

QoS AND MOBILE TECHNOLOGIES

EDITORS:

AISHA-HASSAN ABDALLA HASHIM

OMER MAHMOUD

RASHEED SAEED

**DEPARTMENT OF ELECTRICAL AND COMPUTER
ENGINEERING
INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA**



IIUM Press

Published by:
IIUM Press
International Islamic University Malaysia

First Edition, 2011
©IIUM Press, IIUM

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without any prior written permission of the publisher.

Perpustakaan Negara Malaysia

Cataloguing-in-Publication Data

ISBN: 978-967-418-142-0

Member of Majlis Penerbitan Ilmiah Malaysia -- MAPIM
(Malaysian Scholarly Publishing Council)

Printed by :
IIUM PRINTING SDN.BHD.
No. 1, Jalan Industri Batu Caves 1/3
Taman Perindustrian Batu Caves
Batu Caves Centre Point
68100 Batu Caves
Selangor Darul Ehsan
Tel: +603-6188 1542 / 44 / 45 Fax: +603-6188 1543
EMAIL: iiumprinting@yahoo.com

TABLE OF CONTENTS

	TITLE	No
PART 1:QoS APPROACHES		
CHAPTER 1:	Introduction to QoS Approaches	2
CHAPTER 2:	Internet Quality Of Service Architectures	11
CHAPTER 3:	Integrated Services	17
CHAPTER 4:	Differentiated Services	21
CHAPTER 5:	Quality Of Service (QoS) Ad-Hoc On-Demand Distance Vector (AODV)	27
CHAPTER 6:	QoS Routing In Ad-Hoc Wireless Networks	33
CHAPTER 7:	MPLS And Traffic Engineering	41
PART 2: MOBILITY MANAGEMENT APPROACHES		
CHAPTER 8:	Introduction to Mobility Management	47
CHAPTER 9:	Nested Mobile Networks	53
CHAPTER 10:	Evaluation of NEMO Extensions	59
CHAPTER 11:	Handoff Process In Micromobility Protocols	65
CHAPTER 12:	Comparison Between Network Simulators	71
PART 3: WIRELESS TECHNOLOGY		
CHAPTER 13:	Introduction to Local Area Network (LAN) Communication Protocols	77
CHAPTER 14:	MANET routing protocols	85
CHAPTER 15:	VANET Applications	95
CHAPTER 16:	Vehicle To Vehicle Routing Protocols	101
CHAPTER 17:	Wi-Fi Mesh Network	111
CHAPTER 18:	Overview Of Wimax Mesh	117
CHAPTER 19:	Current Trends On WIMAX Using MIMO Technology	129
CHAPTER 20:	Self-Organized Femtocell Networks	141
CHAPTER 21:	Self-Organized Synchronization For Femtocell Network	155
CHAPTER 22:	Spectrum Management In Femtocell	169
CHAPTER 23:	Smart Grid Communication	179
CHAPTER 24:	UWB Overview	189
CHAPTER 25:	ZIGBEE Applications	197

CHAPTER 26:	Improvement Of Vertical Handover In GPRS/WIFI Seamless Convergence	205
CHAPTER 27:	The Application Of Sensor Network And Routing Protocols In Wireless Communication	215
CHAPTER 28:	A Study Of Channel Assignment Approach To Reduce Frequent Reassignment	227
CHAPTER 29:	Association Management Schemes For Wireless Mesh Network	231
CHAPTER 30:	Challenges In Multi-Radio Multi-Channel Wireless Mesh Network	237
CHAPTER 31:	Mobility Support in Diffserv and MPLS network	243
CHAPTER 32:	Mobility Management And Context Transfer	247
CHAPTER 33:	LTE -Advanced Overview	251
CHAPTER 34:	Time Synchronization Protocols And Approaches	261
CHAPTER 35:	MPLS Architectures	265

CHAPTER 1

INTRODUCTION TO QoS APPROACHES

SOHELI FARHANA, DR. OMER MAHMOUD

Dept. of ECE, Faculty of Engineering, IUM

1.1 OVERVIEW

This part of the book provides a systematic investigation into the QoS approaches in wireless networks and mobile communications. In addition to this, internet quality of service (QoS) architectures is discussed together with an expository analysis of integrated and differentiated services. An explication of QoS routing in ad hoc wireless networks is provided together with the mechanism of operation of Quality of Service (QoS) ad hoc on-demand distance vector (AODV) routing. This book part concludes with the discussion of MPLS and traffic engineering.

A computer network is the infrastructure that allows two or more computers (called hosts) to communicate with each other. The network achieves this by providing a set of rules for communication, called protocols, which should be observed by all participating hosts. The need for a protocol should be obvious: it allows different computers from different vendors and with different operating characteristics to 'speak the same language'. This chapter introduces the fundamental concepts of computer networks. We will first look at constituent network components and various network types, and then describe a reference model for network protocol architectures which we will expand upon throughout the rest of this book. We will also discuss the role of international standards and major standards organizations.

1.2 NETWORK COMPONENTS

Fig. 1.1 shows an abstract view of a network and its hosts. The network is made up of two types of components: nodes and communication lines. The nodes typically handle the network protocols and provide switching capabilities. A node is usually itself a computer (general or special) which runs specific network software [1]. The communication lines may take many different shapes and forms, even in the same network. Examples include: copper wire cables, optical fiber, radio channels, and telephone lines.

A host is connected to the network by a separate communication line which connects it to one of the nodes. In most cases, more than one host may be connected to the same node. From a host's point of view [2], the entire network may be viewed as a black box, to which many other hosts are connected. Each host has a unique address allocated to it by