

# Ganapathy Raman Madanagopal

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## EDUCATION

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**KTH Royal Institute of Technology**, Stockholm, Sweden. Master of Science in Communication Systems.  
Autumn 2013 – Present.

*Relevant Courses Taken: Advanced Internetworking, Internet Security and Privacy, Network Services and Internet-based Applications, Optical Networking, Product Realization Process, Research Methodology and Scientific Writing and Technology based Entrepreneurship.*

GPA: 4.75/5

**Anna University**, Chennai, TN, India. Bachelor of Engineering in Electronics and Communication Engg., 2011

*Relevant Courses Taken: Fundamentals of Computer Science, Data Structures and Algorithms, Computer Networks, High Speed Networks, Optical Communication, Wireless and Mobile Communication,*

Percentage: 87, First class with Distinction (Ranked 38 among 8626).

**Don Bosco MHSCS**, Chennai, TN, India. Higher Secondary, 2007

*Major Subjects Taken: Computer Science, Mathematics, Physics, Chemistry.*

Percentage: 93.5

## WORK EXPERIENCE

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**SecureW2**, (<http://www.securew2.com/>), Chennai, India

(June 2014 – Present).

*Developer – Intern*

- Work experience as a developer in the area of Wireless security and BYOD.
- Contributed to integration of RADIUS protocol and associated features with the organizations product.
- Worked on integration of Enterprise Java Bean Certificate Authority (EJBCA).
- Extensively gained knowledge over areas of Authentication and authorization protocols.
- Also worked on the various Web UI components HTML, Wicket and Backend Java.

**Wipro Technologies**, (<http://www.wipro.com/>), Hyderabad, India

(Sep 2011 – Aug 2013).

*Project Engineer*

- Work experience as a C developer and has knowledge on Networking Protocols.
- Contributed in development and maintenance project for layer-3 protocols ISIS, OSPF, RIP and BGP and performed unit testing and bug fixing for the respective modules.
- Fixed various defects for the client IPInfusion (<http://www.ipinfusion.com/>) on networking protocol and on the ZebOS stack.
- Developed Command Line Interface (CLI) for users to configure Routers and Switches.
- Worked on various flavors of hardwares Broadcom (BCM), Trident, Katana and Bingo and Ericsson's SIU and CMX hardwares.

**Tata Communication Limited**, (<http://www.tatacommunications.com/>), Chennai, India

(Oct 2010 – Apr 2011).

*Performance Analyst - Intern*

- Responsibilities include performance monitoring and detecting link failures.
- Quality of Service (QOS) analysis on calls between India and Singapore.
- Analyze various causes for the failed calls.
- Developed a software that automatically calculates Answer to Seizure Ratio of the calls for the entire day.
- Gained experience on SS7 protocol.

## SKILLS

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- Proficiency of software development in C, C++, Java, HTML, Assembly, VB.
- Development and Debugging Tools: VIM, Eclipse, Netbeans, GDB, BASH, R, Latex.
- Experience on CISCO IOS, Juniper JunOS and IP-Infusion ZebOS Configurations.
- Familiarity with TCP/IP, Network Programming, Threads, Pipes and Sockets.
- Networking Tools: NS3, Wireshark, IXIA, Tcpdump, Iperf.
- Platforms: UNIX, GNU/Linux, Windows, MAC.
- Versions Control Tools: GIT, SVN, CVS, IBM Clear Quest.
- Certifications: Wipro Certification for 'Layer-3 Networking Protocols' and HCL Certification of Merit of in 'Network Technology and Devices'.
- Worked on Agile and various software development cycle methodologies.

## PROJECTS

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### Application Layer

- **WebMail Server** (<https://github.com/GanapathyRaman/Webmail>)  
In this project, we have developed a webmail server (Http server + SMTP server) for sending emails. Clients Web form containing the regular fields to send an email was designed using HTML and web server was written in JAVA to handle the requests from clients. On submitting the form webserver makes a connection with the SMTP server responsible for the domain specified in the "To" field. An MX lookup is made to find the SMTP server address. . Also MIME support is also provided using "Quoted Printable" encoding and ISO-8859-15 character set is supported.
- **Automatic Call Answering SIP Speaker** (<https://github.com/GanapathyRaman/SIPSpeaker>)  
In this project, we have developed a SIP Server/Speaker (SIP UA) using JAVA, which can be considered as a robot which automatically answers to the incoming SIP calls. The SIP speaker will waits for the incoming call and answers when call is received from the Client. When the call is answered, a pre-configured voice message will be played out to the client and finally the call is terminated. A web server is also provided, where the administrator of the SIP Speaker can type a customized message through the web portal. This new message will be saved and played out to the SIP clients then on. Also the administrator can view, delete the existing message through the web page. For text to voice conversion, we used FreeTTS and "kevin16 voice".

### Transport Layer

- **Reliable UDP** (<https://github.com/GanapathyRaman/RUDP>)  
In this project, we have developed a library for Reliable UDP, which enables the application using it to send multiple files to multiple destinations. The library inserts a RUDP header on the payload of normal UDP datagram by which a reliable transmission can be achieved. It does the flow control using Go-Back-N ARQ sliding window technique same as in TCP, but in contrast RUDP doesn't provide congestion control, error recovery and other TCP capabilities. RUDP has its application in the scenarios where user do not want to add more overhead to the data (as like in TCP header of 20 bytes), but requires overall reliable data transfer.
- **Analyzing Congestion Control on WebRTC Applications**  
([https://drive.google.com/folderview?id=0B\\_zNSL9cwhx\\_dENVcHZXZ18zdW8&usp=sharing](https://drive.google.com/folderview?id=0B_zNSL9cwhx_dENVcHZXZ18zdW8&usp=sharing))  
This project work revolves around the new peer-to-peer communication technology WebRTC. We designed a network topology where we analyzed and compared existing real time peer-to-peer communication protocols with WebRTC. Also we defined a set of requirements that can provide effective congestion control in WebRTC technology.

## Networking Layer

- **Packet Bouncer** (<https://github.com/GanapathyRaman/PacketBouncer>)

In this project, we have developed a packet bouncer, which can be thought as an intermediate node/firewall which doesn't allow the client inside the network to connect directly to the server. Bouncer listens and receives packet on fake IP address and on a specific incoming port. The client will send the packet to the bouncer on the specific IP and port. LibPcap is used to tap the received packet on the bouncer. All fields in the IP header is validated and modified accordingly. Support for ICMP has been provided. And for the TCP connections, the bouncer modifies the TCP header (TCP Source and Destination ports) and forwards it to the Server or client depends on the port on which it receives the packet. Special support was provided to handle multiple FTP connections. The project was developed using C language.

- Has extensively worked on various routing protocols ISIS, OSPF, RIP, BGP and MPLS.

## Data Link Layer & Physical Layer

- **Wifi Starvation, Collision Probability Calculation and Performance Evaluation of Backoff Mechanism** (<https://github.com/GanapathyRaman/WifiStarving>)

This project involves design and simulation of various flows in a single-cell Wifi network. This project aims to study the cause and effects of various Wifi issues such as "Wifi-Starving" and "Hidden Terminal" problem. NS3 is used to design the network topology and for obtaining the simulation results. Basic starvation and Co-operative starvation of Wifi nodes were measured. Both symmetric and asymmetric flows in the Wifi node scenarios were simulated and various parameters such as back-off interval, average collision probability using Bianchi's Formula.

- **OneKey** (<http://onekey.yummycode.com/>)

OneKey is an electronic card that remembers all your NFC cards and can act like any of them upon your command. To add a new card, user can use the provided NFC reader to clone the card and mobile application to register it. Now simply select it from the card's simple one-button interface and you are good to go.

## Network Management

- **Miniature Internet Service Provider (ISP)** (<https://onedrive.live.com/?cid=ABC05E43F6BA489A&id=ABC05E43F6BA489A%211212>)

To learn and stimulate the real time environment during the Master's program, we designed a miniature of real ISP running Interior and Exterior Routing Protocols, Multicast service, DHCP, DNS and Web Server. We also deployed VoIP and VPN services on the network.

- **Memory Management System** ([https://github.com/GanapathyRaman/Unix\\_MemoryManagementSystem](https://github.com/GanapathyRaman/Unix_MemoryManagementSystem))

Developed a memory management system during the training program at WIPRO Technologies that would allocate and manage pools of memory on the heap. The system was developed on a Linux box using C language and provided a console-based user-interface.

## Bachelor Thesis

### **An Efficient Algorithm for Analyzing Telephone Signaling in International Switching System**

([https://drive.google.com/file/d/0B\\_zNSL9cwhx\\_VVV6d2F3ckdseUk/edit?usp=sharing](https://drive.google.com/file/d/0B_zNSL9cwhx_VVV6d2F3ckdseUk/edit?usp=sharing))

An algorithm which can detect various causes and other required parameters for the call failures in a telephone network. Area of interest was around SS7 protocol. We developed a software based on this algorithm which can be used to compute the Answer to Seizure ratio of an organization, by which we can save Network Engineers time in analyzing the performance of the communication network.

## TALKS AND PUBLICATIONS

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- “An Efficient Algorithm for Analyzing Telephone Signalling in International Switching System”, at NCCNS’11 National Conference organized at Hindustan University, Chennai.
- “Analyzing Congestion Control on WebRTC Applications”, an academic paper detailing various requirements for congestion control in Real Time WebRTC applications.
- P3 - A Privacy Preserving Middleware for Recommendation based Services.
- “IBM-Millipede - Ultra Dense Storage Technology”, at IBM Techno challenge organized by Anna University.

## HONORS AND AWARDS

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- 100% tuition fee waiver awarded by KTH Royal Institute of Technology.
- Awarded gold medal by Anna University for securing university top rank in my under graduation.
- “Feather in the Cap” award at Wipro Technologies, for best contribution to the project and for the good feedback from the customer.
- Awarded best project year for the project Wifi Starvation in Advance Internetworking – II course.
- Best Project Award at Wipro Technologies, for implementing a Memory Management System as a part of the training programme.
- Won 1st prize for presenting a paper on “An Efficient Method for Ultra Dense Storage Technology” in a national level technical symposium held at Vel High Tech Engineering College.
- Have presented and got 2nd prize for a paper on “IBM-Millipede Technology” in a national level technical symposium held at Velammal Engineering College, Chennai.
- Judge's Winner Award at College of Engineering, Guindy for developing Line Follower and Obstacle detecting Robot.