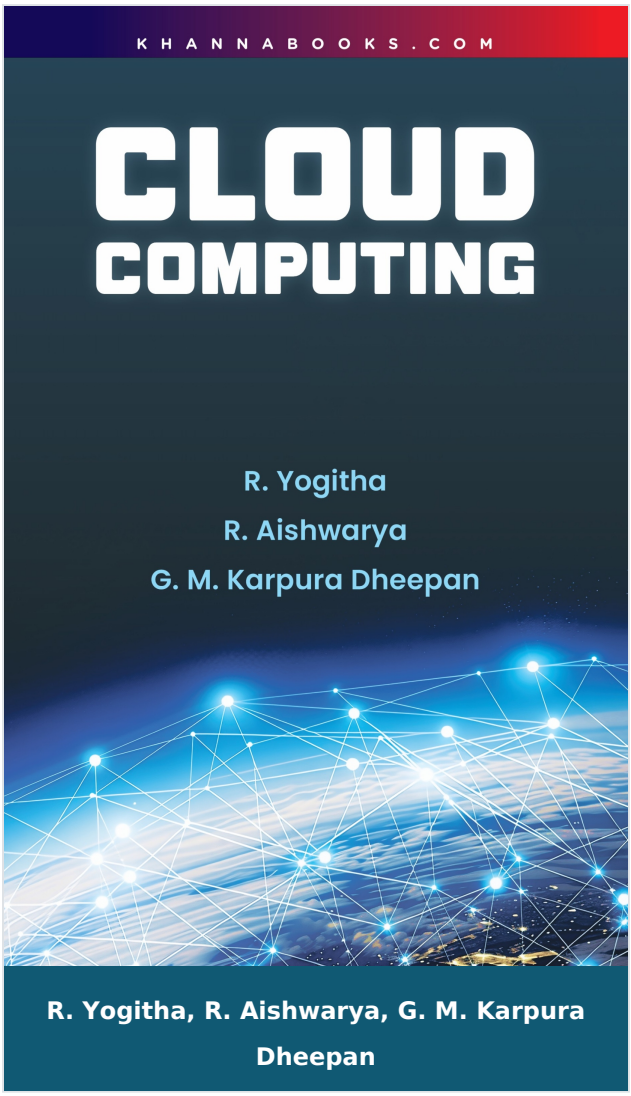


# Cloud Computing


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| **Author :** | R. Yogitha, R. Aishwarya, G. M. Karpura Dheepan |
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## Product Description

**Cloud Computing**

This comprehensive textbook provides a structured and authoritative introduction to Cloud Computing. guiding readers from foundational principles to advanced real-world applications. It serves as an essential resource urce for students, IT professionals, and researchers seeking to master the technologies that power modem digital infrastructure The book clearly outlines the origins and essential characteristics of cloud environments, such as Rapid Elasticity, Broad Network Access, and Measured Service, setting the stage for deep dives into implementation. It thoroughly examines the cloud infrastructure, covering foundational technologies like data center components, power efficiency metrics (PUE), and the multi-level implementation ofvirtualization across CPU, Memory, and I/O. A significant portion is dedicated to cloud architecture, detailing the fundamental service models (SaaS, PaaS, laaS) and various deployment models (Public, Private, Hybrid). Finally, a major focus is placed on cloud security, detailing the CIA Triad, Zero Trust principles, and modem DevSecOps practices crucial for designing and deploying secure cloud software. By covering these core concepts and modern storage systems (Object. NoSQL Databases), this book delivers both the academic knowledge and the practical value needed to confidently design, manage, and secure scalable cloud solutions.

**Salient Features:**

- **Core Cloud Characteristics**: The book meticulously details the defining aspects of cloud computing, such as Rapid Elasticity, Meaaured Service. and On-demand Seli service, contrasting them with traditional IT models for a clear understanding of cloud value
- **Advanced Infrastructure**: Features an in-depth exploration of data center design, including.crucial topics like calculating Power Usage Effectiveness (PUE) and

implementing robust power redundancy configurations (N+1, 2N forhigh for high reliability

- **Multi-Level Virtualization**: Explains the foundational role of virtualization by detalling the implementation levels across CPU, Memory, and I/D, including hypervisor types and the mechanics of creating virtual machines
- **Cloud Security Focus:** Provides dedicated coverage of Cloud Computing Software Security. focusing on the CIA Triad (Confidentiality, Integrity, Availability), Zero Trust principles, and legal compliance requirements.
- **Secure Development Practices**: Highlights the adoption of modem security methods like DevSecOps and Secure Development Practices to integrate security into the CI/CD pipeline and mitigate risks from the requirements phase onwards.
- **Comprehensive Service Models**: Offers a detailed comparative analysis of the three fundamental service models-laaS, Paas, and Saas complete with their respective features, benefits, and roies within various cloud architecture
- **Modern Cloud Storage**: Delves Inte scalable data management, covering distributod file systems (HDFS, Ceph FS), NoSOL doud databases (MongoDB, Dynamo DB), and industry-leading Object Storage solutions (Amazon 53, Ceph).

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4C/4344, Ansari Road, Daryaganj, New Delhi-110002

Email: contact@khannabooks.com | Tel: 011-2324 44 47 - 48 | Mobile: +91-99109 09320

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## Author


**R. Yogitha**

R. Yogitha Associate Professor, Dept of CSE, Sathyabama Institute of Science and Technology

**R. Aishwarya**

R. Aishwarya Associate Professor, Dept of CSE, Sathyabama Institute of Science and Technology

**G. M. Karpura Dheepan**

G. M. Karpura Dheepan Associate Professor, Dept of CSE, Sathyabama Institute of Science and Technology



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