® International Journal of Research Available at https://edupediapublications.org/journals

e-ISSN: 2348-6848
p-ISSN: 2348-795X
Volume 03 Issue 12
August 2016

Implementation of Multiple Wireless Sensor Networks by Using Cloud Computing

N. ChandraSekhar,
Research Scholar, Dept of ECE,
JNTU College of Engineering
Chandu9930@gmail.com

Dr. Y.V. Narayana
Professor, Dept of ECE,
Tirumala Engineering College,
narayana_yv@gmail.com

Dr. M Asharani, Professor,
Professor, Dept of ECE,
JNTU College of Engineering
ashajntu1@gmail.com

Abstract- *Wireless sensor Networks (WSN) has been focus for analysis for many years. WSN permits novel and attractive solutions for information getting across the spectrum of Endeavour together with business, transportation, industrial automation, health-care and environmental watching. Despite these advances, the exponentially increasing data extracted from WSN isn't obtaining adequate use attributable to the dearth of experience, time and cash with that the data may well be better explored and keep for future use. This transformation of data derived from device networks into a valuable resource for information hungry applications can have the benefit of techniques being developed for the rising Cloud Computing Technologies. Ensuing generation of WSN can profit once device data is additional to blogs, virtual communities, and social network applications ancient High Performance computing approaches is also replaced or realize an area in data manipulation before the data being rapt into the Cloud. During this paper, a unique infrastructure is proposed to integrate the Cloud computing model with WSN.*

KEY WORDS: Wireless device Networks, FPGAs, Cloud Computing.

INTRODUCTION:

Recent advances in micro-electro-mechanical systems (MEMS) technology, wireless data network, and digital physical science have enabled the event of low-power, low-cost, multifunctional device nodes that square measure little in size and communicate unbound briefly distances[1-5]. These little device nodes, that accommodates sensing, processing, and communication parts, leverage the concept of device networks based on cooperative effort of an oversized range of nodes. Device networks represent a major improvement over ancient sensors, that square measure deployed within the following 2 ways in which [6-8].

- Sensors may be positioned off from the particular phenomenon, i.e., one thing best-known by sense perception. During this approach, giant sensors that use some advanced techniques to differentiate the targets from environmental noise are required [9-10].
- Several sensors that perform solely sensing may be deployed. The positions of the sensors and communications topology are rigorously designed. They transmit statistic of the detected [11]

Phenomenon to the central nodes wherever computations are performed and information are fused. Sensing element networks carries with it an oversized variety of little sensing element devices that have the potential to take numerous measurements of their atmosphere. These measurements will include seismal, acoustic, magnetic, IR and video information. every of those devices is supplied with a tiny processor and wireless communication "Antenna" and is powerdriven by electric battery creating it terribly resource constrained to be used, sensors are scattered around a sensing field to gather data regarding their surroundings. for instance, sensors is utilized in a field of battle to collect data regarding enemy troops, find events like explosions, and track and localize targets. Upon readying during a field, they form associate adhoc network and communicate with one another and with processing centers [12-14].

Sensor networks are typically supposed to last for long periods of your time (months/years). However, because of the restricted energy obtainable on board, if a detector remains active endlessly, its energy are depleted quickly resulting in its death. To prolong the network period, sensors alternate between being active and sleeping. There are many detector choice algorithms to attain this whereas still achieving the goal of deployment.

PROBLEMS WITH SENSOR SELECTION:

The sensing element choice problem will be outlined as follows: Given a group of sensors S = , we want to determine the "best subset" S of X sensing device to satisfy the necessities of 1 or multiple missions. The "best subset" is one that achieves the desired accuracy of data with respect to a task whereas meeting the energy constraints of the sensors. So, we've two conflicting goals: 1. lower the price of operation & 2. Collect data of high accuracy. This trade-off is sometimes sculptured using the notions of utility and price • utility: accuracy of the gathered data and its utility to a mission. • Cost: this consist in the main of energy spent activating and in operation the sensors that is directly proportional to variety of chosen sensors k. Another price issue that may be considered here is that the risk of sleuthing a device which can increase for active sensors particularly if wireless communication is used. The goal of a device choice theme is to pick out a set S of k sensors specified the whole utility is maximized whereas the price is a smaller amount than a definite budget. for several utility models, this problem is at least as hard1 because the backpack problem that is (weakly) NP-complete.2 this implies there's no polynomial-time algorithmic rule, though there's a pseudo-polynomial algorithmic rule (poly in number of devices and sensor costs). this is often clearly not fascinating, particularly if we tend to contemplate a network with a large vary of attainable device prices. Hence, realistic restrictions of the problem have received attention. as an example, Isler and Bajcsy1 assume that utilities have geometric structure which total price is either zero or eternity, based on whether or not $|S| \leq k$ holds[15-18].

Fig. 1 shows the WSN and Cloud Computing integration framework. The framework elements include: processing Unit (DPU), Pub/Sub Broker, Request Subscriber (RS), Identity and Access Management Unit (IAMU), and information Repository (DR). Information collected from the WSN moves through an entranceway to the DPU. The DPU can method the information into a storage format so send the information to the DR. we've thought-about sixteen temperature sensors for the implementation.

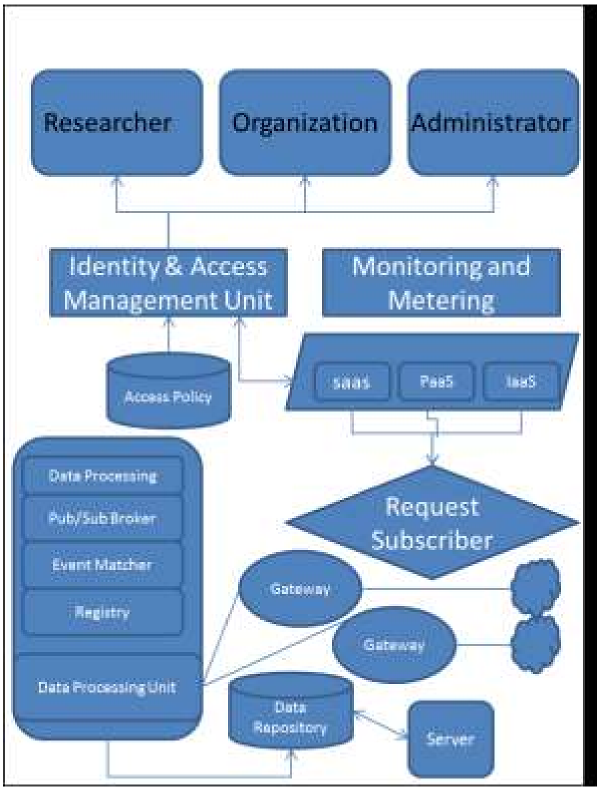

Fig. 1. Sensor-Cloud Integration Framework

Users will connect to the Cloud through the secured IAMU and will be given access on the basis of the policy stored against their user account. After access has been granted users can put forward data access requests. The requests will be forwarded to the RS and the RS will create a subscription on the basis of this request and forward this subscription to the Pub/Sub Broker. Data received in the cloud will be identified by the DPU which will create a published data event and send the event to an event queue at the Pub/Sub Broker. When a new event is published, each subscription is evaluated by the event matcher. Once the event matching process finds a match the published data is made available to the user after further processing is carried out if required [19-20].

The proposed system maintains the whole of sixteen temperature sensors without any collisions in between them.

RESULTS:

The implementation is completed with the verilog language by mistreatment the Xilinx package. Figure 4, 2, 3 shows the RTL views of the projected systems. Figure five shows the temporal order results of the system.

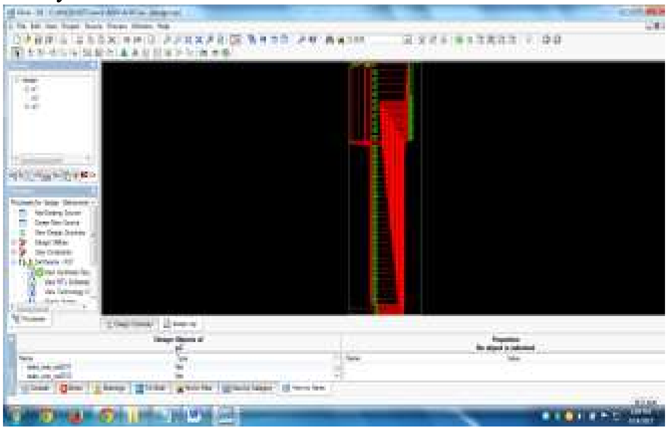

Figure 4 RTL view

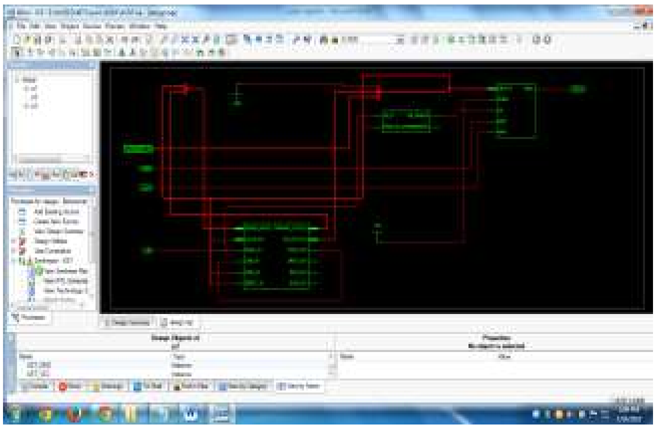

Figure 2 RTL view

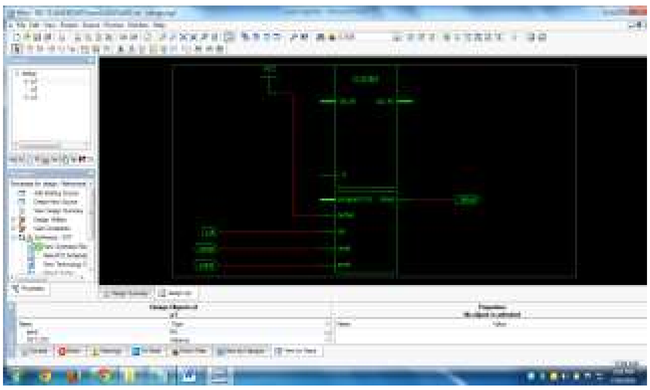

Figure 3 RTL view

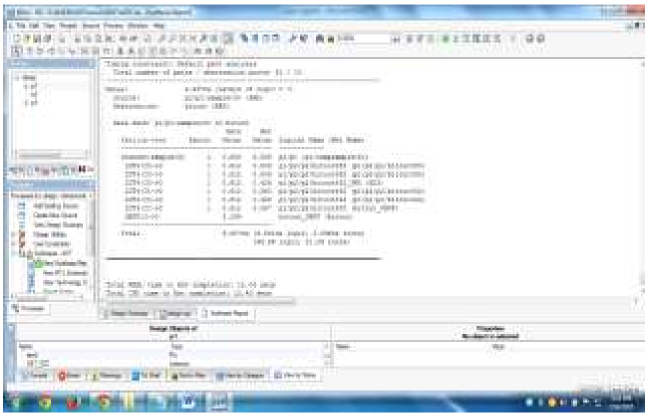

Figure 5 timing diagram

CONCLUSION:

Integration of WSN and Cloud Computing can offer advantages to organizations and the research community. Organizations can profit by utilizing Cloud storage and an optimized framework for process, storage and retrieval of WSN generation data. The projected WSN Cloud Computing framework can offer an optimum approach to user management, access control, storage and retrieval of distributed data. Future work can embrace additional development of the data process, storage and retrieval methodology. There square measure parallels to the on-demand video Cloud solutions presently being implemented. Another side of future analysis are to spot an optimum approach to allow data manipulation before publication.

REFERENCES

[1] V.Rajesh, J.M.Gnanasekar, R.S.Ponmagal, P.Anbalagan, "Integration of Wireless Sensor Network with Cloud", International Conference on Recent Trends in Information, Telecommunication and Computing, Kochi, Kerala, 12-13 Mar 2010, pp 321-323, Print ISBN: 978-1-4244-5956-8, DOI: 10.1109/ITC.2010.88

[2] Wen-Yaw Chung, Pei-Shan Yu, Chao-Jen Huang, "Cloud Computing System Based on Wireless Sensor Network", Federated Conference on Computer Science and Information Systems, 8-11 Sept 2013, pp 877-880, INSPEC Accession Number: 13884725.

[3] Rajeev Piyare, Sun Park, Se YeongMaeng, Seung Chan Oh, Sang Gil Choi, Ho Su Choi, Seong Ro Lee, "Integrating Wireless Sensor Network into Cloud Services for Real-time Data Collection, International conference on ICT Convergence [ICTC], 14-16 Oct 2013, Jeju, pp752-756, DOI : 10.1109/ ICTC.2013.6675470.

[4] Carlos OberdanRolim, Fernando Luiz Koch, Carlos Becker Westphall, Jorge Werner, Armando Fracalossi, Giovanni Schmitt Savador, "A Cloud Computing Solution for Patient's Data Collection in Health Care Institutions", 2nd International Conference on eHealth, Telemedicine and Social Medicine, St. Maarten, 10-16 Feb 2010, pp 95-99, DOI: 10.1109 /eTELEMED .2010.19.

[5] Peter Langendoerfer, Krzysztof Piotrowski, Manuel Diaz, Bartolome Rubio, "Distributed Shared Memory as an Approach for Integrating WSNs and Cloud Computing", 5th International Conference on New Technologies, Mobility and Security, Istanbul, 7-10 May 2012, pp 1-6, DOI: 10.1109/NTMS.2012.6208723.

[6] Srimathi C, Soo-Hyun Park, Rajesh N, "Proposed framework for underwater sensor Cloud for environmental Monitoring", 5th International Conference on Ubiquitous and Future Networks, Da Nang, 2-5 July 2013, pp 104-109, DOI: 10.1109/ICUFN.2013.6614788.

[7] John Tooker, Xin Dong, Mehmet C. Vuran, Suat Irmak, "Connecting Soil to the Cloud: A Wireless Underground Sensor Network Test bed", 9th Annual IEEE Communications Society Conference on Sensor, Mesh and Ad Hoc Communications and Networks, Seoul, 18-21 June 2012, pp 79-81, Print ISBN: 978-1-4673-1904-1, DOI:10.1109/SECON.2012.6275848.

[8] Tongrang Fan, Xuan Zhang, FengGao, "Cloud Storage Solution for WSN Based on Internet Innovation

Union", International Journal of Database Theory and Application, Vol 6, No. 3, June 2013, pp 49-58.

[9] Perumal.B, PallikondaRajasekaran.M, Ramalingam. H.M, "WSN Integrated Cloud for Automated Telemedicine [ATM] Based E-Healthcare Applications", 4th International Conference on Bioinformatics and Biomedical Technology, Singapore, Vol 29, Feb 2012, pp 166-170.

[10] Geoffrey C Fox, Alex Ho, Eddy Chan Anabas, "Measured Characteristics of FutureGrid Clouds for Scalable Collaborative Sensor-Centric Grid Applications", International Conference on collaboration Technologies and systems, Philadelphia, 23-27 May 2011, pp 151-160, DOI: 10.1109/CTS.2011.5928677.

[11] SajjadHussain Shah, FazleKabeer Khan, Wajid Ali, Jamshed Khan, "A New Framework to Integrate Wireless Sensor Networks with Cloud Computing", IEEE Aerospace Conference, Big Sky, MT, USA, 2-9 Mar 2013, pp 1-6, Print ISBN: 978-1-4673-1812-9, DOI: 10.1109/AERO.2013.6497359.

[12] Peng Zhang, Zheng Yan, Hamlin Sun, "A Novel Architecture Based on Cloud Computing for Wireless Sensor Network", 2nd International Conference on Computer Science and Electronics Engineering [ICCSEE], pp 472-475, 2013.

[13] JunyaTerazono, Hideyuki Fukuhara, Takuto Yamada, Toshiaki Nihei, Kazunori Suzuki, Isamu Koseda, Ryutaro Fujita, Toshiaki Miyazaki, Senroh Saito, Atsushi Kara, Takafumi Hayashi, "A Sensor Network using Content- Aware Messaging Network Architecture", ICROS-SICE International Joint Conference, Fukuoka, 18-21 Aug 2009, pp 5055-5058, Print ISBN: 978-4-907764-34-0.

[14] David Tracey, Cormac Sreenan, "A Holistic Architecture for the Internet of Things, Sensing Services and Big Data", 13th IEEE/ACM International Symposium on Cluster, Cloud, and Grid Computing, Delft, 13-16 May 2013, pp 546-553, Print ISBN: 978-1-4673-6465-2, DOI: 10.1109/CCGrid.2013.100.

[15] RazviDoomun, ThaierHayajneh, Prashant Krishnamurthy, David Tipper, "SECLOUD: Source and Destination Seclusion Using Clouds for Wireless Ad hoc Networks", IEEE Symposium on Computers and Communications, Sousse, 5-8 July 2009, pp 361-367, Print ISBN: 978-1-4244-4672-8, DOI: 10.1109/ISCC.2009.5202367.

[16] SudarsanRaoVemuri, Dr. N Satyanarayana, V Lakshmi Prasanna, "Generic Integrated Secured WSN-Cloud Computing For U-Life Care", International Journal of Engineering Science and Advanced Technology, Vol 2, Issue 4, pp 897-907, Aug 2012, ISSN: 2250-3676.

[17] Ahmed Lounis, AbdelkrimHadjidj, AbdelmadjidBouabdallah, YacineChallal, "Secure and Scalable Cloud-based Architecture for e-Health Wireless sensor networks", 21st International Conference on Computer Communications and Networks (ICCCN), Munich, 30 July-2 Aug 2012, pp 1-7, Print ISBN: 978-1-4673-1543-2, DOI: 10.1109/ICCCN.2012.6289252.

[18] Khandakar Entenam Unayes Ahmed, Mark A Gregory, "Integrating Wireless Sensor Networks with Cloud Computing", 7th International Conference on Mobile Ad-hoc and Sensor Networks (MSN), Beijing, 16-18 Dec 2011, pp 364-366, Print ISBN: 978-1-4577-2178-6, DOI: 10.1109/MSN.2011.86.

[19] Mohamed Firdhous, Osman Ghazali, Suhaidi Hassan, "Trust Management in Cloud Computing: A Critical Review", International Journal on Advances in ICT for Emerging Regions, Sept 2011, Vol. 2, No. 4, pp 24-36, DOI: http://arxiv.org/abs/1211.3979.

[20] Rosangela de Fátima Pereira, Marcelo Risse de Andrade, ArturCarvalhoZucchi, Karen Langona, Walter Akio Goya, Nelson Mimura Gonzalez, Tereza Cristina MeloBrito de Carvalho, Jan-Erik Mangs, AzimehSefidcon, "Distributed processing from large

scale sensor network using Hadoop", IEEE International Congress on Big Data, Santa Clara, CA, 27 June-2 July 2013, pp 417-418, Print ISBN: 978-0-7695-5006-0, DOI: 10.1109 / BigData.Congress.2013.64.

[21] Wei Wang, Kevin Lee, David Murray, "Integrating Sensors with the cloud using dynamic proxies", IEEE 23rd International symposium on Personal Indoor and Mobile Radio communications, Sydney, 9-12 Sept. 2012, pp 1466-1471, DOI: 10.1109 / PIMRC .2012 .6362579.

[22] Rajesh V, O Pandithurai, S Mageshkumar, "Wireless sensor data on cloud", IEEE International Conference on Communication, Control and Computing Technologies, Ramanathapuram, 7-10 Oct 2010, pp 476-481, DOI:10.1109/ICCCCT.2010.5670599.

[23] Wen Qiang Wang, Xiaoming Zhang, Jiangwei Zhang, Hock Beng Lim, "Smart Traffic Cloud: An Infrastructure for Traffic Applications", IEEE 18th International Conference on Parallel and Distributed Systems, Singapore, 17-19 Dec 2012, pp 822-827, DOI: http://doi.ieeecomputersociety.org/10.1109/ICPADS.20 12.134.

[24] Giancarlo Fortino, MukaddimPathan, Giuseppe Di Fatta, "Body Cloud: Integration of Cloud Computing and BodySensor Networks", IEEE 4th International Conference on Cloud computing Technology and Science, Taipei, 3-6 Dec 2012, pp 851-856, DOI: 10.1109/CloudCom.2012.6427537.

[25] B. B. P. Rao, P. Saluja, N. Sharma, A. Mittal, S. V. Sharma,"Cloud computing for internet of things and sensing based applications", 6th International Conference on Sensing Technology, Kolkata, India, 18-20 Dec 2012, pp 374–380, DOI: 10.1109 / ICSens T.2012.6461705.

N.ChandraSekhar completed his M.Sc, M.Tech with electronics and communication engineering. He has published more than five international journals. Currently he is a research Scholar in JNTU, Hyd and working as Associate Professor cum Head of the department for ECE in Khammam Institute of Technology and Science.

Dr. Y. Venkata Narayana, was born in a tiny village, west Godavari dist, A.P.,India, way back in 1968. His brilliant academic record won him a seat in B.Tech, ECE, JNTU college of Engineering, Ananthapur and passed out it in flying colours in 1991. He pursued his ME in electronic instrumentation from college of engineering, Andhra University during 1997-1999 and secured second rank. He followed it up with research in the same university, which finally cultimated in the award of P.hD in the area of communications on "investigations on Beam Conversions using arrays by phase only control. He has put up a total of twenty years of service-16 years in teaching and four years as senior engineer, instrumentation in power plant rain claiming limited, Visakhapatnam. He was actively associated with erection and commissioning of 53.5MW co-generation plant. Presently, he is the principal cum professor in Tirumala Engineering College, Jonnalagadda, Narsaraopet. Prior to it he had worked in various capacities at different engineering colleges across A.P. To his credit, he has presented twenty six international journals. He is the fellow member of IETE.

Submitted Ph.D thesis on "Design of built in self test and repair scheme for static RAM,s". Published 6 technical papers in National and International Conferences. Co-Ordinated one TAPTEC project Rs. 6.5 Lacks in establishing VLSI lab and one R&D project for 9.0Lacks in designing an ASIP for Image processing applications sponsored by AICTE, Delhi, Co-Ordinator for SPOORTHI'04 a student symposium. Coordinated 4 refresher courses conducted by Acad. Staff College, JNTU,Hyderabad. Attended about 10 workshops on VLSI-EDA Tools, Design for Testability, Altera tools, SILVACO tools, National Instruments-Virtual Instruments-Lab view etc.