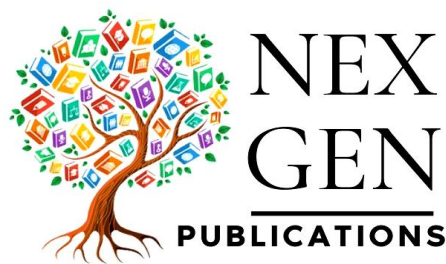


NETWORK DYNAMICS: **CONCEPTS, PROTOCOLS, AND EMERGING** **TECHNOLOGIES**

DR. PARVEEN SADOTRA
DR. PRADEEP CHOUKSEY
MR. MAYANK CHOPRA
MS. RABIA KOSER



Network Dynamics: Concepts, Protocols, and Emerging Technologies



**India | UAE | Nigeria | Uzbekistan | Montenegro | Iraq |
Egypt | Thailand | Uganda | Philippines | Indonesia**
www.nexgenpublication.com

Network Dynamics: Concepts, Protocols, and Emerging Technologies

Authored By:

Dr. Parveen Sadotra

Assistant Professor, Department of Computer Science and Informatics
Central University of Himachal Pradesh, Shahpur Parisar, Shahpur

Dr. Pradeep Chouksey

Associate Professor and Head of Department
Computer Science and Informatics at Central University Himachal
Pradesh (H.P.)

Mr. Mayank Chopra

Assistant Professor, Department of Computer Science & informatics
Central University of Himachal Pradesh, India

Ms. Rabia Koser

Assistant Professor, Govt. P.G. College, Rajouri Higher Education
Department , UT of Jammu and Kashmir

Copyright 2024 by Dr. Parveen Sadotra, Dr. Pradeep Chouksey,
Mr. Mayank Chopra and Ms. Rabia Koser

First Impression: March 2024

**Network Dynamics: Concepts, Protocols, and Emerging
Technologies**

ISBN: 978-81-19477-92-0

Rs. 1000/- (\$80)

No part of the book may be printed, copied, stored, retrieved, duplicated and reproduced in any form without the written permission of the editor/publisher.

DISCLAIMER

Information contained in this book has been published by Nex Gen Publications and has been obtained by the authors from sources believed to be reliable and correct to the best of their knowledge. The authors are solely responsible for the contents of the articles compiled in this book. Responsibility of authenticity of the work or the concepts/views presented by the author through this book shall lie with the author and the publisher has no role or claim or any responsibility in this regard. Errors, if any, are purely unintentional and readers are requested to communicate such error to the author to avoid discrepancies in future.

Published by:
Nex Gen Publications

Preface

"Network Dynamics: Concepts, Protocols, and Emerging Technologies" is a world that you have entered. Networks are the foundation of our communication infrastructure in the connected digital age we live in today, influencing how we communicate, share information, and innovate. Networks operate in the background to make it possible for you to stream your favourite show, communicate a buddy who lives halfway across the world, or do business online.

This book serves as your guide to comprehending the complex mechanisms of networks, from the basic ideas that govern their operation to the state-of-the-art technologies that are influencing their future. We'll dive into the fundamental ideas that underpin network dynamics, covering subjects like data transfer, routing, and network security in a style that is understandable to readers of all experience levels.

But this is not a book about the fundamentals. We'll also delve deeply into the most recent advancements and cutting-edge technologies that are revolutionising networking. We will look at how these developments are changing how we connect and communicate, from the emergence of 5G and the Internet of Things (IoT) to the potential applications of blockchain and artificial intelligence in networking.

"Network Dynamics" is a useful resource for anyone interested in networking, be they a novice student starting out in the field, an experienced professional trying to keep current, or just someone who is interested in learning more about how the internet functions. Come along with us as we explore the exciting field of network dynamics, where the opportunities are endless, just like the digital cosmos itself.

Acknowledgement

It takes a network of support and cooperation to write a book; it is never a single endeavour. We sincerely thank all of the individuals who helped to make "**Network Dynamics: Concepts, Protocols, and Emerging Technologies.**"

First and foremost, we would want to sincerely thank our families for their unfailing support and patience during this journey. Their tolerance and faith in our efforts served as the cornerstone on which we constructed this book.

We owe a debt of gratitude to our mentors and colleagues, whose knowledge and insight enhanced the substance of this book. Their helpful criticism and insightful observations really aided in the development of the concepts and the reader understands of intricate procedures.

We extend our special gratitude to the reviewers for their careful examination and insightful comments, which greatly improved the text and ensured its accuracy and applicability in the quickly developing field of network dynamics.

We express our gratitude to the editorial team and publishers for their expertise and commitment in making this initiative a reality. Their assistance and knowledge were crucial in turning our idea into a reality.

Finally, we would like to express our gratitude to all of our readers. We are motivated to keep searching for new ideas and information in this everevolving sector by your curiosity about the complexities of network dynamics.

We have commenced a collaborative effort to decipher the intricacies of network dynamics, and we gratefully acknowledge the input of all those who have alongside us on this path.

Dr. Parveen Sadotra
Dr. Pradeep Chouksey
Mr. Mayank Chopra
Ms. Rabia Koser

About the Authors



Dr. Parveen Sadotra (MCA, Ph.D, CCSP, CEH, CCSP and CCCA) is presently an Assistant Professor in Department of Computer Science and Informatics, Central University of Himachal Pradesh, Shahpur Parisar, Shahpur. He has definitive experience in the field of computers and Cyber Crime Investigation Training.

He specialize in Cyber Security, Ethical Hacking and Cyber Forensics, Furthermore, Dr. Sadotra presented and published various research papers on Cyber Laws, Investigation of cyber crime, Intrusion Detection System, Cyber Security, Web Security, E- Commerce and Cyber Education in the leading journals. He also published two books on Mobile Technologies and Cloud Computing. He also serves as reviewer of papers in conference. In addition to this he delivered various Lectures and Presentation in Workshop, Seminar and in capsule Trainings. He has got various Appreciations & Commendations certificates from J&K Police for Working on Cyber Crime.



Dr. Pradeep Chouksey is an Associate Professor and Head of Department of Computer Science and Informatics at Central University Himachal Pradesh (H.P.). He has teaching and research experience of more than 16 years. He is actively involved in research with more than 50 presentations, publications and articles in several reputed peer-reviewed international journals, National and international conferences, edited books, etc. He had served as session chair at several National and international conferences. He serves as external examiner for doctoral candidates, external member of doctoral committees, member of board of studies, and academic auditor for various institutions and universities. He also serves as reviewer of papers for various international journals and subject expert for external committees.



Mayank Chopra has received BSc Physics (Hons.) degree from Himachal Pradesh University, India, and MSc Information Technology degree from Central University of Himachal Pradesh, India. Currently he is working as an Assistant Professor in the Department of Computer Science & Informatics at Central University of Himachal Pradesh, India. His current research interest includes deep learning, UAV, web development, security and data science.



Ms. Rabia Koser (MSc- IT, M.Phil) is presently working as Assistant Professor in Higher Education Department, UT of Jammu and Kashmir and presently posted at Govt. P.G. College, Rajouri, Union Territory of J&K.

She specializes in Various Programming Languages like C, C++, Java, Software Engineering, Management Information System and Cloud Computing. Furthermore, Prof. Rabia presented and published various research papers on Cyber Forensic and Cyber Security in the leading journals. She also published a book on Cloud Computing.

Table of Contents

Preface	IV
Acknowledgement	V - VI
About the Authors	VII - IX
Table of Contents	X - XI
Title of Chapters	Page No.
<i>Chapter - 1</i>	1 – 29
<i>Introduction to Computer Networks</i>	
<i>Chapter - 2</i>	30 – 49
<i>Network Models and Protocols</i>	
<i>Chapter - 3</i>	50 – 62
<i>Physical Layer</i>	
<i>Chapter - 4</i>	63 – 75
<i>Data Link Layer</i>	
<i>Chapter - 5</i>	76 – 96
<i>Network Layer</i>	
<i>Chapter - 6</i>	97 – 115
<i>Transport Layer</i>	

<i>Chapter - 7</i>	116 – 134
<i>Session and Presentation Layers</i>	
<i>Chapter - 8</i>	135 – 153
<i>Application Layer</i>	
<i>Chapter - 9</i>	154 – 168
<i>Wireless and Mobile Networking</i>	
<i>Chapter - 10</i>	169 – 183
<i>Network Security</i>	
<i>Chapter - 11</i>	184 – 202
<i>Network Management and Performance</i>	
<i>Chapter - 12</i>	203 – 224
<i>Emerging Technologies</i>	

ABOUT THE AUTHORS



Dr. Parveen Sadotra

Assistant Professor, Department of Computer Science and Informatics
Central University of Himachal Pradesh, Shahpur Parisar, Shahpur



Dr. Pradeep Chouksey

Associate Professor and Head of Department
Computer Science and Informatics at Central University Himachal Pradesh (H.P.)



Mr. Mayank Chopra

Assistant Professor, Department of Computer Science & informatics
Central University of Himachal Pradesh, India

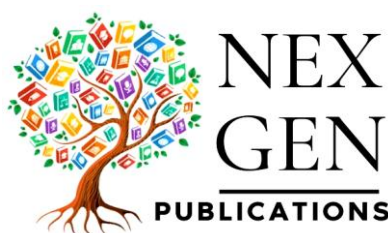


Ms. Rabia Koser

Assistant Professor, Govt. P.G. College, Rajouri Higher Education Department, UT of Jammu and Kashmir

ABOUT THE BOOK

To comprehend the complex inner workings of contemporary networks, "**Network Dynamics: Concepts, Protocols, and Emerging Technologies**" is a necessary resource. By dissecting intricate ideas into straightforward explanations, we examine the protocols that control network traffic flow and data movement. We cover the cutting-edge innovations influencing the future of networks, from the Internet of Things (IoT) and blockchain technology to breakthroughs in wireless communication. This book offers insightful information on network dynamics for both novices and experts in the field. Come along on a voyage to discover the secrets of networks and acquire the skills necessary to manoeuvre through their always changing environment.



India | UAE | Nigeria | Malaysia | Montenegro | Iraq | Egypt | Thailand | Uganda | Philippines | Indonesia

Nex Gen Publications || www.nexgenpublication.com || info@nexgenpublications.com