DISTRIBUTED OPERATING SYSTEMS
The Logical Design

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Contents

The usefulness of computer systems, the scope and quality of services provided, and their user-friendliness depend very strongly on their operating systems. An operating system can be defined as that part of a computer which transforms lifeless hardware into a powerful and usable system. Operating systems are continually behind in the race with computer hardware to achieve the goal of meeting user expectations. There are many reasons for this situation, and an analysis of the history of operating systems and their current state of development makes it possible to identify the majority of them. Despite this, we can say that an operating system can improve the performance of hardware on which it runs or in the worst case, can hide all possibilities provided by that hardware.

To date, a large number of operating systems have been constructed for centralized computing systems, and detailed performance studies have been made on a number of them. Simulation models of the major functions exist, and their critical design parameters and architecture are well understood. A theory of centralized operating systems does exist and the methodology of operating system development (for a given application and defined requirements) is well known.

At present we are in the next stage of the development and use of computer systems. Research is being carried out both to increase the processing capacity of a single computer system, by using closely-coupled multiprocessors, and also to improve performance within the bounds of fixed and marginally increasing processing capacity. The latter is due to connections of computers spread over geographic distances and the development of distributed systems. This implies a need for specialized operating systems.

At the same time, the goal is to provide the user with a large virtual computing environment in which placement of data and locus of computation is handled automatically. As the user is interested in short response time, class of services provided, and the quality of these services work needs to be carried out in the area of distributed operating systems.

1.1 Motivation for distributed operating systems

Distributed systems are developed because of the enormous rate of technological change in microprocessor technology. **Distributed systems** is a term used to define a wide range of computer systems, from weakly-coupled systems such as wide area networks to strongly-coupled systems such as local area networks to very strongly-coupled systems such as multiprocessor systems. In this book we address local area networks and in some cases wide area networks which are those with high bandwidth.

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