IJREAT International Journal of Research in Engineering & Advanced Technology, Volume 2, Issue 2, Apr-May, 2014
ISSN: 2320 – 8791(Impact Factor: 1.479)
www.ijreat.org

A Hybrid Communication Infrastructure Power System Using Effective Sensor Network

S.Saranya[1], A.Vijay[2], Dr.G.K.D.Prasana Venkatesan[3]

Assistant Professor[1], Vice Principal, Professor and Head[2] Post Graduate student- ME in Communication Systems[3]
Department of E.C.E., PGP College of Engineering and technology, Namakkal, Tamilnadu, India

***Abstract* – In this paper, we tend to develop a period of time situational awareness framework for the electrical transmission facility victimization Wireless Sensor Network (WSN).While WSNs area unit capable of value economical watching over immense geographical areas, many technical challenges exist. The low power, low rate devices cause information measure and latency bottlenecks. During this paper our objective is to style wireless network capable of period time of delivery of physical measurements for ideal preventive or corrective management action. For network style, we tend to formulate associate degree optimization drawback with the target of minimizing the installation and operational prices whereas satisfying the end-to-end latency and information measure constraints of the info flows. We tend to study a hybrid hierarchical specification composed of a mixture of wired, wireless and cellular technologies which will guarantee low value period of time information watching. We tend to formulate a placement drawback to search out the best location of cellular enabled transmission towers. Further, we tend to gift analysis result of the optimization resolution for various situations. Our information is generic and addresses planet situations with uneven device information generation, unreliable wireless ling behavior, non-uniform cellular coverage, etc. Conjointly we tend to enhance the on top model with a time-based reservation frame-work. Also we enhance the above model with a weighted cluster bandwidth, which is reserved on slot basis using weighted clustering algorithm.**

***Keywords*: Cyber-physical network style, hierarchical hybrid network, Smart grid, Wireless Device Network.**

I. INTRODUCTION

Infrastructure less network is thought as Mobile Ad Network (MANET).These network don't have any static routers. All nodes area unit obtained movement and it's created to maneuver keeping with the network association. The MANET is mobile; they use wireless connections to attach varied networks. The total network is of mobile network and may be created to maneuver by referencing to different nodes in network. During this style of network, some pairs of terminals might not be ready to communicate on to with one another and relaying of some messages is needed so they're reached quickly to their finish position. The nodes that area unit gift during this network can be ready to communicate with different network by use of forwarding table. The nodes can be thought-about to any of the article or someone if they have to transfer the data's. MANET may be a network with mobile nodes while not web like infrastructure wherever each mobile node behaves a router for routing supply to destination, to watch the standing of the ability system in period of time, sensors area unit place in numerous elements within the power network. These sensors area unit capable of taking the fine-grained measurement of a spread of physical or electrical parameters and generate plenty of knowledge. Delivering this info to the control center in a cost efficient and timely manner may be an essential challenge to be addressed so as to create an intelligent sensible grid Network style may be creation an essential fact of device based mostly cable watching thanks to the massive scale, immense tract, uncommon topology and significant temporal order needs. The goal is to deploy multiple totally different sensors in essential locations of the cable to sense mechanical properties of its numerous elements and transmit the detected information through an acceptable wireless network to the center. At the center, it is often combined with existing electrical information within a system to gain a prefect preventive or corrective management call. We tend to style a hybrid hierarchical network that spans wired, wireless and cellular technologies to supply value optimized delay and information measure unnatural information transmission.

Further, we tend to gift the feasibleness analysis considering numerous sensible problems regarding the reading and operation of the device network. This paper is organized as follows. Section II explains the connected work followed by device network style in Section III. Section IV presents analysis studies and Section VI concludes the paper.

II.RELATED WORK

Dynamic circuit thermal line rating deals with the watching these conditions and shrewd vertical clearance or sag to ground, it's follow the onset o potential to develop period of time line ratings and use the complete capability of existing transmission lines. During this project, they investigated the feasibleness of providing period of time cable ratings to system operators by watching the conductor tension and environmental factors. The strategy monitors overhead conductor tension, close temperature, and internet radiation temperature rise. Information is passed to a ground station via unfold spectrum radio and energy management system (EMS). Calculations area unit performed to work outline condition like sag and dynamic thermal to constraint, further more as operational warning (time to thermal overload under base system conditions) by the EMS, which results displayed on operator screens. Signals area unit given to operators, WHO will scale backload or generation to stay the road inside thermal and vertical clearance constraints. Potential edges of period of time cable ratings include: improved system dependability and safety, reduced capital expenditures, magnified potency of generation resources, and lower rates for utility customers.

The role of pervasive and Cooperative device Networks in sensible Grids Communication. The use of WSNs technology is gaining favor inside electrical power trade for a mess of applications. This paper has shown simulation results for an IEEE 802.15.4 based mostly communication network and has printed the potential roles of such a network for urban sensible grid communication. The obtained results have shown because the employment of WSNs based mostly communication services are incredibly promising for many power systems communication applications: automation, remote watching and oversight. Pervasive grid watching and walk communications area unit different potential applications that the utilization of WSNs technology is helpful. WSNs design strategies aimed at improving the network performances in terms of data latency, number of simultaneous and active connections.

Smart grid is primarily visualized as a jump in harnessing communication and data technologies to boost grid dependability and to alter integration of assorted sensible grid resources like renewable resources, demand response, electrical storage and electrical transportation supported a criticism of the dependability impacts of those resources, it's all over that aperfect mixture of the sensible grid resources results in a praise internet demand that eventually accentuates dependability problems any. So the position of meeting dependability challenges within the realization of the sensible grid is under scored. Associate degree subject area framework is projected to function a representation of such common vision to facilitate the planning, development and grid wide integration of assorted elements further more because the emergence of standards and protocols required for a wise grid. This design support a multitude of fail proof geographically and temporally coordinated hierarchical watching and management actions over time scales starting from milliseconds to operational coming up with horizon. The design delivers high performance through a virtual hierarchical operation of a mess of software system agents and service in structure, geographical an practical dimensions. These high performance infrastructures are often thought as a "Super EMS" consisting of a network of networks. The abstract style permits for organic process implementation of the infrastructure.

Energy Economical Model, we tend to develop single level and 2 level communication models for information gathering in a exceedingly structured multiclustered device networks. This sort of device network can be applied in atmosphere, highway or power cable watching systems. Their objective is to reduce the ability consumption within the overall networks. We tend to used CTMC (Continuous Time Andre Mark off Chain) to research {the 2|the 2} models and located that two level communication model will be performed higher than single level communication

model in terms of total power consumption in an exceedingly native cluster. The power consumption for the pinnacle node in single level approach is similar to the member nodes whereas within the 2 level approaches it's a lot of complicated. Power consumption for the PAR node is higher in single level approach than that in 2 level approaches.

Next Generation watching and management functions for future management centers presents the vision of future management centers for data processing. Comparison of this technology and also the future vision is mentioned. Infrastructure and technology gaps, further more because the road maps towards the purpose vision, area unit mentioned. This paper points out the technology and infrastructure gaps to fill totally implement future management centers, furthermore as a roadmap towards the project vision is predicted to be an essential part of the long run sensible transmission grid.

III PLANNED SYSTEM

We propose an optimum resolution that minimizes the installation and maintenance prices whereas satisfying all the constraints like latency and information measure. We have a tendency to gift a generic formulation that addresses challenges like uneven flow information measure needs, irregular cellular coverage, etc. Further, our planned methodology additionally provides some way to search out price optimized progressive preparation solutions to satisfy newer future specifications. Additionally our works aims to boost information measure utilization by implementing the framework for plenty assignment.

IV SYSTEM ARCHITECTURE AND ANALYSIS

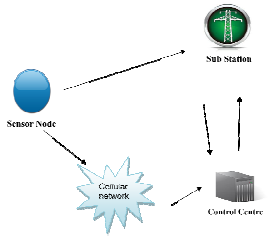

Fig.1 *Block Diagram*

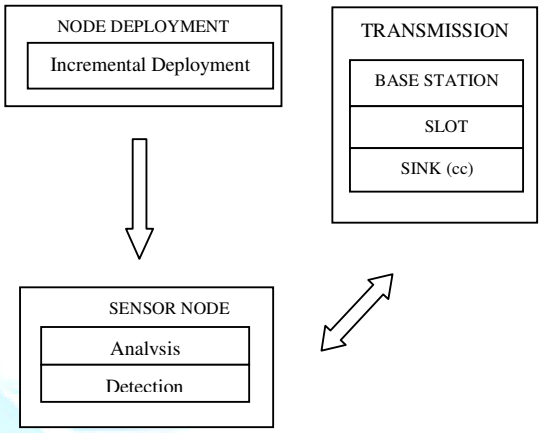

Fig.2 *Data flow diagram*

We term this method as memory less deployment because it discards any memory of existing cellular enabled towers. This method can result in installation on an entirely new set of towers, thus risking loss of any investment made in installing existing cellular transceivers in the first place.

We present a method to add new cellular links on top of existing network to satisfy newer requirements while minimizing installation costs. Through this incremental deployment we can reuse the existing cellular enabled transceivers as much as possible.

The method proposed previously relies heavily on symmetry and hence cannot accommodate asymmetric flow bandwidth requirement in the network. There can be several scenarios leading to towers generating sensor data at different rates.

This can be due to a requirement of fine grained sensor measurement in order to attain better situational awareness of a particular tower located in a sensitive area. Fig. 5 shows such a scenario. Our proposed formulation can easily accommodate such asymmetric requirements. This is because each flow generated at a tower is individually formulated. We follow normal distribution to generate Asymmetric data for sampling.

The transmission line considered is uniformly covered by a cellular communication network. This means that cellular transceivers can be placed under any tower (Base Station).

Due to the diverse geographical terrains traversed by the long transmission lines, there might be remote areas where cellular coverage is not available.

There is prolonged outage on certain cellular towers. In such cases, there are additional constraints on the placement of cellular transceivers. We refer to this version of the problem as Coverage Constrained placement problem where relay nodes can only be installed on a subset of the transmission towers which are covered by cellular service.

ALGORITHM DESCRIPTION:

1. Calculate the distance and degree of node.
2. Then weight of the node (tower).
3. Then form the cluster with cluster head.

BASIS FOR OUR ALGORITHIMIC PROGRAM

To decide however like a node being a cluster head, we have a tendency to take into consideration it's degree transmission power quality and battery power. The subsequent options are thought about in cluster algorithm. Every cluster head will ideally support only δ (a pre-defined Threshold) nodes to confirm economical medium access management (MAC) functioning. If the cluster head tries to serve a lot of nodes than it's capable of the system potency suffers within the sense that the nodes can incur a lot of delay as a result of they need to attend longer. A high system turnout may be achieved by limiting or optimizing the degree of every cluster head.

A cluster head is ready to speak higher with its neighbor having nearer distances from it inside the transmission varies. Because the nodes move removed from the cluster head, the communication might become tough due principally to signal attenuation with increasing distance.

PLANNED ALGORITHIMIC PROGRAM

Based on the preceding discussion, we have a tendency to propose an algorithmic program known as weighted bunch algorithmic program (WCA) that effectively combines every of the on top system parameters with bound advisement factors chosen in keeping with the system wants. The output of cluster head choice procedure may be a set of nodes known as the dominant set. The amount of nodes that a cluster head will handle ideally is δ. This can be to confirm that cluster head don't seem to be over loaded and also the potency of the system is maintained at the expected level. The cluster head election procedure is invoked at the time of system activation and additionally once the present dominant set is unable to hide all the nodes.

V SIMULATION RESULT

Simulation model is carried out using Network simulator -2 and the Protocol GPSR is implemented. In simulation model the main process is node creation, zone partition, Relay node selection and closest path routing. The network animator results show all those process by using NS-2 simulation software. The cluster nodes are created for the transmission and the reception process, cluster nodes are capable of transmit and receive the packets.

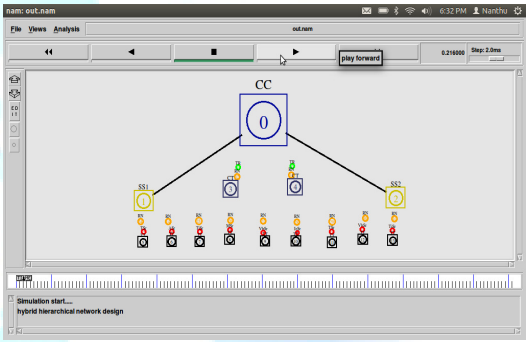

Fig.3 *NAM output showing Hybrid Hierarchical network design*

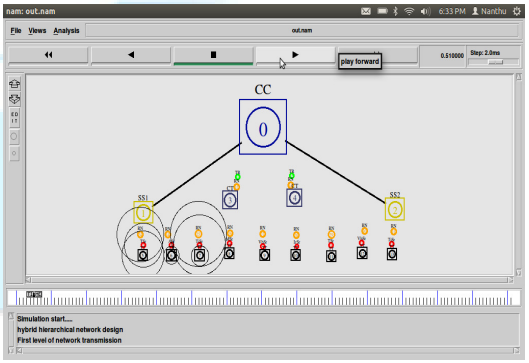

Fig.4 *NAM out showing First level of transmission*

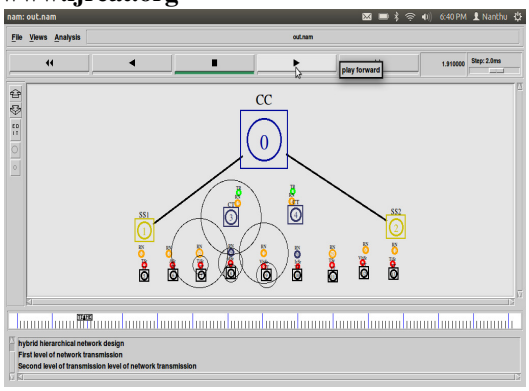

Fig.5 *NAM out showing Second level of transmission*

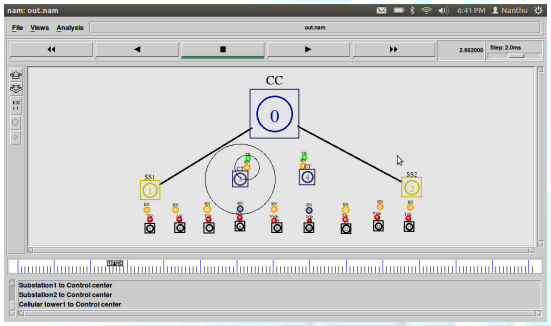

Fig.6 NAM output showing third level of transmission

Fig.3 shows the hybrid hierarchical networks are the formulation of network design and also nodes will be incremental deployment.

Fig.4 shows the routing process of first level of transmission, it will be followed by the information sensor network to the substation.

Fig.5 shows the routing process for the second level of transmission, it will be followed by the information sensor node to cellular network.

Fig.6 shows the routing process for the third level of transmission, it will be followed by the information cellular network to the control center.

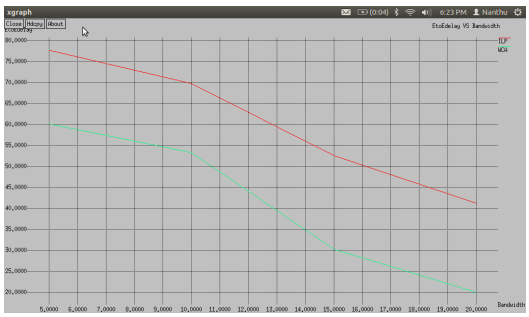

Fig.7 Xgraph compares the end to end delay Vs Bandwidth of ILP and WCA

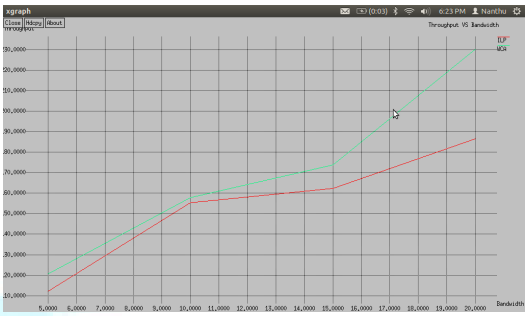

Fig.8 Xgraph Throughput Vs Bandwidth

VI CONCLUSION

In this paper we tend to project the optimum time interval based as a rule of information measures bandwidth reservation theme that helps the electrical grid line sensors to update their detected parameters to control center. Our proposed work optimizes the bandwidth usage and reduces the overall network energy, retransmission of data. Our future work moves in the direction of applying trust model in cooperative data transmission for malicious node detection and mitigation in existing network

REFERENCES

1. H. Li, G.W. Rosen Wald, J. Jung, and C. Liu, "Strategic power infrastructure defense", *Proc. IEEE*, vol.93, no.5, pp. 918–933, May 2008.

2. P. Zhang, F. Li, and N. Bhatt, "Next-generation monitoring, analysis and control for future smart control center," *IEEE Trans.* Smart Grid, vol.1, no. 2, pp. 186–192, Sep 2010.

3. V. C. Gungor and F. C. Lambert, "A survey on communication networks for electric system automation," *Computer Newt.*, vol. 50, no. 7, pp. 877–897, May 2009.

4. P. Ramachandran, V. Vittal, and G. T. Heydt, "Mechanical state estimation for overhead transmission lines with level spans," *IEEE Trans. Power Syst.*, vol. 23, no. 3, pp. 908–915, Aug. 2011.

5. S. Malhara and V. Vittal, "Mechanical state estimation of overhead transmission lines using tilt sensors," *IEEE Trans. Power Syst.*, vol.25, no. 3, pp. 1282–1290, Aug 2010.

6. J. Ausen, B. F. Fitzgerald, E. A. Gust, D. C. Lawry, J. P. Lazar, and R. L. Oye, "Dynamic thermal rating system relieves transmission constraint," in *Proc. IEEE 11th Int. Conf. Transm. Distrib. Construction,Oper.,Live-Line Maintenance (ESMO)*, Oct 15–19, 2006.

7. V. C. Gungor, L. Bin, and G. P. Hancke, "Opportunities and challenges of wireless sensor networks(WSN) in smart grid," *IEEE Trans. Ind. Electron.*, vol.57, no.10, pp. 3557–3564, Oct 2010.

8. Y. C. Wu, L. F. Cheung, K. S. Lui, and P.W. T. Pong, "Efficient communication of sensors monitoring overhead transmission lines," *IEEE Trans. Smart Grid*, vol.3, no.3, pp. 1130–1136, Sep 2012.

9. S. Ullo, A. Vaccaro, and G. Velotto, "The role of pervasive and cooperative sensor networks in smart grids communication," in *Proc.15th IEEE Mediterranean Electro tech. Conf. MELECON)*, Apr. 26–28, 2010, pp. 443–447.

10. A. Bose, "Smart transmission grid applications and their supporting infrastructure," *IEEE Trans. Smart Grid*, vol.1, no.1, pp. 11–19, Jun 2010.

11.K. Moslehi and R. Kumar, "A reliability perspective of the smart grid," *IEEE Trans. Smart Grid*, vol.1, no.1, pp. 57–64, Jun 2010.

AUTHORS PROFILE

1. S.Saranya, Post Graduate student- ME in Communication Systems at PGP College of Engineering and Technology, Namakkal.

2. A.Vijay, Assistant Professor / Electronics and communication and Engineering Department at PGP College of Engineering and Technology, Namakkal, Tamilnadu, India.

2. Dr.G.K.D.Prasanna Venkatesan, Completed Ph.D from College of Engineering, Anna University, Chennai, India. He is currently working as Vice-Principal, Professor & Head of Department of Electronics and Communication Engineering at PGP College of Engineering and Technology. Namakkal, Tamil nadu, India. His research interests includes Wireless Sensor Networks, 4G Wireless Networks, Cloud Computing,Adhoc Network, etc.