UNIVERSITY OF MORATUWA
SRI LANKA

IMPLEMENTATION OF A FULL-FEATURED IP TELEPHONY SYSTEM

Submitted in partial fulfillment for the degree of Masters of Engineering in Electronics and Telecommunication

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The work presented in this dissertation has not been submitted for the fulfilment of any other degree

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DEDICATION

I dedicate this thesis to my Central collage Kekirawa , University of Peradeniya and University of Moratuwa for the guidance given to me at all times to achieve my goals and targets and providing me with the post graduate course that I received.

It is with reverence and respect that I remember my parent and teachers at this junction of my life for giving me the best of energy and enabling me to get the best possible education.

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ABSTRACT

Traditionally, voice traffic has been carried on circuit-switched networks. However, in recent years great interest has been generated in carrying voice over a variety of nontraditional packet-switched networks. These techniques are known generally as Voice over Packet (VoP). The most popular implementation of VoP has been VoIP on the IP-based Internet. Other VoP technologies comprise those such as voice over Frame Relay (VoFR), Voice Over ATM (VoATM) ,and voice over Digital Subscriber Loop (VoDSL). IP is the dominating technology in end user level deployments, carrying millions of minutes of voice traffic today.

This thesis describes the implementation of an Internet Telephony (Voice over IP, VoIP) system within the University's voice and data networks.

The deployment of VoIP can reduce costs by combining all types of traffic onto a single network infrastructure, eliminating the need to maintain and pay for several different services. The University has its internal telephone network implemented via several PABXs, and its computer network consisting of several departmental networks. Implementation of the VoIP system enables the integration of the two, and through that, the extension of telephone facilities to a larger group of people, as well as the development of value-added services. ITU-T Recommendation H.323 is the most widely used standard facilitating VoIP.

Further this details the hardware and the software aspects of the designed H.323-based VoIP system, and their integration for implementation in the university-wide network.

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LIST OF ABBREVIATIONS

ACF	Admission Confirmation
APE	Application Protocol Entity
ARJ	Admission Reject
ARQ	Admission Request
BCF	Bandwidth Change Confirmation
B-ISDN	Broadband Integrated Services Digital Network
BRJ	Bandwidth Change Reject
BRQ	Bandwidth Change Request
CAS	Channel Associated Signalling
CED	Called Terminal Identification Tone
CID	Conference Identifier
CIF	Common Intermediate Format
CNG	Calling Tone
DBR	Deterministic Bit Rate
DCF	Disengage Confirmation
DNS	Domain Name System
DRQ	Disengage Request
DSVD	Digital Simultaneous Voice and Data
DTMF	Dual-Tone Multi Frequency
FAS	Facility Associated Signalling
GCC	Generic Conference Control
GCF	Gatekeeper Confirmation
GID	Global Call Identifier
GIT	Generic Identifier Transport
GK	Gatekeeper
GQOS	Guaranteed Quality of Service
GRJ	Gatekeeper Reject
GRQ	Gatekeeper Request
GSTN	General Switched Telephone Network
GW	Gateway
HDLC	High Level Data Link Control
HTTP	Hypertext Transfer Protocol
ID	Identifier
IP	Internet Protocol
IRQ	Information Request
IRR	Information Request Response
ISDN	Integrated Services Digital Network
ISUP	ISDN User Part
ITU-T	International Telecommunication Union – Telecommunication Standardization Sector
LAN	Local Area Network
LCF	Location Confirmation
LRJ	Location Reject
LRQ	Location Request
MC	Multipoint Controller

MCS	Multipoint Communications System
MCU	Multipoint Control Unit
MG	Media Gateway
MGC	Media Gateway Controller
MP	Multipoint Processor
MTU	Maximum Transmission Unit
N-ISDN	Narrow-band Integrated Services Digital Network
NACK	Negative Acknowledge
NFAS	Non-facility Associated Signalling
NNI	Network-to-Network Interface
NSAP	Network Layer Service Access Point
OLC	H.245 OpenLogicalChannel message
PBN	Packet Based Network
PDU	Packet Data Unit
PRI	Primary Rate Interface
QCIF	Quarter CIF
QOS	Quality of Service
RAS	Registration, Admission and Status
RAST	Receive and Send Terminal
RCF	Registration Confirmation
RIP	Request in Progress
RRJ	Registration Reject
RRQ	Registration Requestb
RTCP	Real Time Control Protocol
RTP	Real Time Protocol
SCN	Switched Circuit Network
SCR	Service Control Response
SSRC	Synchronization Source Identifier
TCP	Transport Control Protocol
TGW	Trunking Gateway
TSAP	Transport layer Service Access Point
UCF	Unregister Confirmation
UDP	User Datagram Protocol
UNI	User-to-Network Interface
URJ	Unregister Reject
URQ	Unregister Request