Further More Investigations on Evolution of Approaches and Methodologies for Securing Computational Grids

R.S.Venkatesh[1], P.K.Reejeesh[2], Prof.S.Balamurugan[3], S.Charanyaa[4]

Department of IT, Kalaignar Karunanidhi Institute of Technology, Coimbatore, TamilNadu, India[1,2,3]

Senior Software Engineer Mainframe Technologies Former, Larsen & Tubro (L&T) Infotech, Chennai, TamilNadu,

India[4]

ABSTRACT: This paper reviews methods developed for anonymizing data from 2004 to 2006 . Publishing microdata such as census or patient data for extensive research and other purposes is an important problem area being focused by government agencies and other social associations. The traditional approach identified through literature survey reveals that the approach of eliminating uniquely identifying fields such as social security number from microdata, still results in disclosure of sensitive data, k-anonymization optimization algorithm ,seems to be promising and powerful in certain cases ,still carrying the restrictions that optimized k-anonymity are NP-hard, thereby leading to severe computational challenges. k-anonimity faces the problem of homogeneity attack and background knowledge attack . The notion of l-diversity proposed in the literature to address this issue also poses a number of constraints , as it proved to be inefficient to prevent attribute disclosure (skewness attack and similarity attack), l-diversity is difficult to achieve and may not provide sufficient privacy protection against sensitive attribute across equivalence class can substantially improve the privacy as against information disclosure limitation techniques such as sampling cell suppression rounding and data swapping and pertubertation. This paper aims to discuss efficient anonymization approach that requires partitioning of microdata equivalence classes and by minimizing closeness by kernel smoothing and determining ether move distances by controlling the distribution pattern of sensitive attribute in a microdata and also maintaining diversity.

KEYWORDS: Data Anonymization, Microdata, k-anonymity, Identity Disclosure, Attribute Disclosure, Diversity

I. INTRODUCTION

Need for publishing sensitive data to public has grown extravagantly during recent years. Though publishing demands its need there is a restriction that published social network data should not disclose private information of individuals. Hence protecting privacy of individuals and ensuring utility of social networ data as well becomes a challenging and interesting research topic. Considering a graphical model [35] where the vertex indicates a sensitive label algorithms could be developed to publish the non-tabular data without compromising privacy of individuals. Though the data is represented in graphical model after KDLD sequence generation [35] the data is susceptible to several attacks such as homogeneity attack, background knowledge attack, similarity attacks and many more. In this paper we have made an investigation on the attacks and possible solutions proposed in literature and efficiency of the same.

II. VM PLANTS: PROVIDING AND MANAGING VIRTUAL MACHINE EXECUTION ENVIRONMENTS FOR GRID COMPUTING – 2004

VM - Virtual Machine plants provide a reliable and flexible environment for problem solving in a grid computing systems. Service oriented architecture is employed to represent VM plant middle for providing VM customization and efficient cloning.

The main objective of this architecture is to provide flexibility, fast VM instantiation, scalability, resilience to failures and interoperability. Flexibility is obtained by applying the cloning process onto various VM technologies. Interoperability is achieved by using efficient cloning mechanisms.

Every users and resource providers select a unique service for distributed computing in VM plant architecture. A "classic" Virtual Machine has the ability to run on different OS. It provides isolation and security mechanisms; supports customization and encapsulation; provide support for legacy applications.

The VM plant architecture works on the basis of services provided within web and grid frame works. The client communicates with the service through VMshop. The service then makes use of standard mechanisms to create a new virtual machine. The client cannot directly access the VM plants. The new instantiated VM's are used for accessing VM plants. The VMshop can provide secure access to resources; configuring network; gives resources access information; supports query handling.

VM plant uses "Production Process Planner" (PPP) for the process of creating new Virtual Machine. The PPP after receiving a request, selects an exact VM from the VM warehouse. VM information system gives information about currently used machines. VM monitor is used to update the VM information system.

Once the exact Virtual Machine is selected, it has to satisfy the following tests.
  i.   Subset test
 ii.   Prefix test
iii.   Partial test

After this the Virtual Machine is cloned using VM Production Line. Then the VM should parse on several configuration processes. After cloning and configuration processes are completed, the virtual workspace is combined with n IP address. The cloning and configuration techniques are used for describing the feasibility of the VM. VM Plants architecture is efficient for instantiation of VM clones and flexible for producing new services.

III. SECURITY AND TRUST ISSUES IN SEMANTIC GRIDS – 2005

A large scale distributed computing system such as "Grid computing" should have the ability to allow sharing of resources over a "Virtual Organization" (VO). Recently, the Grid Security Infrastructure (GSI) possesses a trust relationship between Grid Computers. But still there are no suitable methods for authentication and authorization. Even they do not have the ability to select a "trustworthy" user.

"Access Control" is enhanced using Property based authorization mechanisms, automatic certification, bidirectional & iterative security negotiations and policy based authorization. The "Trust Management" includes two basic approaches.

  i.   Policy - based trust management.
 ii.   Reputation – based trust management.

The Policy - based trust management reveals certain rules, standards and policies to identify whether a user is "trustworthy" or "untrustworthy". The Policy - based trust management is responsible for taking access control decisions. The system which posses Policy - based trust makes use of semantics for making decisions.

The Reputation – based trust management concentrates on public - key certificates, P2P system, mobile ad – hoc network and semantic web.

A user to access a resource must satisfy some of the following security mechanisms.
  i.   Proxy certificates signed by a Certification Authority.
 ii.   Identity based authorization.
iii.   Simple authentication/authorization.
iv.   Manual credential fetching.

A term called "Community" is introduced in which all the users can communicate with each other efficiently. The introduction of these communities will decrease the cost of interaction. Communities can be formed either implicitly or explicitly. There are four phases in which a trust is achieved in virtual organization.

i.   Service provider identification – determines VO objectives.
ii.   Formation and service provider invitation – compute community trust and provision resources.
iii.   Operation and service provider interaction – trust based service invocation.
iv.   Dissolution – terminates the resources.

In Grid Computing, the security and trust issues in a Virtual Organization is computed using policy – based and reputation – based trust management approaches. The basic idea of this paper is to point out the restrictions of resources and access control protection mechanisms seen in Grid Computing.

IV. MOVING TO CLOUD COMPUTING STEP – BY – STEP – 2006

Cloud computing is the extension of SOA which provides resources such as Storage – as – service, Data – as – a – service and platform – as – a – service. The logic is to identify which cloud service can be adopted for the exiting SOA.

A cloud is organized with the help of following services.
   i.   Testing – as – a – service
   ii.   Management – as – a – service
   iii.   Application – as – a – service
   iv.   Process – as – a – service
   v.   Information – as – a – service
   vi.   Database – as – a – service
   vii.   Storage – as – a – service
   viii. Infrastructure – as – a – service
   ix.   Platform – as – a – service
   x.   Integration – as – a – service
   xi.   Security – as – a – service

Security and performance are observed as barriers in cloud. However, cloud does not support all the computing resources. The cloud computing is suitable for cases where
      i.   Applications, processes and data are independent.
      ii.   New applications are used.
      iii.   Web – based platform is used.
      iv.   Core internal enterprise architecture should be good.

Cloud computing is not suitable when
      i.   Processes, applications and data are coupled.
      ii.   High security is needed.
      iii.   Application is legacy.
      iv.   The points of integration are not well defined.

The cloud architecture describes about the
      i.   Business drivers.
      ii.   Information under management.
      iii.   Existing services under management.
      iv.   Core business processes.

There are several steps involved in the process of creating cloud. They are
   i.   Access the business.
   ii.   Access the culture.
   iii.   Access the value.
   iv.   Understand your services, processes, data and cloud resources.

v.   Identify candidate data, services and processes.
vi.   Create a governance strategy and security strategy.
vii. Bind candidate services to data and processes.
viii. Relocate services, processes and information.
ix.   Implement security, governance and operations.

V. CONCLUSION AND FUTURE WORK

Various methods developed for anonymizing data from 2004 to 2006 is discussed. Publishing microdata such as census or patient data for extensive research and other purposes is an important problem area being focused by government agencies and other social associations. The traditional approach identified through literature survey reveals that the approach of eliminating uniquely identifying fields such as social security number from microdata, still results in disclosure of sensitive data, k-anonymization optimization algorithm ,seems to be promising and powerful in certain cases ,still carrying the restrictions that optimized k-anonymity are NP-hard, thereby leading to severe computational challenges. k-anonimity faces the problem of homogeneity attack and background knowledge attack . The notion of l-diversity proposed in the literature to address this issue also poses a number of constraints , as it proved to be inefficient to prevent attribute disclosure (skewness attack and similarity attack), l-diversity is difficult to achieve and may not provide sufficient privacy protection against sensitive attribute across equivalence class can substantially improve the privacy as against information disclosure limitation techniques such as sampling cell suppression rounding and data swapping and pertubertation. Evolution of Data Anonymization Techniques and Data Disclosure Prevention Techniques are discussed in detail. The application of Data Anonymization Techniques for several spectrum of data such as trajectory data are depicted. This survey would promote a lot of research directions in the area of database anonymization.

REFERENCES

1. Pieter Van Gorp and Marco Comuzzi "Lifelong Personal Health Data and Application Software via Virtual Machines in the Cloud" IEEE Journal of Biomedical and Healthcare Informatics, Vol. 18, No. 1, Jan 2014
2. Sape J. Mullender, Andrew S.Tanenbaum, "Protection and Resource Control in Distributed Operating Systems", 1984.
3. Paul J.Levine, "Computer security system for a time shared computer accessed over telephone lines US 4531023 A, 1985
4. John G.Campbell,Carl F.Schoeneberger,"Remote hub television and security systems", US 4574305 A, 1986.
5. A Pfitzmann, "Networks without user observability", Computers & Security 6/2 (1987) 158-166, 1987
6. TF Lunt, " Automated audit trail analysis and intrusion detection: A survey" In Proceedings of 11th National Conference on Security, 1988
7. Lichtenstein Eric Stefan 1984 a, Computer control medical care system US4464172.
8. ARalph R.Frerichs, Dr. PH.Robert A. Miller 1985, Introduction of a Microcomputer for Health Research in a Developing Country.
9. Steven P.Brown 1986, Combinational Medical Data, Identification and health Insurance card.
10. Peter P. Gombrich, Richard J. Beard, Richard A. Griffee, Thomas R. Wilson, Ronald E. Zook, Max S. Hendrickson 1989,A Patient care system,US4835372 A.
11. Paavo T. Kousa, " VOICE NETWORK SECURITY SYSTEM" US 4797672 A, 1989
12. D Graft, " Methodology for network security design", IEEE Transactions on Computers, 1990
13. Heberlein, "Network Security MONITOR, 1991
14. John R. Corbin, " Apparatus and method for licensing software on a network of computers US 5138712 A", 1992
15. S Gordon, "Computer Network Abuse", 1993.
16. Neil Bodick, Andre L. Marquis1990, Interactive system and method for creating and editing a knowledge base for use as a computerized aid to the cognitive process of diagnosis,US4945476 A.
17. Angela M. Garcia, Dr.,Boca Raton 1991 a, System and Method for scheduling and Reporting Patient related services including prioritizing services,US5974389 A.
18. Clark Melanie Ann, John Finley, Huska; Michael Edward, Kabel; Geoffrey Harold, Graham, Marc Merrill 1991 b,System and Method for scheduling and Reporting Patient Related services.
19. Robert W. Kukla1992,Patient care communication system, US5101476 A
20. Mark C. Sorensen 1993, Computer aided medical diagnostic method and apparatus, US5255187 A.
21. Edward J. Whalen, San Ramon, Olive Ave Piedmont 1994,Computerized file maintenance System for managing medical records including narrative patent documents reports.
22. Desmond D. Cummings 1994b,All care health management system, US5301105 A.
23. Woodrow B. Kesler Rex K Kesslerin 1994 c,Medical data draft for tracking and evaluating medical treatment.

24. Joseph P. Tallman, Elizabeth M. Snowden, Barry W. Wolcott 1995, Medical network management system and process, US5471382 A.
25. Peter S. Stutman, J. Mark Miller 1996,Medical alert distribution system with selective filtering of medical information
26. Edwin C. Iliff1997,computerized medical diagnostic system including re-enter function and sensitivity factors, US5594638 A.
27. Timothy Joseph Graettinger, Paul Alton DuBose 1998, Computer-based neural network system and method for medical diagnosis and interpretation. US5839438 A.
28. Melanie Ann Clark, John Finley Gold, Michael Edward Huska, Geoffrey Harold Kabel, Marc Merrill Graham1999,Medical record management system and process with improved workflow features, US5974389 A.
29. Richard S. Surwit, Lyle M. Allen, III, Sandra E. Cummings 2000 a, Systems, methods and computer program products for monitoring, diagnosing and treating medical conditions of remotely located patients, US6024699 A.
30. Jeffrey J. Clawson 2000 b, Method and system for giving remote emergency medical counsel to choking patients, US6010451 A.
31. Marc Edward Chicorel 2001, Computer keyboard-generated medical progress notes via a coded diagnosis-based language, US6192345 B1.
32. Charlyn Jordan2002, Health analysis and forecast of abnormal conditions.
33. Jeffrey J. Clawson2003, Method and system for an improved entry process of an emergency medical dispatch system
34. PekkaRuotsalainen 2004, A cross-platform model for secure Electronic Health Record communication.
35. Roger J. Quy2005, Method and apparatus for health and disease management combining patient data monitoring with wireless internet connectivity, US6936007 B2.
36. Avner Amir, Avner Man2006 a, System and method for administration of on-line healthcare, WO2006006176 A2.
37. Paul C.Tang, Joan S. Ash, David W. Bates, J. Marc overhage and Daniel Z.Sands 2006 b, Personal Health Records: Definitions, Benefits, and Strategies for Overcoming Barriers to Adoption.
38. Christopher Alban, KhiangSeow2007, Clinical documentation system for use by multiple caregivers.
39. Brian A. Rosenfeld, Michael Breslow2008, System and method for accounting and billing patients in a hospital environment.
40. Jacquelyn Suzanne Hunt, Joseph Siemienczuk 2009, Process and system for enhancing medical patient care.
41. Richard J. Schuman2010, Health care computer system, US7831447 B2.
42. Kanagaraj, G.Sumathi, A.C.2011,Proposal of an open-source Cloud computing system for exchanging medical images of a Hospital Information System
43. AvulaTejaswi, NelaManoj Kumar, GudapatiRadhika, SreenivasVelagapudi 2012 a, Efficient Use of Cloud Computing in Medical Science.
44. J. Vidhyalakshmi, J. Prassanna 2012 b, Providing a trustable healthcare cloud using an enhanced accountability framework.
45. Carmelo Pino and Roberto Di Salvo 2013, A Survey of Cloud Computing Architecture and Applications in Health.
46. K.S. Aswathy, G. Venifa Mini 2014 a, Secure Alternate Viable Technique of Securely Sharing the Personal Health Records in Cloud.
47. Abhishek Kumar Gupta, Kulvinder Singh Mann 2014 sharing of Medical Information on Cloud Platform.
48. D. C. Kaelber, A. K. Jha, D. Johnston, B. Middleton, and D. W. Bates, "Viewpoint paper: research agenda for personal health records (PHRs),"J. Amer. Med. Inform. Assoc., vol. 15, no. 6, pp. 729–736, 2008.
49. J. Ahima, "Defining the personal health record," vol. 76, no. 6, pp. 24–25, Jun. 2005.
50. W. Currie and M. Guah. "Conflicting institutional logics: a national programme for it in the organizational field of healthcare:, Journal of Information Technology, 22:235–247,2007.
51. M. Gysels, A. Richardson, and J. I. Higginson "Does the patient-held record improve continuity and related outcomes in cancer care: a systematic review", Health Expectations,10(1):75–91, Mar. 2007.
52. International Organization for Standardization. ISO TR20514:2005 Health Informatics - Electronic Health Record Definition, Scope and Context Standard. International Organization for Standardization (ISO). Geneva, Switzerland,2005.
53. B.Powmeya , Nikita Mary Ablett ,V.Mohanapriya,S.Balamurugan,"An Object Oriented approach to Model the secure Health care Database systems,"In proceedings of International conference on computer , communication & signal processing(IC^{3}SP)in association with IETE students forum and the society of digital information and wireless communication,SDIWC,2011,pp.2-3
54. Balamurugan Shanmugam, Visalakshi Palaniswami, "Modified Partitioning Algorithm for Privacy Preservation in Microdata Publishing with Full Functional Dependencies", Australian Journal of Basic and Applied Sciences, 7(8): pp.316-323, July 2013
55. Balamurugan Shanmugam, Visalakshi Palaniswami, R.Santhya, R.S.Venkatesh "Strategies for Privacy Preserving Publishing of Functionally Dependent Sensitive Data: A State-of-the-Art-Survey", Australian Journal of Basic and Applied Sciences, 8(15) September 2014.
56. S.Balamurugan, P.Visalakshi, V.M.Prabhakaran, S.Chranyaa, S.Sankaranarayanan, "Strategies for Solving the NP-Hard Workflow Scheduling Problems in Cloud Computing Environments", Australian Journal of Basic and Applied Sciences, 8(15) October 2014.
57. Charanyaa, S., et. al., , A Survey on Attack Prevention and Handling Strategies in Graph Based Data Anonymization. International Journal of Advanced Research in Computer and Communication Engineering, 2(10): 5722-5728, 2013.
58. Charanyaa, S., et. al., Certain Investigations on Approaches forProtecting Graph Privacy in Data Anonymization. International Journal of Advanced Research in Computer and Communication Engineering, 1(8): 5722-5728, 2013.
59. Charanyaa, S., et. al., Proposing a Novel Synergized K-Degree L-Diversity T-Closeness Model for Graph Based Data Anonymization. International Journal of Innovative Research in Computer and Communication Engineering, 2(3): 3554-3561, 2014.
60. Charanyaa, S., et. al., , Strategies for Knowledge Based Attack Detection in Graphical Data Anonymization. International Journal of Advanced Research in Computer and Communication Engineering, 3(2): 5722-5728, 2014.
61. Charanyaa, S., et. al., Term Frequency Based Sequence Generation Algorithm for Graph Based Data Anonymization International Journal of Innovative Research in Computer and Communication Engineering, 2(2): 3033-3040, 2014.
62. V.M.Prabhakaran, Prof.S.Balamurugan, S.Charanyaa," Certain Investigations on Strategies for Protecting Medical Data in Cloud", International Journal of Innovative Research in Computer and Communication Engineering Vol 2, Issue 10, October 2014
63. V.M.Prabhakaran, Prof.S.Balamurugan, S.Charanyaa," Investigations on Remote Virtual Machine to Secure Lifetime PHR in Cloud ", International Journal of Innovative Research in Computer and Communication Engineering Vol 2, Issue 10, October 2014
64. V.M.Prabhakaran, Prof.S.Balamurugan, S.Charanyaa," Privacy Preserving Personal Health Care Data in Cloud" , International Advanced Research Journal in Science, Engineering and Technology Vol 1, Issue 2, October 2014

65. P.Andrew, J.Anish Kumar, R.Santhya, Prof.S.Balamurugan, S.Charanyaa, "Investigations on Evolution of Strategies to Preserve Privacy of Moving Data Objects" International Journal of Innovative Research in Computer and Communication Engineering, 2(2): 3033-3040, 2014.
66. P.Andrew, J.Anish Kumar, R.Santhya, Prof.S.Balamurugan, S.Charanyaa, " Certain Investigations on Securing Moving Data Objects" International Journal of Innovative Research in Computer and Communication Engineering, 2(2): 3033-3040, 2014.
67. P.Andrew, J.Anish Kumar, R.Santhya, Prof.S.Balamurugan, S.Charanyaa, " Survey on Approaches Developed for Preserving Privacy of Data Objects" International Advanced Research Journal in Science, Engineering and Technology Vol 1, Issue 2, October 2014
68. S.Jeevitha, R.Santhya, Prof.S.Balamurugan, S.Charanyaa, " Privacy Preserving Personal Health Care Data in Cloud" International Advanced Research Journal in Science, Engineering and Technology Vol 1, Issue 2, October 2014.
69. K.Deepika, P.Andrew, R.Santhya, S.Balamurugan, S.Charanyaa, "Investigations on Methods Evolved for Protecting Sensitive Data", International Advanced Research Journal in Science, Engineering and Technology Vol 1, Issue 4, Decermber 2014.
70. K.Deepika, P.Andrew, R.Santhya, S.Balamurugan, S.Charanyaa, "A Survey on Approaches Developed for Data Anonymization", International Advanced Research Journal in Science, Engineering and Technology Vol 1, Issue 4, Decermber 2014.
71. S.Balamurugan, S.Charanyaa, "Principles of Social Network Data Security" LAP Verlag, Germany, ISBN: 978-3-659-61207-7, 2014
72. S.Balamurugan, S.Charanyaa, "Principles of Scheduling in Cloud Computing" Scholars' Press, Germany,, ISBN: 978-3-639-66950-3, 2014
73. S.Balamurugan, S.Charanyaa, "Principles of Database Security" Scholars' Press, Germany, ISBN: 978-3-639-76030-9, 2014

APPENDIX

S.no	YEAR	AUTHORS	TITLE
1	1984	Sape .MULLENDER and Andrew S TANENBAUM	PROTECTION AND RESOURCE CONTROL IN DISTRIBUTED OPERATING SYSTEMS
2	1985	Paul j.Levine	COMPUTER SECURITY SYSTEM FOR TIME SHARED COMPUTER ACCESSED OVER TELEPHONE LINES
3	1986	Norman Hardy	COMPUTER SYSTEM SECURITY
4	1987	Andreas Pfitzmann, Michael Waidner	NETWORKS WITHOUT USER OBSERVABILITY
5	1988	Chris J. Mitchell	KEY STORAGE IN SECURED NETWORK
6	1989	Fred C. Piper	VOICE NETWORK SECURITY SYSTEM
7	1990	Donald Graji Mohnish Pabrai Uday Pahrai	METHODOLOGY FOR NETWORK SECURITY DESIGN
8	1991	L. Todd Heberlein	NETWORK SECURITY MONITOR
9	1992	John R. Corbin	APPARATUS AND METHOD FOR LICENSING SOFTWARE ON A NETWORK OF COMPUTERS
10	1993	Michael P.	COMPUTER NETWORK ABUSE
11	1994	Bruce E. McNair	SYSTEM AND METHOD FOR GRANTING ACCESS TO A RESOURCE
12	1995	Scott D. Hammersley, Arthur D. Smet, Peter M. Wottreng	METHOD AND APPARATUS FOR INTRAPROCESS LOCKING OF A SHARED RESOURCE IN A COMPUTER SYSTEM
13	1995	Daniel B. Clifton	RESOURCE ACCESS SECURITY SYSTEM FOR CONTROLLING ACCESS TO RESOURCES OF DATA PROCESSING SYSTEM

14	1996	Wei-Ming Hu	METHOD AND APPARATUS FOR AUTHENTICATING A CLIENT TO A SERVER COMPUTER SYSTEMS WHICH SUPPORT DIFFERENT SECURITY MECHANISMS
15	1997	Mark S. Miller, E. Dean Tribble, Norman Hardy, Christopher T. Hibbert	DIVERSE GOODS ARBITRATION SYSTEM AND METHOD FOR ALLOCATING RESOURCES IN A DISTRIBUTED COMPUTER SYSTEM
16	1998	Ian Foster, Carl Kesselman,Gene Tsudik, Steven Tuecke	A SECURITY ARCHITECTURE FOR COMPUTATIONAL GRIDS
17	1999	Daniel S. Glasser, Ann Elizabeth McCurdy, Robert M. Price	METHOD AND SYSTEM FOR CONTROLLING USER ACCESS TO A RESOURCE IN A NETWORK COMPUTING ENVIRONMENT
18	2000	Rajkumar Buyya, David Abramson, and Jonathan Giddy	AN ARCHITECTURE FOR A RESOURCE MANAGEMENT AND SCHEDULING SYSTEM IN A GLOBAL COMPUTATIONAL GRID
19	2001	Lalana Kagal, Tim Finin and Anupam Joshi	MOVING FROM SECURITY TO DISTRIBUTED TRUST IN UBIQUITOUS COMPUTING ENVIRONMENT
20	2002	Farag Azzedin and Muthucumaru Maheswaran	TOWARDS A TRUST-AWARE RESOURCE MANAGENT IN GRID COMPUTING SYSTEM
21	2003	Von Welch1 Frank Siebenlist2 Ian Foste	SECURITY FOR GRID SERVICES
22	2004	Ivan Krsul, Arijit Ganguly, Jian Zhang	VMPLANTS:PROVIDING AND MANAGING VM EXECUTION ENVIRONMENTS FOR GRID COMPUTING
23	2005	Daniel Olmedilla1, Omer F. Rana2, Brian	SECURITY AND TRUST ISSES IN SEMANTIC GRIDS
24	2006	David S. Linthicum	MOVING TO CLOUD COMPUTING STEP BY STEP
25	2007	Uzi Dvir	SECURITY SERVER IN THE CLOUD
26	2008	Mladen A. Vouk	CLOUD COMPUTING-ISSUES,RESEARCH AND IMPLEMENTATIONS
27	2009	Meiko Jensen,	ON TECHNICAL ISSUES OF CLOUD COMPUTING
28	2010	S. Subashini n, V.Kavitha	SECURITY ISSUES FOR CLOUD COMPUTING
29	2011	Luis M. Vaquero	SECURITY ISSUES IN CLOUD COMPUTING
30	2012 I	Deyan Chen1, Hong Zhao	DATA SECURITY AND PRIVACY PRESERVATION IN CLOUD COMPUTING
31	2012 A	Mohammed A. AlZain ,	CLOUD COMPUTING SECURITY SINGLE-MULTI CLOUDS
32	2013 C	Ming Li,	SCALABLE AND SECURE SHARING OF PERSONAL HEALTH RECORDS
33	2013 B	Miltiadis Kandias,	INSIDER THREAT IN CLOUD COMPUTING

34	2013 A	Niroshinie Fernando	MOBILE CLOUD COMPUTING-SURVEY
35	2014 D	Diogo A. B. Fernandes	SURVEY ISSUES IN CLOUD COMPUTING
36	2014 B	Md Whaiduzzaman	SURVEY ON VEHICULAR CLOUD COMPUTING
37	2014 A	A.Madhuri1, T.V.Nagaraju	RELIABLE SECURITY IN CLOUD COMPUTING ENVIRONMENT
38	2015 A	IbrahimAbaker	RISE OF BIG DATA ON CLOUD COMPUTING-REVIEW AND OPEN ISSUES
39	2015	TargioHashem	RISE OF CLOUD COMPUTING ARCHITECTURE IN BIG DATA
40	2015D	Gavin O Donnell,	CLOUD COMPUTING
41	2016	Sundas Iftikhar, Anum Tariq,	OPTIMAL TASK ALLOCATION ALGORITHM FOR COST MINIMIZATION AND LOAD BALANCING OF GSD TERMS
42	2016	Hamed Rezaei, Behdad Karimi, and Seyed Jamalodin	EFFECT OF CLOUD COMPUTING SYSTEM IN TERMS OF SERVICE QUALITY OF KNOWLEDGE MANAGEMENT SYSTEM
43	2017	Thanh Dat Dang	A FRAMEWORK FOR CLOUD BASED SMART HOME
44	2018	Christian Biener, Martin	INSURABILITY OF CYBER RISK

BIOGRAPHY

R.S.Venkatesh and P.K.Reejeesh are currently pursuing their B.Tech. degree in Information Technology at KalaignarKarunanidhi Institute of Technology, Coimbatore, Tamil Nadu, India. Their areas of research interests include Network Security, Cloud Computing and Database Security.

Prof.S.Balamurugan obtained his B.Tech degree in Information Technology from P.S.G. College of Technology, Coimbatore, Tamil Nadu, India and M.Tech degree in Information Technology from Anna University, Tamil Nadu, India respectively. He is currently working towards his PhD degree in Information Technology at P.S.G. College of Technology, Tamil Nadu, India. At present he holds to his credit **65 papers International Journals and IEEE/ Elsevier International Conferences.** He is currently working as Assistant Professor in the Department of Information Technology, Kalaignar Karunanidhi Institute of Technology, Coimbatore, Tamil Nadu, India affiliated to Anna University TamilNadu, India. He is **State Rank holder** in schooling. He was **University First Rank holder** M.Tech. Semester Examinations at Anna University, Tamilnadu, India. He served as a Joint Secretary of IT Association, Department of Information Technology, PSG College of Technology, Coimbatore, Tamilnadu, India. He is the **recipient of gold medal and certificate of merit** for best journal publication by his host institution **consecutively for 3 years**. Some of his professional activities include invited Session Chair Person for two Conferences. He has guided 16 B.Tech projects and 2 M.Tech. projects. He has won a best paper award in International Conference. His areas of research interest accumulate in the areas of Data Privacy, Database Security, Object Modeling Techniques, and Cloud Computing. He is a life member of ISTE,CSI. **He has authored a chapter in an International Book "Information Processing" published by I.K. International Publishing House Pvt. Ltd, New Delhi, India, 978-81-906942-4-7. He is the author of 3 books titled "Principles of Social Network Data Security", ISBN: 978-3-659-61207-7, "Principles of Scheduling in Cloud Computing" ISBN: 978-3-639-66950-3, and "Principles of Database Security", ISBN: 978-3-639-76030-9.**

S.Charanyaa obtained her **B.Tech** degree in Information Technology and her **M.Tech** degree in Information Technology from Anna University Chennai, Tamil Nadu, India. She was **gold medalist** in her B.Tech. degree program. She has to her credit **27 publications in various International Journals and Conferences**. Some of her outstanding achievements at school level include **School First Rank holder** in 10th and 12th grade. She was working as Software

Engineer at Larsen & Turbo Infotech, Chennai for 3 years where she got promoted as Senior Software Engineer and worked for another 2 years. She worked at different verticals and worked at many places including Denmark, Amsderdam handling versatile clients. She is also the recipient of **best team player award for the year 2012 by L&T**. Her areas of research interest accumulate in the areas of Database Security, Privacy Preserving Database, Object Modeling Techniques, and Cloud Computing. **She is the author of 3 books titled "Principles of Social Network Data Security", ISBN: 978-3-659-61207-7, "Principles of Scheduling in Cloud Computing" ISBN: 978-3-639-66950-3, and "Principles of Database Security", ISBN: 978-3-639-76030-9.**