# DR. ETTIKAN KANDASAMY KARUPPIAH

**Phone: (M) +65-9083-2057 &** +60 12 3474905
**Email:** ekaruppiah@nvida.com  ettikan@yahoo.com  www.ettikan.org

## BRIEF SUMMARY

**Research & Development Focus** area in past years include BigData Analytics, IoT Protocols, Algorithm Design/Optimization, Network Protocols, Cluster Computing, Wireless Protocol for Embedded Systems, HPC, GP/GPU, Many/Multicores, Distributed Computing, AV Processing, P2P, QoS, Data Processing, Machine Learning, Image Analytics, System Optimization/Parallelization and System Performance Acceleration with **>70 publications, >40 patents, book chapters and productization/R&D commercialization achievement.** He also serves as Adj. at universities, reviewer and chair of selected conferences, Senior Member of IEEE, Industry Consultant etc.

**Industry Expertise:** More than 18 years of progressively (**NTT, Intel, Panasonic & MIMOS, TM R&D, Nvidia**) responsible experience in driving mission-critical projects for various clients across the career with proven success in ensuring delivery of optimum service levels meeting business needs.

**Continual Improvement:** Passionate interest in applied research and dedication to enhance technical knowledge via self exploration and external knowledge acquisition. Publish and present at conferences, a featured speaker in various panels of association and contributed extensively to the industry through *technical papers and patents*.

**People/Project Leadership:** Natural leader who takes charge of complex projects from inception through all development phases. Due to his unconventional approach, he has been hired for various Transformational Team/Division/Lab formation/operation leadership. Known for being calm and decisive during crises. Able to concurrently manage several ongoing projects and teams with key deliverables. Currently with Nvidia Singapore as *Senior Manager, Developer Relations for Asia Pacific South Region.*

## AREAS OF EXPERTISE

Research & Development ● ICT Project Management ● Software Architecture ● Solution Architecture ● Design Architecture ● Relationship Management ● Stakeholder Management ● Patent Writing ● Conference Papers ● Technical Journals ●Embedded & Distributed Software Engineering ● Strategic Planning & Execution ● Visionary Leadership ● Resource Management ● Team Leadership & Motivation

## PARALLEL COMPUTING, HPC AND GP/GPU

Ettikan Master's thesis titled, *'A Collective Communication Performance Model for PVM Programs on Ethernet Workstation/PC Clusters'* was to study efficiency of Parallel Virtual Machine programs, where tasks were executed in parallel between inter-networked compute nodes [1|-], 1999. Later he worked for Intel R&D for design and implementation of control plane and data plane protocols using micro code (assembly like software language) for their new IXP series of processors. During his 5 years work, he designed and implemented various protocols and network software components meeting Intel product design needs. Most of his work were converted into dissertation [16|2]. He published numerous papers, journal and obtained 2 granted patents in this area. His **Ph.D was in Distributed Computing (Thesis: '*SLINA: Service Locating Using IPv6 Anycast at Network Layer')** in 2005. Later while in Panasonic R&D he worked on multiprocessor (Audio, Video & General Cores) software research for AV processing and network protocols targeted for consumer electronics application with numerous patents and publication [5|8]. During this period, parallel approach was used for efficient resource management in terms of AV data processing. Next, in 2011 he was hired to establish and lead National Laboratory, at MIMOS called Accelerative Technologies Lab (ATL) with ~30 research engineers. Later, under ATL he established National '**GPU R&D and Compute Solution Center'** (http://gpu.mimos.my) jointly funded and governed by Nvidia, HP and MIMOS, serving as the center of GPGPU related R&D activities by collaborating with international companies, universities and industry partners. Key technical lead initiated MoU/MoA signing partnership with companies' e.g **ESRI Inc and Intel for joint R&D work which he leads**. Working on many large projects in specialized area with few examples such as SOCSO (RM350Mil), Government Projects (BigData, Embedded, BI etc), Petronas/UZMA (Oil & Gas), Video Analytics. He is also successfully applied for CRC for this lab and established several University Labs with GPU teaching centers. During these years he undertook many HPC, GP-GPU & Parallel Computing projects under his supervision with almost 15 engineers working on software components. The key components were eventually listed as MiAccLib 2.0.1 @ (http://www.nvidia.com/content/tesla/pdf/gpu-accelerated-applications-for-hpc.pdf). He jointly published >12 papers/journals and >10 patents in the area Nvidia GP-GPU (can be referred in the appendix session).

As part of transformational leadership, he pioneered in commercializing R&D results **within 2nd year of his appointment and grew Labs revenue/royalty/grant base to millions of RM with various activities including new grants, joint grants, industry consultancies etc**.

## IoT AND BIGDATA EXPERIENCE

His journey in IoT started way back in 1998 with IPv6 protocol R&D [19|4] which was intended for devices addressing, communication and routing. He was one of the pioneer in IPv6 work in Malaysia then, and did his Ph.D in this area. Focused on device anycast [6|1] routing and processing at Network Processor [8|1], he looked at various device routing protocols [6|1] TCP, UDP. IPv4, IPv6, ATM, RTP, RTSP, RTCP etc and service location [1|1] protocols which he implemented on Intel IXP-Series Network Processors. Later, his R&D focus was in Consumer Electronic devices and its communication both in home network and Internet. Extensive work was done in service location [1|1] protocols for Home CE devices [6|2] in various area including AV/Image Processing [3|4], Multicasting Protocols [4|1], Device Ontology [2|1], Device Communication Latency [4|4], Service Discovery [1|3], Wireless [-|1] and Application Layer Routing [4|3] with selected work implemented on Panasonic Embedded Processor. His and his team work then translated to various Panasonic products. In 2007, he lead a team of engineers to implement IoT communication message translator engine covering LonTalk, Modbus, RS232, ZigBee (SEP), Wifi/802.x, DLNA (SOAP/SSDP/etc] and several other protocols for home gateway. Later his sub-team implemented striped down version of IPv6 stack (6lowpan) on embedded processor for Panasonic Aircond communication which was later productized. During this period he published many papers, patented innovative methods and actively participated in standards bodies (e.g IETF). Moving away from lower layer IoT protocols, currently he and his team is focusing on application layer protocols e.g REST, SOAP, HTTP, XML, HTML, MQTT, DDS, AMQP for end device communication as light weight protocol running on either gateway devices or at cloud/server devices respectively enabling sensor communication. Specific focus is to develop continuously evolving generic application layer framework targeted for telco and end user service enablement with ease of customization. Being the GM of the R&D group he is responsible monetization of the stack being developed on various platforms and different use cases by closely collaborating with marketing/product specification team.

In broader perspective, he has looked at bigdata processing from data processing, data ingestion, data cleansing, data security, data analytics, data visualization and data dissemination. He started his work in BigData with data acceleration by adopting GPUvsCPU computing [2|4], financial data analytics [5|2], text/string analytics [5|2], Seismic Data Computing [1|-], AV Stream Processing [2|2], Video Data Analytics [5|3], High Speed Processing/Optimization Techniques [4|4], BigData Processing Middleware Development [4|-], Data Cleansing [1|1], Data Analytics Acceleration [2|3], Data Security with Anonymization [1|1] and geospatial computing [1|1] using Spark. He and his team has spent last ~5 years working on different type of data analytics including video, text/string, seismic, financial, government, sensor, weather, machine logs etc either structured/unstructured and stored/real-time using different software/framework technologies including Claudera Hadoop Stack, self-developed and 3rd party tools for actual solution/libraries development meeting specific end-user needs. Most of his team solution has been adopted by customers (monetized) and being used in production environment. As for analytics, R and Weka was mostly used with self-developed open source visualization engine. In these five years he and his team has done many PoC, library & middleware development, end client project implementation, consultancies, technology transfer, His transformational leadership, practical, fast-learning and entrepreneurial market driven R&D skill made him to be one of the pioneer in BigData landscape in Malaysia especially in government and SME market segment as entrusted in MIMOS as Director of ATL. Being pioneer and working with challenging customers, required him to go extra-mile showcasing business value of bigdata analytics closing project deals. Many of his/team projects were funded by 3rd parties.

*Note : [Number of Publications | Number of Patents ] in his specific R&D area/topics. Please refer to publication/patent section*

## ACADEMIA

→ **Ph. D in Distributed Computing (Thesis: '*SLINA: Service Locating Using IPv6 Anycast at Network Layer')*** from School of Computer Science, University Science Malaysia, Penang in 2005
→ **M Sc in Computer Science (Thesis: '*A Collective Communication Performance Model for PVM Programs on Ethernet Workstation/PC Clusters')*** from School of Computer Science, University Science Malaysia, Penang in 1999
→ **Bachelors Degree in Computer Science (Thesis: '*Document Conferencing System for Multimedia Conferencing System')*** from School of Computer Science, University Science Malaysia, Penang in 1997

## NOTABLE ACHIEVEMENTS

→ ***At Nvidia,*** he is responsible to interface, coach, guide and develop gpu/cuda research & development community in Asia Pacific South region covering various GPU/CUDA technologies and platforms.

→ ***At TM R&D***, he is responsible as **General Manager for Division Leadership** with 7 different R&D Labs with revenue of RMXXmillion, overseeing various type of projects including commercialized R&D projects, research projects, PoC projects, to be commercialized projects, university collaborative projects and direct business engagement project.

→ ***At MIMOS,*** led Accelerative Technologies Lab with ~30 research engineers and established a '**GPU R&D and Compute Solution Center'** (http://gpu.mimos.my) jointly funded and governed by Nvidia, HP and MIMOS, serving as the center of GPGPU related R&D activities by collaborating with international companies, universities and industry partners. Key technical lead initiated MoU/MoA signing partnership with companies' e.g **ESRI Inc and Intel for joint R&D work which he leads**. Working on many large projects in specialized area with few examples such as SOCSO (RM350Mil), Government Projects (BigData, Embedded, BI etc), Petronas/UZMA (Oil & Gas), Video Analytics. As part of transformational leadership, he pioneered in commercializing R&D results **within 2nd year of his appointment and grew Labs revenue/royalty/grant base to millions of RM with various activities including new grants, joint**

**grants, industry consultancies etc**. He was also responsible for various divisional and company-wide transformational initiatives such as patent-process improvisation, new governmental project initiation, international organization partnership, cross-lab project initiatives. *Key Technical driver* for Big Data related national level initiatives and projects within and external critical organization such as MDeC, MAMPU and various Technology Recipients resulting in Technology transfer and key national objectives achievements. Appointed as International Advisor for University Tunku Abdul Rahman and Adjunct-Professor for Multimedia University in the area of Many-Multi-Core area with Postgraduate students supervision. Numerous of his/team patents have been applied/granted and made into products.

→ *At Panasonic,* initiated collaborative research activities with Corporate Lab & Domain partners in Japan & Singapore and formulated research direction, research process and methodology establishment. Established the new R&D Lab called **Panasonic Kuala Lumpur Lab focusing on IP, AV, IoT, and Wireless Protocol R&D as part of Panasonic Head Quarters (Osaka-Japan) overseas lab.** As part of Osaka Corporate Lab aspiration was solely responsible to establish, operate and delivered departmental needs by being Group Manager of remote-overseas entity in Kuala Lumpur with strong project collaboration across overseas lab (Japan, Singapore, US, Europe and SEA). *Directly responsible for product quality software and R&D deliverables, meeting organizational expectation.* Won '**Best Overseas Research Show case'** award for Panasonic International (Internal) Technology in 2008. Successfully applied for 18 **JP/International patents [15 Independent & 3 Dependent]** in the Home Networking/Network Processing products (4 successful key CE products) and ~45 reviewed conference/book chapter/journal paper publications. His team won '**Best Poster Paper'** award at global Panasonic Technical Symposiums. Numerous of his/team patents have been applied/granted and made into products. Achieved '**Star Grant'** award for PKLL/ATDG by MDeC/Malaysian Government Agency for strategic research activities as part of Panasonic corporate research lab program. '**Research Grant'** from STAR/MDeC (MYR7.2million). One of few organization to setup overseas Corporate Lab in Cyberjaya.

→ *At Intel Malaysia,* he was hired as part of new initiatives in IPv6/ATM related embedded development for Network Processor IXP1xxx and 2xxx series jointly with US/Ireland lab using microcode (assembly like); while serving industrial consultancy. Key contributor for project initiation and significantly contributed in spec writing individually for first embedded microcode. Again his transformational leadership shined and *responsible for new team formation and technology transfer from Ireland with 4 months overseas placement focusing in the area of IXP2400/2800, IXP225 Embedded Network Processors (NP).* Filed several patents in the newly formed division ICG/Malaysia which was eventually granted in IPv6 and embedded space for Intel. He also won '**Intel Innovator'** award from Intel Communication Group for first patent filer in ICG Penang Division. With additional responsibilities shown, he was given '**Intel Research/Education'** award for enabling & supporting Research/Education activities in local universities. First in the department to successfully file an invention disclosure which led to patent filling application/granting to US department of patent filing with approval from the Intel Patent Committee. He **advised** various countries on IPv6 related development and deployment activities as Head of APAN-MY-IPv6 as industry rep.

→ *At MMU,* he served as Computational & Networking lecturer for short period of time with direct responsibilities of syllabus setup, academia work and industry consultancies (e.g Intel). Served as University Network consultant on ATM issues.

→ *At NTT MSC,* established the first IPv6/ATM link between NTT MSC and Japan NTT into Malaysia with software R&D and link level configuration. Trained at Musashino Lab in Japan and transferred technology to the resources at Malaysia. Successfully **introduced** IPv6-related activities in Malaysia through various presentations and active participation at national/international levels.

→ *As a Student*, besides academic excellence **(e.g honored with 'Research Scholarship'** for Postgraduate studies in France (Masters & Ph. D) by USM under Fellowship program which he declined) and received '**Student Scholarship'** award from SONY TV Malaysia (Undergraduate Scholarship), he also actively involved in various student bodies and communities work with excellent leadership qualities.

## ORGANIZATIONAL SCAN

NVIDIA SINGAPORE
**Senior Manager, Developer Relations**                                                                                   **(May'16- Present)**
Responsible to interface, coach, technically guide and develop gpu/cuda developer community in Asia Pacific South region covering various GPU/CUDA technologies and platforms for HPC Cluster, Higher Research & Education Institutions, Enterprises and Start-ups.

TELEKOM MALAYSIA R&D, MALAYSIA.
**General Manager, Computational Science Division**                                                          **(June'15- Apr'16)**
→ Managed Computational Sciences Division with 150 Researchers/Engineers which is ~50% of the organization size and revenue of RMXXmillion.

INFORMATION COMMUNICATION DIVISION, MIMOS BHD, Malaysia
**Principal Researcher & Director - Accelerative Technology Lab**                                    **(Mar'11- May'15)**

- → Spearheaded all activities related to Research definition & management, Software / Design / Solution Architecture for the Accelerative Technology Lab.
- → Oversee various projects across **BigData Analytics, Algorithm Design/Optimization, Network Protocols, IoT, Cluster Computing, Wireless Protocol for Embedded Systems, GP/GPU, FPGA, Many/Multicores, Distributed Computing, AV Processing, P2P, QoS, Data Processing, Machine Learning, Image Analytics, System Optimization/Parallelization and System Performance Acceleration**
- → Handle projects across **diverse domains including Text/String, Image, Video, Network Protocol, Finance, Crypto, Statistical, Predictive algorithm R&D, Library Design, Distributed/Parallel System that translates into patents, libraries, middleware/framework/application software, papers and applications**
- → Handle applications using libraries / softwares like fraud detection (AML), data cleansing (PERKESO), MoH (Data Warehouse), MoHR (Jobs Malaysia Search Engine), PDRM (Data Analytics, Customs (Image/Data Analytics), Financial Risk Management, Data Scrambling/Encryption/Decryption, Video Conferencing, Large Data Analytics, Network Processor, Video Enc/Dec, etc.
- → Provide support in grant proposal submissions in conjunction with Sponsored Projects Administration (budget development, documentation, administrative portions of proposals, internal approvals, monitoring issues around effort, cost share, etc.)
- → Responsible for client service, project planning, resourcing, account management, business development, team development and disseminating sensory knowledge
- → Deliver projects through effective management to ensure all deliverables in terms of time, cost and quality are met
- → Focal Point of Contact for all client-related escalations; coordinate with customers to ensure all areas of concern are attended to / worked upon for improving service levels
- → Foster key relations by developing & executing plans to retain and expand business with existing clients as well as meet their business needs while offering innovative opportunities for business growth and survival in the market
- → Exceptional skills in managing global multi-site, multi-vendor projects using innovative, simple, cost-effective techniques / tools

---

PANASONIC KUALA LUMPUR LAB & ADVANCED TECHNOLOGY DEVELOPMENT GROUP, R&D CENTRE, Malaysia
**Principal Engineer & Group Manager** **(Feb'05 – Jan'11)**

- → Handled IP Stack, Eco/Wireless Home Network Protocols, PAN, IoT, P2P/ALM for Multi-Interfaces, Digital TV, AV Protocols and embedded systems related R&D activities in the organization leading to patents, technical reports, conference papers, prototyping and product quality code development
- → Appointed in the PKLL/ATDG department (Panasonic Kuala Lumpur Laboratory/Advanced Technology Development Group) to setup, initiate collaborative R&D activities with Corporate Lab partners in Japan (Hub) / Singapore and formulate R&D strategies, processes & methodology for the newly established Lab

---

NETWORK PROCESSOR SOFTWARE ENGINEERING TEAM, NPD, CIG, INTEL MICROELECTRONICS, Malaysia
**Manager / Lead / Sr. Network / Software Engineer** **(Feb'03 – Jan05)**

- → Worked on IXP1200 ATM/AAL2 design and development, NAT/NAPT design for IXP2400/2800, IXP225 Embedded Network Processors (NP) System Testing and led the IXP4XX/IXP2XXX NP System Test team
- → Solely accountable for transferring IXP225 System Test knowledge to Penang from Intel-Ireland and setting up the new team, including the system test lab; formed a new group for transferring entry level network processor system testing
- → Providing consulting services as IPv6 Expert to the department in various projects
- → Led a team of Sr. Engineers from various functions (development, system testing and release process) to formulate a standard process for end to-end validation process with an aim to re-look at current Infrastructure Software Organization validation process and define a unified end-to-end validation process for the organization. The process was reviewed, accepted and implemented within the NP software organization
- → Managed and co-ordinated departmental funds for university research with a team of engineers involved in the research project review, selection of universities, monitoring and guiding research activities
- → Successfully completed **4 US patents (2 Independent & 2 Dependent - Granted)**

**Sr. Network / Software Engineer** **(Apr'01 – Jan'03)**

- → **IPv6 Projects/Consultancy:** Worked as Sr. Researcher and gained immense knowledge on IPv6 along with providing consulting services for teams across Malaysia; reviewed and provided feedback on various projects related to IPv6 protocol stack implementation on IXP4XX and integration of application stack for IXP4XX for external certification with performance analysis; worked in close collaboration with the Technical Marketing team / Engineers to resolve issues raised by customers on protocol designs on NPs for multiple projects
- → **NAT-PT (RFC2766/2765):** As a Software Architect, worked collaboratively with counterparts to outline software architecture on latest NPs; As Project Lead, worked with a 2-member team in gathering requirements, performing high & low level designs to implement NAT-PT protocol software stack; understood protocols from RFCs, wrote high & low level design documents for latest Intel® NPs, IXP2400/IXP2800 where final implementation was done by another team of Software Engineers.
- → **ATM/AAL2 for 3G Node B:** Worked with a 4-member team for ATM/AAL2 protocol development and implementation on IXP1200 Network Processor; managed protocol designing and unit testing in the team. Coordinated with third party software vendors, marketing team and customers for initial requirement gathering, design and design

verification. The protocol stack was intended for Node B (3G) implementation utilizing Intel® IXP1200 NP. Besides, ATM/AAL2 protocol development, 3G Node B Network Layer protocols were also simulated to ensure protocol performance to the required environment

→ **University Technical Committee Chair and Mentor:** Worked as an interface and chair for Industry (Intel) funded research projects with local universities including MMU and USM. Appointed as the Chair of the internal department level education/research working group to steer and co-ordinate all departments funded research projects with a team of mentors and managers. Worked with one of the universities to formulate syllabus related to NP for teaching adaptation at UG & PG levels

---

MULTIMEDIA UNIVERSITY, Malaysia
**Lecturer - Faculty of Information Technology** **(Jul'00 – Mar'01)**

---

RESEARCH & BUSINESS DEVELOPMENT DEPARTMENT, NTT MSC SDN BHD, Malaysia
**R&D Engineer** **(Jun'99 – Jun'00)**

---

DISTED-STAMFORD COLLEGE, Malaysia
**Lecturer – School of Computer Science** **(Jun'97 – May'99)**

---

NETWORK RESEARCH GROUP, SCHOOL OF COMPUTER SCIENCE, USM, Malaysia
**Research Assistant** **(Feb'97 – May'97)**

---

*See Annexure for Patents, Conference & Technical Session Papers, Book Chapters, Journals, Internet Drafts, etc.*

# ANNEXURE...

## P A T E N T S

→ Teoh Ee Na, **Karuppiah, E.K, et. al** (To be filed in 2015), **"Apparatus and Method for data anomaly detection and prediction based on dynamic behavior extraction".** 20140001662.

→ Amirreza Zarrabi, **Karuppiah, E.K et. al (To be filed in 2015), "Apparatus and Methods for Descriptor-Based Runtime Memory Management in GPGPU Devices".** 20140001602.

→ Teoh Ee Na, Amril Nasir, **Karuppiah, E.K, (To be filed in 2015), "Method to Dynamically Restructuring Data Instances for Data Anomaly Discovery".** 20140001598.

→ Yaszrina Y., Mohanaraj P., **Karuppiah, E.K, (To be filed in 2015), "Apparatus and Method for multi-attributed security message batching (MASMB) in distributed multi-GPU environment".** 20140001593.

→ Yong Keh Kok, Amirul Abdullah, **Karuppiah, E.K, et. al (To be filed in 2015), "An apparatus and method for timestamp representation that enables parallel manipulation of full and partial timestamp sub-segments while maintaining global uniqueness".** 20140001580

→ Yong Keh Kok, **Karuppiah, E.K et. al** (Filed in 2014), **Apparatus and method for fine-grained parallel redundancy encoder and decoder with expression matching using heterogeneous processing**

→ Keeratpal S., Fazli M.N., **Karuppiah, E.K et. al** (Filed in 2014), **"System and methods of self learning multi model pre-emptive database and file system query route selection for simulation and analytics supporting data sources of various volumes"**

→ Yong Keh Kok, Fazli M.N, **Karuppiah, E.K et. al** (Filed in 2014), **"Apparatus and Method for Multi Queries Processing Acceleration using GPU computing"**

→ Lim Su Jin, Zeldy Zuriady, **Karuppiah, E.K et. al** (Filed in 2014), **"System And Method For Dynamic Next Hop Selection In Large-Scale Wireless Sensor Network To Reduce Power Consumption And Measurement Cost"**

→ Shahirina.T, Ong Peng Shen, Lee Chin Yang, **Karuppiah, E.K** et al, (Filed in 2014),"**Apparatus & Method To Allow Data Reusability And Eliminate Process Duplication For Parallel Video Analytics**"

→ Amril, **Liew Soung Yue, Karuppiah E.K** et. al (Filed in 2014), "**A Cumulative Prefix-Based Directory Node Selection And Searching Scheme For Service Discovery In Peer-To-Peer Networks**"

→ Yaszrina Y., **Karuppiah, E.K** Ngo Chuan Hai, et. Al (Filed in 2014), **"Adaptive-Window Edit Distance Algorithm Computation"**

→ Yaszrina Y., Ngo Chuan Hai, **Karuppiah, E.K** (Filed in 2013), **"Method of Determining Accuracy for Sub-string Order and Similarity"**

→ Harjinthar S., Mohamed Farid, Shariq H., & **Karuppiah, E.K** (Filed in 2013), **"A Non-Invasive Imaging Method for Volumetric and Speed Measurement of Blood 'Train' in Visible Vessels"**

→ Keeratpal Singh, **Karuppiah, E.K** (Filed in 2013), **"System and methods for multi factor resource aggregation simulation model targeting distributed geographical location needs for public safety"**

→ Yaszrina Y., Ngo Chuan Hai, **Karuppiah, E.K** (Filed in 2013), **"Method and Apparatus for Parallel Moving Adaptive Window Filtering Edit Distance Computation"**

→ Shahirina. T, **Karuppiah, E.K** et. al (Filed in 2013), **"A System and Method for Detecting an Object"**

→ Mohana, **Karuppiah, E.K** et. al (Filed in 2013), "**Scalable Method and Apparatus for Parallel Computation Using Hybrid Heterogeneous Processor Capable of Dynamic Resource Configuration".**

→ Amril, **Karuppiah, E.K** et. al (Filed in 2013), "**Method & System for Computational Steering in a Virtualized Environment**"

→ Shahirina. T,Zulaika.K & **Karuppiah, E.K**(Filed in 2013),"**A Self-Learning Video Analytic System & Method Thereof**"

→ Chong PK, **Karuppiah, E.K** et. al(Filed in 2013),"**A Method & Apparatus for Accelerated SPARQL Query Processing**"

→ Lim BP, **Karuppiah, E.K** et. al (Filed in 2013),"**A System and Method for Virtual Machine Reservation for Delay Sensitive Service Applications**"

→ Shafiq, **Karuppiah, E.K** et. al(Filed in 2013),"**System & Method for Optimal Memory Management Between CPU and FPGA Units**"

→ Amril, **Karuppiah, E.K** et. al(Filed in 2012),"**System & Method for Virtual Peer to Virtual Peer in a Virtualized Environment**"

→ Mohamed Farid, Harjinthar S., & **Karuppiah, E.K** (Filed in 2012), **"System and Method for Motion-Matching and Stitching of Multiple Video Sources based on Designated Regions Of Interest"**

→ Soo SM, **Karuppiah, E.K** et. al (Filed in 2012), "**System for Improving Image Processing Goodput**"

→ Mohana, **Karuppiah, E.K** et. al (Filed in 2012), "**Load Balancing for Graphics Processing Units in An Image Processing System**"

→ **Karuppiah, E.K** (Filed in 2012), "**System and Method for Preemptive Address Conflict Resolution in Automatic Device Address Assignments**"

→ David Wong, **Karuppiah, E.K** & Hwang BH et. Al. (2010), **"Apparatus and Methods for CE Devices' Energy Conservation Based on Communication Needs/Control Device, Relay Method and Program Therefore"**, **WO/2012/111344**

→ David Wong, Lavinder Singh, Adrian Sunil, **Karuppiah, E.K** & Hwang BH, (written 2010), **"Apparatus and Method for Gateway Discovery Reflective of Communication Devices' Actual Network Topology/Communication Terminal and Cluster Observation Method"**, JP2011223533

→ **Karuppiah, E.K** et al. (2009), **Terminal and N-Tree Constructing Method** US20110002333

→ Lim BP & **Karuppiah, E.K** et. al., **Communication Terminal and Cluster Observation Method**, WO/2012/049788A1.

→ Lim BP & **Karuppiah, E.K** et. al., **Communication Channel Building Device and N-Tree Building Method**, WO/2009/153945A1, US20110064079

→ Lim BP & **Karuppiah, E.K** (written 2009), **"Apparatus and methods for terminal cluster formation in terminal relay type multi-point communication"**. **JP2012085115**

→ Jonathan Tan, Lim BP & **Karuppiah, E.K** (written 2009), **"Apparatus and Method for Network Latency Prediction Using Optimal Target Node Sampling"**. JP2012044522, US20120198060

→ Lee Ern Yu & **Karuppiah, E.K** (written 2009), **"Apparatus and Method for Prioritized and Optimized Dynamic Resource Allocation Mechanism for AV Path Construction/ Route Construction Device and Route Construction Method"**, JP2012085014, WO/2012/046358A1

→ **Karuppiah, E.K** et al. (written 2008), **"Localized Reactive Replication Function Delegation Mechanism for Fast Route Adaptation/Terminal Device and Packet Transmission Method"**. **Patent# JP2010166240 A, Patent# WO2010082281A1,** Filed **20090114** Published **20100729**

→ **Karuppiah, E.K**. (written 2008), **"Apparatus and Method for Decentralized Selective and Dynamic Application Layer Multicast based Audio Mixing/Multicast Communication Apparatus and Method for Receiving and Forwarding Data via a Network Among a Plurality of Nodes"**, US20100238925A1, WO2010106608 A1, EP2409456A1 Filed **20091223** Published **20100923**

→ Lim BP, **Karuppiah, E.K**, Tan PK, Miyake Y., (written 2007) **Media Path Selection for Distributed Media Service / Selection of Media Path to Distributed Media Service"**, Patent# JP2009081661A, Filed **20070926** Published **20090416**

→ **Karuppiah, E.K** et. al., (written 2007), **"An Apparatus and Method for Performing Fair Bandwidth Sharing with N-Tree using ALM_FRC Mechanism/Terminal and N-Tree Construction Method "** , Patent # JP2009213120A , #WO2009098748A1, Filed **20081201** Published **20090917**

→ Lim BP, **Karuppiah, E.K** et. al. (written 2007), **"Apparatus and Methods for Differentiated Fair Bandwidth Allocation on Source-Specific Network Path/ Communication Channel Building Device and N-Tree Building 20110305169 method"**, Patent# JP: 2007-177432, US20110305169, WO/2010/082281A1

→ Tanabe N., Miyake Y., **Karuppiah, E.K**, Tan PK, (written 2006), **"An Apparatus and Method for Real-time Multimedia Streaming with future multimedia stream requirement/Device and Method for Real-Time Multimedia Streaming having Requisite of Future Stream"**. Patent#JP2008306569 A, Filed **20070608** Published **20081218**

→ **Karuppiah, E.K**, Tan PK and Miyake Y., (written 2006), **"Negotiable and Resource Optimized Distributed Multimedia Services Scheduling/Scheduling of Negotiable and Optimumly Resource-Dispersed Multimedia Service", Patent# JP2009017289A,** Filed **20070705** Published **20090122**

→ Ooi CC, **Karuppiah, E.K**, Tan PK, Miyake Y., (written 2005) Method & Apparatus for Playing Video Data of High Bit Rate Format by a Player Capable of Playing Video Data of Low Bit Rate Format. **US Patent #US20100166387A1, Patent#WO2008029640A1,** EP#2061241A4, Filed **20070824** Published **20080313**

→ Lim BP, **Karuppiah, E.K**, Tan PK, Tanabe N., (written 2005) **Content Back-up Method & Device. Patent#** JP2008065765A. **JP2006245630A** Filed **20060911** Published **20080321**

→ **Karuppiah, E.K**, Tan PK and Tanabe N., (2005), **"A Method And System for Content Reliability By Content Aware Pairing at Home Heterogeneous Consumer Electronics Network Devices/Backup Method and Device of AV Content" Patent#**JP2008015739A. JP2006185398A Filed **20060705** Published **20080124**

→ **Karuppiah, E.K.** (written 2002). **Network Address Routing Using Multiple Routing Identifiers, US Patent #US7280752B2, #US20030161309 A1**

→ **Karuppiah, E.K.** (written 2003). **Anycast Addressing for Internet Protocol Version Six**, US Patent # [US7676595B2](#), [#US20050198367 A1](#), [#EP1700452A2](#) [WO2005067259 A2/A3](#)

## CONFERENCE & TECHNICAL SESSION PAPERS

→ **Ettikan K. Karuppiah** , *et al,* "Open Platform for Advanced Analytics Meeting Data Convergence Challenge", International Scientific-Practical Conference Smart Government: Science and Technology 2014

→ Amir Z., **Ettikan K. Karuppiah** , *et al, "Gravitational Search Algorithm using CUDA" Hong Kong, PDCAT 2014.*

→ Teoh Ee Na, **Ettikan K. Karuppiah,** et. al, *"Exploration of the Effectiveness of Expectation Maximization Algorithm for Suspicious Transaction Detection in Anti-Money Laundering", ICOS 2014*

→ Yong Keh Kok, Amirul N., **Ettikan K. Karuppiah,** "Multi Keyword Range Search in GPU and MIC", Kuala Lumpur, ICOS 2014

→ Yong Keh Kok, **Ettikan K. Karuppiah,** Chua Meng Wei, Simon See, "[Galactica: A GPU Parallelized Database Accelerator](#)", Beijing, AES 2014

→ Ong Peng Shen, Shahirina Mohd Tahir, **Ettikan K. Karuppiah**, Ooi Chee Pun, Chang Yoong Choo, "An FPGA-Based Hardware Implementation of Visual Based Fall Detection", TENSYMP 2014

→ Yong Keh Kok & **Ettikan K. Karuppiah**, "Galactica: Accelerated Query Processing", GTC2014, San Jose

→ Shahirina Mohd Tahir, Ong Peng Shen, Lee Chin Yang, **Ettikan K. Karuppiah**, "GPUs making Video Analytics Real Time", GTC2014, San Jose

→ Shahirina Mohd Tahir, Ong Peng Shen, Lee Chin Yang, **Ettikan K. Karuppiah**, "Implementation of Intrusion Detection System in CUDA for Real-Time Multi-Node Streaming", ICSPC 2013

→ Poh Kit Chong, Yaszrina M. Yassin, Chuan Hai Ngo, Amril Nazir, **Ettikan K. Karuppiah**, "Accelerating Data Cleansing for Malaysian Names Using Multi-core GPUs", IEEE Conf on Open System(ICOS), 4th IEEE International Conf, Malaysia,2013

→ WenMei Ong, Vishnu Monn Baskaran, Poh Kit Chong, **Ettikan K. Karuppiah**, "A Parallel Bloom Filter String Searching Algorithm on a Many-core processor*",* IEEE Conf on Open System (ICOS), 4th IEEE International Conf, Malaysia, 2013

→ Amirul Abdullah, Amril Nazir, Mohanavelu Senapan, Soo Saw Meng, **Ettikan K. Karuppiah**, "Fast Multi Keyword Range Search in GPGPU", IEEE Symposium on GPU Computing and Applications (GPUAPP13), Singapore, 2013

→ **Ettikan K. Karuppiah**, Yong Keh Kok, Keeratpal Singh*,* **"Middleware Framework for Programmable Multi-GPU based BigData Applications"**, IEEE Symposium on GPU Computing and Applications (GPUAPP13), Singapore, 2013

→ Yong Keh Kok, **Ettikan K. Karuppiah** "Hash Match on GPU", IEEE CONFERENCE ON OPEN SYSTEMS (ICOS), Sarawak, Kuching, 2013

→ Lim Su Jin, Lee Sze Wei, Simon Lau, **Ettikan K Karuppiah, "Link quality prediction for multimedia streaming based on available bandwidth and latency",** The 7th IEEE Workshop on Network Measurements, 2013, Australia

→ Lim Su Jin, Lim Boon Ping, Lee Sze Wei, Simon Lau, **Ettikan K Karuppiah**, Shahirina Mohd Tahir, **"Implementing stochastic gradient descent based on historical network distance for available bandwidth prediction"**, The 2nd International Conference on e-Technologies and Networks for Development (ICeND 2013), 2013, Malaysia

→ Soo SM, Mohana, **Ettikan K Karuppiah** et al, "**Value at Risk using Historical Method on GPU**", GPU Technology Conference, US, 2012

→ Peng Shen Ong, Yoong Choon Chang, Chee Pun Ooi, Wooi Haw Tan, **Ettikan K Karuppiah**, Shahirina Mohd Tahir, **"An FPGA Implementation of Intelligent Visual Based Fall Detection***"*, International Conference on Circuits, Devices and Systems (CCDS), 2013, Malaysia

→ Chin-Jou Chong, Wooi-Haw Tan, Yoong Choon Chang, **Ettikan K Karuppiah**, Shahirina Mohd Tahir, **"Real-time Visual Based Fall Detection System using Reconfigurable Hardware",** International Conference on Emerging Trends in Computer Science & Information Technology (ICETCSIT), 2013, Malaysia

→ Chong Poh Kit, Yong Keh Kok, **Ettikan K Karuppiah, "A Multi-GPU Framework for In-Memory Text Data Analytics",** International Workshop on Engineering Object-Oriented Parallel Software (EOOPS), Spain, 2013

→ Mohd Shafiq Alias, **Ettikan Kandasamy Karuppiah,** Chong Poh Kit, Shahirina Mohd Tahir, **"Real-time Multiple Video Streams Processing on PC-based FPGA platform",** IEEE International Conference on Computer Science and Network Technology (ICCSNT), 2012, China

→ Mohamad Amirul, Mohd Adib Omar, Nur'Aini, **Ettikan K Karuppiah**, Mohanavelu, Soo Saw Meng, Poh Kit Chong, **"Sorting Very Large Text Data in Multi GPUs",** 2012 IEEE International Conference on Control System, Computing and Engineering (ICCSCE), 2012, Malaysia

→ Alan Hong Wai Ding, Phooi Yee Lau, Soung-Yue Liew, Ea-Na Teoh, Amril Nazir, Poh Kit, **Ettikan K. Karuppiah "A Distributed Framework for Mining Financial Data",** 2012 International Workshop on Data Analytics and Mining in the Cloud, Taiwan, 2012

→ Soung-Yue Liew, Ea-Na Teoh, Phooi Yee Lau, Amril Nazir, Poh Kit Chong, **Ettikan K. Karuppiah** "**An Overlay Approach for Service Discovery in a Large-Scale Decentralized Cloud**", 2012 IEEE Asia Pacific Cloud Computing Congress (APCloudCC), 2012, China

→ Boon Ping Lim, Poh Kit Chong, **Ettikan Kandasamy Karuppiah**, Yaszrina Mohamad Yassin, Amril Nazir, Mohamed Farid Noor Batcha **"FARCREST: Euclidean Steiner Tree-based Cloud Service Latency Prediction System",** 10th Annual IEEE CCNC, 2013, Las Vegas

→ Boon Ping Lim, Poh Kit Chong, **Ettikan Kandasamy Karuppiah, "Network Latency Prediction Using High Accuracy Prediction Tree",** ICUIMC (IMCOM), 2013, Malaysia

→ Amril Nazir, Yaszrina Mohamad Yassin, **Ettikan K.K,** Chong Poh Kit "**Evaluation Of Virtual Machine Scalability On Distributed Multi/Many-Core Processors For Big Data Analytics**" IEEE Conf on Open System, 2012, KL, Malaysia

- Mohd Haziq Rahmad, Soo Saw Meng, **Ettikan K.K**, Hong Ong, **"Comparison of CPU and GPU Implementation of Computing Absolute Difference",** 2011 IEEE International Conference on Control System, Computing and Engineering (ICCSCE 2012), November 2011, Penang, Malaysia
- Thilmee Baduge, Lim Boon Ping, Kunio Akashi, Jason Soong, Kenichi Chinen, **Ettikan K.K**, Eiichi Muramoto, **"Functional and Performance Verification of Overlay Multicast Applications – A Product Level Approach",** IEEE Consumer Communication and Networking Conference, January 2010, Las Vegas
- Khoa T.P, Nam Thoai, E.Muramoto & **Karuppiah, E.K**. et. al, **"Treemap - The Fast Routing Convergence Method for Application Layer Multicast",** IEEE Consumer Communication and Networking Conference, January 2010, Las Vegas
- Lim Boon Ping, Ettikan KK, En Shu Lin, Eiichi Muramoto Pek Yew Tan, Khoa Phan, Thoai Nam, **"Bandwidth Fair Application Layer Multicast for Multi-party Video Conference Application",** IEEE Consumer Communication and Networking Conference, January 2009, Las Vegas
- David Wong Liang Tai, Chua Tze Hau, ICTF, Hwang Boon Hun & **Ettikan K.K., "Embedded Software Optimization Techniques on Low-Power DSP",** IEEE 3rd APESER (Asia-Pacific Embedded Systems Education and Research) Conference, December 2009, Singapore
- Jonathan Tan, Lim BP, Lin ES, Jason Soong, **Ettikan K.K.,** Thilmee Baduge & E. Muramoto, **"All Panasonic Technical Symposium - Design and Implementation of Dynamic Join/Leave Application Layer Multicasting on PeaksProII",** December 2009, Osaka, Japan
- Kelvin Choy Chuong Wen, Wong Sau Peng, Tan Su Wei, Norliza Mohamad Zaini, **Ettikan Kandasamy Karuppiah**, **"Organization of Devices Information in Ontology Representation to Support Service Composition",** 3rd International Symposium on Information Technology 2008 (ITSim2008), IEEE, Kuala Lumpur, 2008
- Wong Sau Peng, Kelvin Choy Chuong Wen, Tan Su Wei, Norliza Mohd. Zaini, **Ettikan Kandasamy Karuppiah**, **"Service Continuity for Audio Visual Service"** ISCE (International Symposium of Consumer Electronics) IEEE, 2008, Portugal
- B.P. Lim, Ettikan K.K. Lin ES, Tan PY, Muramoto E, **"All Matshushita Technical Symposium - Application of the ALM Technology on PeaksPro II ",** December 2008, Osaka, Japan
- Khong YC, Ng Kwan Ti, Lee Ern Yu & **Ettikan K.K., "All Panasonic Technical Symposium - Application Layer Multicast based Decentralized MCU Audio Conference",** December 2008, Osaka, Japan
- B.P. Lim, Yap KH, Ettikan K.K. Lin ES, Tan PY, Muramoto E, **"All Matshushita Technical Symposium Application Layer Multicast Based Video Conferencing",** December 2007, Osaka, Japan
- Nguyen Due Chinh, **Ettikan K.K.** & Lam Yoke Khei **"Efficient Development Methodology for Multithreaded Network Application"** Research and Development, 2007. SCOReD 2007. 5th Student Conference
- **Ettikan Kandasamy Karuppiah**, Lim Boon Ping and Tan Pek Yew, **"Effect of AV Traffic on UPnP Advertisements in a Home Network Environment",** 2006 IEEE Conference on Network, Networking - Challenges and Frontiers November 13-15'06, Singapore
- B. P. Lim, **Ettikan K. K.,** Y. K. Lam, B. P. Ang, **"Performance Tests on Distributed Real-Time and Embedded Middleware",** in Proceedings of MMU International Symposium on Information and Communication Technologies, Petaling Jaya, Malaysia
- B.P. Lim, **Ettikan K. K,** Tan PY, Miyake Y. Tanabe N., **"All Matshushita Technical Symposium - AV Content Reliability in Home Network",** December, Osaka, Japan. (Best Presentation Award)
- **Ettikan Kandasamy Karuppiah,** Ooi Chia Ching, Tan Pek Yew, **"All Matshushita Technical Symposium - On Demand AV Format Conversion and Control Protocol",** December, Osaka, Japan
- **Ettikan Kandasamy Karuppiah**, Ooi Chia Ching and Tan Pek Yew, **"Challenges for Home Network in Consumer Electronic Perspective",** in Proceedings of MMU International Symposium on Information and Communication Technologies, Petaling Jaya, Malaysia
- **Karuppiah, E. K.** (2004) Integrated Global IPv6 Unicast and Anycast Address Lookup with Network Processor, in 3rd Design and Development Forum, Intel Penang, Malaysia
- **Karuppiah, E. K.** & Abdullah, R. (2003) Network Packet Processing with Network Processors, in Proceedings of the International Conference on Robotics, Vision, Information and Signal Processing, Penang, Malaysia, p.280-285
- **Karuppiah, E. K.** & Abdullah, R. (2003). Fault Tolerant IPv6 Anycasting for Service Locating, in Proceedings of MMU International Symposium on Information and Communication Technologies, Petaling Jaya, Malaysia, p.13-16
- **Karuppiah, E. K.,** & Abdullah R. (2003). Global IPv6 Anycast Address Lookup with NP, in Proceedings of 9th Asia-Pacific Conference on Communications, APCC 2003, Penang, Malaysia, p.1106-1110
- **Karuppiah, E.K.,** Ponnusamy, V., & Abdullah R. (2003). Anycast Group Membership Management Protocol, in Proceedings of 9th Asia-Pacific Conference on Communications, APCC 2003, Penang, Malaysia, p.1052-1056
- **Karuppiah, E.K.,** Narayanan, T., & Abdullah R. (2003). Semi-Dynamic Routing Protocols for Anycast Packet Forwarding, in Proceedings of 9th Asia-Pacific Conf on Communications, APCC 2003, Penang, Malaysia, p.978-982
- **Karuppiah, E.K.,** Chan, P.S., & Abdullah R. (2003). Dynamic Routing Protocols for Anycast Packet Forwarding, in Proceedings of 9th Asia-Pacific Conference on Communications, APCC 2003, Penang, Malaysia, p.66-70
- **Karuppiah, E.K.,** Bassam, A.K., & Abdullah R. (2003). Efficient Partition Based IPv6 Lookup Algorithm for Packet Forwarding, in Proceedings of 9th Asia-Pacific Conf on Communications, APCC 2003, Penang, Malaysia, p.238-242
- **Karuppiah, E.K.,** Balapumi, R. & Abdullah R. (2003). IPv6 Anycast Address Lookup Using Trie-Based Algorithm, in Proceedings of 9th Asia-Pacific Conference on Communications, APCC 2003, Penang, Malaysia, p.1082-1086
- **Karuppiah, E.K.** & Abdullah, R. (2002). SLINA: Fault Tolerant and Load Balanced Global IPv6 Anycasting for Service Locating, in Proceedings of Deploying IPv6 Networks, Paris, France, p.130-140
- **Karuppiah, E.K.** & Abdullah R. (2002). An Analysis Of Anycast Architecture, IASTED International Conference Communications and Computer Networks (CCN 2002), Cambridge, USA, p.305-310. Calgary: ACTA Press

- **Karuppiah, E.K.** & Abdullrah, R. (2002). High Speed Packet Processing Challenges for Network Processors, in Proceedings of MMU International conf on Information & Communication Technologies, Petaling Jaya, Malaysia, p.1-4
- Boey Kean Hong, Lim Lee Booi, Samuel Mah, Kenny Puah, **Ettikan K.** and Niam Ming Han (2001). 3G/Node B Protocol Implementation on Intel® IXP1200 Network Processor, MMU International Symposium on Information and Communication Technologies, Petaling Jaya, Malaysia, 16th – 18th October 2001
- **K.Ettikan,** Gopinath Rao Sinniah, Arul Paniandi, Lim Siew Ching and Phang Tze Shu (2002). Online APAN IPv6 Network Monitoring, APAN Conference 2001 Proceedings, Penang, Malaysia, Aug., 2002
- **Karuppiah, E.K.**, Tong H. T. & Seow, C.Y. (2002). Transition Mechanisms Between IPv4 & IPv6 and Deciding Your Choice, in Proceedings of Asia Pacific Advanced Network Conference, Phuket, Thailand, p.87-91
- Host Name Resolution Protocol (HNRP) for IPv6 Addresses - A Study on Existing Implementation and the Need for a New Protocol Gopinath Rao, Sinniah Ettikan Kandasamy Karuppiah and Sureswaran Ramadass 5th IEEE Malaysia International Conference on Communications, 22nd – 24th October 2001
- iDNS Based Optimal Link Selection, MMU International Symposium on Information and Communication Technologies 2001, Malaysia, 16th – 18th October 2001.(co-author)
- Host Name Resolution Protocol For IPv6 Addresses, APAN Conf 2001 Proceedings, Penang, Malaysia, Aug. 20-22, 2001
- The Effect of IPv4 to IPv6 Transition and the iDNS on the VoIP Quality of Service Over Next Generation IP-Based Networks, APAN Conference 2001 Proceedings, Penang, Malaysia, Aug. 20-22, 2001
- An Analysis of Anycast Architecture And Transport Layer Problems, Asia Pacific Regional Internet Conference on Operational Technologies, 26 Feb. - 2 March 2001, Kuala Lumpur, Malaysia
- Practical issues in Porting IPv4 codes to IPv6, Asia Pacific Regional Internet Conference on Operational Technologies, 26 Feb. - 2 March 2001, Kuala Lumpur, Malaysia
- **Ettikan KK** et.a.l, **"Design and Implementation of Multihomed IPv6 Testbed Network for Research Community: The Malaysian IPv6 NOC Experience",** APAN Conference 2000 Proceedings, Beijing, China, Aug. 22-25, 2000
- **Ettikan KK** et.a.l, **"IPv6 Network Set-up and Characteristics in APAN",** APAN Conference 2000 Proceedings, Beijing, China, Aug. 22-25, 2000
- **Ettikan KK** et.a.l, **"IPv6 Performance Analysis on FreeBSD Workstations using simple Applications",** 6th Asian Computing Sciences Conference, Penang, Malaysia, November 2000, Proceedings. Springer Verlag
- **Ettikan KK** et.a.l, **"IPv6 Dual Stack Transition Technique Performance Analysis: KAME on FreeBSD as the Case",** Proceedings, MMU International Conf on Information & Communication Technologies 2000, 5-6th Oct.2000, Malaysia
- **Ettikan KK** et. a.l, **"Application Performance Analysis in Transition Mechanism from IPv4 to IPv6",** Proceedings IWS2000, Tsukuba, Japan, Feb. 15-17, 2000
- **Ettikan KK** et. a.l Migration Issues of Multimedia Conferencing System from to IPv4 to IPv6 Aug. 1998, Proceedings IWS2000, Tsukuba, Japan, Feb. 15-17,2000
- A Collective Communication Performance Model for PVM Programs on TCP/IP Workstation/PC Clusters, Proceedings SEACOMM '98, Penang, Malaysia, Aug. 12-14, 1998

### BOOK CHAPTERS

- **IPv6 Performance Analysis on FreeBSD Workstations using simple Applications** (Book Title: **Advances in Computing Science** — ASIAN 2000, Lecture Notes in Computer Science, 2000, Volume 1961/2000, 571-655.] Ettikan et. al; Springer Verlag Publications
- **Overlay Multimedia Streaming Service for Consumer Electronics Devices** (Book Title: **Advances in Next Generation Services and Service Architectures**; Ettikan et.al (Editors. A. Prasad, J. Buford, V. Gurbani), River Publications, USA, April 2011
- Amirul Abdullah, Amril Nazir, Mohanavelu Senapan, Soo Saw Meng, **Ettikan K. Karuppiah,** "Fast Multi Keyword Range Search in GPGPU", IEEE Symposium on GPU Computing and Applications (GPUAPP13), Singapore, 2013.
- **Ettikan K. Karuppiah**, Yong Keh Kok, Keeratpal Singh, "Middleware Framework for Programmable Multi-GPU based BigData Applications", IEEE Symposium on GPU Computing and Applications (GPUAPP13), Singapore, 2013

### JOURNALS

- **Karuppiah, E.K.** & Abdullah, R. (2003) Survey of Network Processors (NP), **Malaysian Journal of Computer Sci,2003**
- **Karuppiah, E.K.** & Abdullah, R. (2004). Integrated Global IPv6 Unicast and Anycast Address Lookup with Network Processor, **Journal of Internet Technology, April 2004**
- **Karuppiah, E.K.** & Abdullah, R. (2004). Multibit Trie-based Integrated IPv6 Address Lookup Using Network Processor. **IEEE Transactions (Not published due to NDA restriction)**
- **Karuppiah, E.K**. & Abdullah, R. (2004). **Integrated Load Balanced Anycast and Unicast Packet Routing for SLINA. IEEE Transactions (Not published due to NDA restriction)**

### IETF INTERNET DRAFTS

- Khoa T.P, Nam Thoai, E. Muramoto & **Karuppiah, E.K.** (2009). **Xcast6 Treemap: An extension of Xcast6**, Internet Draft. <draft-khoa-treemap-xcast6-extension-00.txt>
- Lim B.P. & **Karuppiah, E.K.** (2008). **ALM API for Topology Management and Network Layer Transparent Multimedia Transport**, Internet Draft. <draft-pkll-irtf-sam-alm-api-00>
- S. Gopinath Rao & **Karuppiah, E.K.** (2003). **Host Name Resolution Protocol (HNRP) for IPv6 nodes**, Internet Draft (Expired). <draft-gopinath-host-name-resolution-protocol-ipv6-00.txt>

→ **IPv6 Hostname auto-registration Procedure (INTERNET-DRAFT** draft-gopinath-ipv6-hostname-auto-reg-00.txt**)** Authors (Gopinath Rao, USM, Malaysia and K. Ettikan/ Intel ASG Penang, Malaysia) Expired

→ Hagino, J.I. & **Karuppiah, E.K.** (2002). **An Analysis of IPv6 Anycast**, Internet Draft. http://www.ietf.org/internet-drafts/draft-ietf-ipngwg-ipv6-anycast-analysis-02.txt

→ **Karuppiah, E.K.** (2002). **Fault Tolerance and Load Balance Services using IPv6 Anycast**, Internet-Draft. http://www.ietf.org/internet-drafts/draft-ettikan-ipngwg-fault-tolarance-anycast-00.txt

## PROFESSIONAL MEMBERSHIPS

→ Member of IEEE & COM-SOC
→ Member of ITU-R Malaysia Chapter (Jun'99 – May'00)
→ Head of APAN-MY-IPv6 Working Group (http://www.my.apan.net/ipv6/index.html) (2001 - 03)
→ Head of APAN-IPv6 Working Group (http://apan.net) (2002)
→ PMI Member