



EFFICIENT ROUTING OF VIDEO REQUESTS USING BUILT-IN-CONTENT CACHING

A PROJECT REPORT

Submitted by

NIKHIL BHARATH.R 212713205059

SUREKHA SREETHAR 212713205096

*in the partial fulfillment for the award of the degree
of*

BACHELOR OF TECHNOLOGY

in

INFORMATION TECHNOLOGY

SRI VENKATESWARA COLLEGE OF ENGINEERING

SRIPERUMBUDUR-602 117

ANNA UNIVERSITY::CHENNAI 600 025

APRIL 2017

ANNA UNIVERSITY: CHENNAI 600 025

BONAFIDE CERTIFICATE

Certified that this project report “**EFFICIENT ROUTING OF VIDEO REQUESTS USING BUILT-IN-CONTENT CACHING**” is the bonafide work of “**NIKHIL BHARATH.R (212713205059), SUREKHA SREETHAR (212713205096)**” who carried out the project work under my supervision.

SIGNATURE

Dr.R.Anitha, Ph.D.,

HEAD OF THE DEPARTMENT

Professor

Information Technology,

Sri Venkateswara College

of Engineering,

Pennalur,Sriperumbudur Tk.

SIGNATURE

Ms.J.Sharon Ranjitha Esther,M.Tech.,

SUPERVISOR

Assistant Professor

Information Technology,

Sri Venkateswara College

of Engineering,

Pennalur, Sriperumbudur Tk.

Submitted for the Project Viva-Voce held on

INTERNAL EXAMINER

EXTERNAL EXAMINER

ACKNOWLEDGEMENT

We would like to express our gratitude to our beloved Principal **Dr.S.GaneshVaidyanathan**, Sri Venkateswara College of Engineering, for his keen interest and encouragement without which the completion of this project would have not been possible

We offer our sincere thanks to **Dr.R.Anitha**, Head of the Department, Information Technology, for her support and suggestions during the tenure of the project.

We would like to thank our supervisor **Ms.J.SharonRanjitha Esther**, Assistant Professor, Department of Information Technology, for her help, guidance,support and constant encouragement throughout the course of the project.

We would like to thank our Project Coordinator **Ms.B.T.Shobana** and **Ms.S.Kalavathi**, Assistant Professor, for having lent a helping hand and encouraging us with their valuable experience and suggestions for the progression of our thesis.

We would also like to thank all faculty and supporting staff members of the department, our parents and friends for their inspiration, Co-operation and encouragement in motivating us to successfully complete this project.

ABSTRACT

Built-in content caching in mobile networks can help improve quality of service, reduce operation expenses, simplify inter-network cooperation, and thus is a promising approach for more efficient network architectures. In addition to the complexity of content placement, routing video requests remains a challenging issue. Two problems need to be addressed: (i) how to select gateways to fulfill a request (i.e., gateway selection); (ii) how to route the requested video data (i.e., traffic engineering). In this work, two objectives are considered to resolve the above two problems, namely, minimizing maximum link utilization and minimizing total link cost. Fast algorithms are implemented and studied. A hop-by-hop routing protocol is developed, which implements the optimization solutions by generating a set of flow-splitting and routing decisions for each router/caching node. Simulation results show that algorithms significantly outperform the Shortest- Path-based algorithm under various system settings.

TABLE OF CONTENTS

CHAPTER NO.	TITLE	PAGE NO.
	ABSTRACT	iv
	LIST OF FIGURES	vii
	LIST OF ABBREVIATIONS	ix
1	INTRODUCTION	1
	1.1 ABOUT THE PROJECT	1
2	LITERATURE SURVEY	3
3	SYSTEM ANALYSIS	6
	3.1 EXISTING SYSTEM	6
	3.2 PROPOSED SYSTEM	6
	3.2.1 SHORTEST PATH ALGORITHM	7
	3.2.2 BINARY SEARCH TREE	8
	3.2.3 HOP BY HOP FORWARDING	9
4	REQUIREMENT SPECIFICATION	10
	4.1 INTRODUCTION	10
	4.2 HARDWARE AND SOFTWARE SPECIFICATION	10
	4.2.1 HARDWARE REQUIREMENTS	10
	4.2.2 SOFTWARE REQUIREMENTS	10

CHAPTER NO.	TITLE	PAGE NO.
5	SYSTEM DESIGN	11
	5.1 ARCHITECTURE DIAGRAM	11
	5.2 SEQUENCE DIAGRAM	12
	5.3 USE CASE DIAGRAM	13
	5.4 FLOW CHART	14
	5.5 COLLABORATION DIAGRAM	15
	5.6 CLASS DIAGRAM	16
	5.7 MODULE DESCRIPTION	17
	5.7.1 UPLOAD VIDEO CONTENTS	17
	5.7.2 NETWORK FORMATION	17
	5.7.3 GATEWAY SELECTION	18
	5.7.4 TRAFFIC ENGINEERING	19
6	IMPLEMENTATION AND RESULTS	20
	6.1 CODING STANDARDS	20
	6.2 SERVER PROCESS	22
	6.3 USER PROCESS	26
	6.4 EXAMINATION OF RESULTS	30
7	CONCLUSION	32
	7.1 PERFORMANCE STUDY	32
	7.2 FUTURE WORK	33
	REFERENCES	34

LIST OF FIGURES

FIGURE NO.	TITLE	PAGE NO.
5.1	Video Request Routing Architecture	11
5.2	Sequence of Actions Performed by Actors	12
5.3	Actors and Use Case Involved in the System	13
5.4	Flow of Events and Decision Making	14
5.5	Collaboration of Methods Invoked by Actors	15
5.6	Attributes and Methods of Classes	16
5.7	Data Flow Diagram of Upload Video Contents in the Server	17
5.8	Data Flow Diagram of Creation of Gateways and Built in Content Cache	18
5.9	Data Flow Diagram of Selection of Gateways Using Super Source Point	19

FIGURE NO.	TITLE	PAGE NO.
5.10	Data Flow Diagram of Path Splitting and Routing Contents to Gateways	19
6.1	Screenshot of Apache Homepage	22
6.2	Screenshot of List of Folders Present in the Webapps	23
6.3	Screenshot of Administrator Login Form	24
6.4	Screenshot of MySQL Database with Validation Contents	24
6.5	Screenshot of Administrator Home Page for Video Upload	25
6.6	Screenshot of List of Uploaded Videos in the Server Webpage	26
6.7	Screenshot of FXML Controller Interface	26
6.8	Screenshot of Local Gateway Serving Interface	27
6.9	Screenshot of User Interface to Request And Stream Video	28
6.10	Screenshot of Intermediate Node Interface for Forwarding Data	29
6.11	Screenshot of Super Source Point for Gateway Selection	29
6.12	Screenshot of Video Content Streaming from Local Gateway Cache	30

LIST OF ABBREVIATIONS

JDK	Java Development Toolkit
JRE	Java Runtime Environment
TCP	Transmission Control Protocol
HTTP	Hyper Text Transfer Protocol
IP	Internet Protocol
CDN	Content Distribution Network
PDN	Packet Data Network
JSP	Java Server Pages