

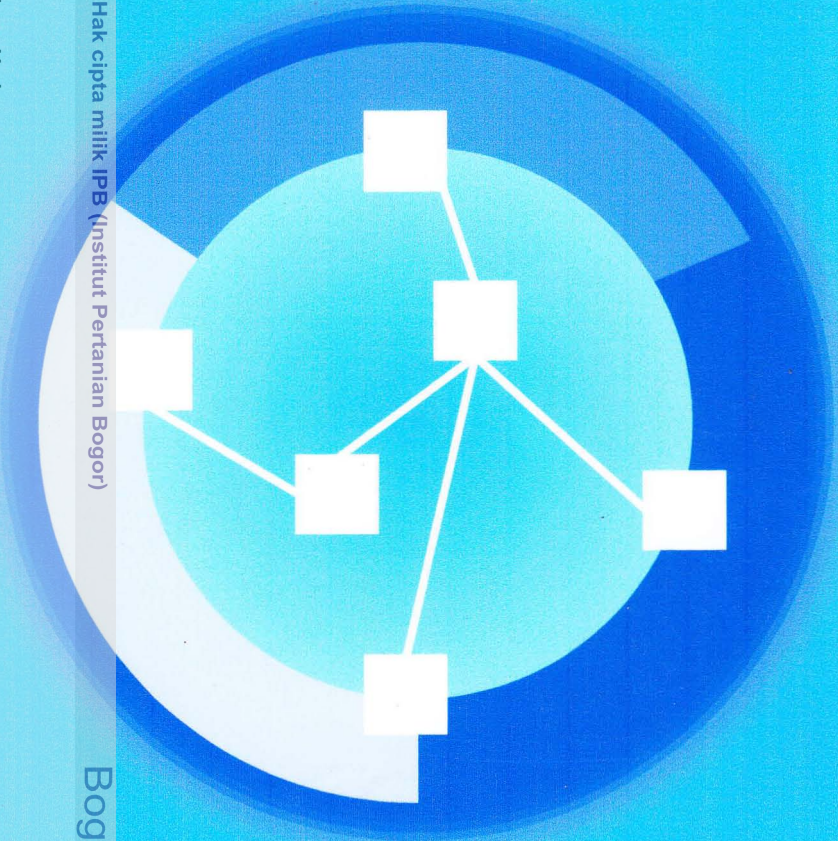


Distributed Systems

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Penulis : Distributed Systems
 Penulis : Prof. Dr. Kudang Boro Seminar, M.Sc

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PREFACE

Study of distributed systems is very popular in current research and practices of internetworked enterprises. Distributed systems enable a loosely coupled agents/sites residing in several geographical areas to work together for common goals. This book describes the very essential features, the theories, development methodology, and sample applications of distributed systems. The target readers of this book can represent students, teachers, IT practitioners, IT-Based system developers, or IT consultants.

This book consists of 8 chapters, each of which is provided with chapter summary. The structure flow of this book is organized as follows:

The book begins with the introductory part embracing definitions, characteristics, motivations of a distributed system. Chapter 2 describes various network topologies connecting distributed sites, and provides comparisons among topologies. Chapter 3 describes how distributed sites inter-communicate, various communication techniques, and communication protocol OSI (Open System Interconnection) are discussed in Chapter 3. Chapter 4 discusses the distribution aspects: computation, data and task balancing, synchronization, recovery and deadlock handling. Chapter 5 describes design methods of developing a distributed system and provides example of some distributed systems. Chapter 6 discusses implementation issues of inter-process communications which are very vital to a distributed system. Chapter 7 provides implementation of multiuser-tools that enable various sites to work together in alternative modes. Finally Chapter 8 concludes the overall discussions of the preceding chapters.

The author is willing to thank and appreciate all helpful people involved in the writing and production of this book. Constructive and fruitful critics are sincerely welcome to improve the quality of this book in the future.

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Chapter 1

Distributed Systems

There are various definitions of a distributed system. These definitions result in a classification of distributed systems. This chapter discusses the principal working principle, characteristics, taxonomy, and motivations of distributed systems.

Definition

A *distributed system* is a set of autonomous interconnected computer systems that interact to perform computational activities cooperatively. This definition can be further expanded by considering what services a distributed system can provide and how they are provided. The terms *sites*, *nodes*, *hosts*, or *computers* are used to refer to the physical distribution of the autonomous computer systems. According to the studied literature [33, 10, 15, 34, 51, 58, 68, 7, 21], a distributed environment could support the following facilities.

- Inter-site communication.
- Resource and task distribution.
- Concurrent computation.
- Remote access.
- Failure detection.
- System security and protection.
- Scalability.
- Dynamic system configuration.

Characteristics

The characteristics of distributed systems can be identified as the following [33, 10, 15, 34, 51, 58, 68, 46, 21].

- Autonomy.** The local computer systems can operate autonomously without direct supervision of a master computer system.
- Interconnection.** A number of sites are connected to each other by a communication network that enables them to exchange information.

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