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Preface

Cloud computing and big data have emerged as two of the most transformative technologies in the 21st century, revolutionizing the way organizations store, manage, and process information. This book, "Cloud Computing and Big Data," has been designed to serve as a comprehensive resource for students, educators, and professionals who seek to understand the fundamental concepts, architectures, and evolving paradigms of cloud technologies and big data frameworks.

Chapter I, Introduction to Cloud Computing, lays the foundation by tracing the evolution of cloud computing, including developments in hardware, internet software, and virtualization. It introduces essential service models such as IaaS, PaaS, SaaS, and newer concepts like Communication-as-a-Service and Monitoring-as-a-Service. This chapter also focuses on building and understanding cloud network infrastructure.

Chapter II, Cloud Information Systems, explores the integration and management of information within the cloud. It emphasizes the significance of cloud federation, presence, privacy, and security, while also addressing standardization and end-user access—critical for modern cloud-based information systems.

Chapter III, Cloud Infrastructure, transitions into the structural aspects of cloud environments. It discusses utility models, evolving software applications, and IT infrastructure, highlighting key technologies such as virtualization, hyper-threading, and blade servers. Standards, automation, and application management are also addressed to provide a thorough understanding of data center optimization and challenges.

Chapter IV, Introduction to Big Data and Hadoop, introduces the concept of big data and its analytics. It traces the historical development of Hadoop, its core components, and tools like Hadoop Streaming and IBM's Big Insights. This chapter serves as a bridge between cloud computing and big data analytics, offering hands-on approaches to data analysis using both Unix tools and the Hadoop framework.

Chapter V, HDFS and MapReduce, dives deep into Hadoop's architectural components. It covers HDFS design, data ingest tools like Flume and Sqoop, data formats, and the MapReduce programming model. Students will learn how data flows in Hadoop, how jobs are scheduled and executed, and how to optimize MapReduce applications for real-world data processing scenarios.

This book aligns with the latest curriculum and learning outcomes (CO1 to CO4) and is intended not only to build theoretical knowledge but also to offer practical insights and applications of cloud and big data technologies. We hope this book empowers learners to confidently navigate and contribute to the evolving digital landscape.

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