be responding in strict timing, it is a time bound system which has well defined, fixed time constraints. It is working based on either event driven or time sharing manner (Kaashoek et al, 1993). Other main responsibility of an OS such as to manage computer hardware resources, scheduling user applications, files and directories writing in the hard drive, sending information across in computer network, and so on. When an event driven systems switch between numbers of task based on their priorities, whereas timesharing systems switch the numbers of task based on system clock interrupts. When the RTOS must handle various events concurrently and ensure that the OS responds to those available events within the predictable time limit given. Popular commercial RTOS includes PSOS, VRTX, RT Linux, and Lynx.

Four decades back, computers systems are very big in size, most expensive, and normal user cannot afford in the home. It is located in University computer centres and big companies. Most of the big organizations had a single large computer machine in his company in paper Lewis TG (2009), it was shared by many users using time sharing manner. In the 1980s, price of computer system was come down to the point where each user has capability to own personal computer system in his or her home and offices. In 1970 - 80s, First Computer Network ARPANET was discovery and heavily funded by US Military Government. It allows user computer systems were often networked together, so that clients could do user remote logins on other clients or server computer system or share hardware's include disk space, computing power, printers, files and directories in several ways. Currently some computer systems have more than one processor per user, either in the form of a parallel/distributed computer or

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