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Survey on Energy Efficient Protocols and Challenges in IOT

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Abstract: Internet of things (IoT) connects everything for communication making smart cites, smart home etc with IoT. it is embedded with various technologies WSN wireless sensor networks one such technology play important role in IoT, sensors with limited power as battery backup problem of IoT. In this paper we survey of different challenges and energy efficient protocol that make IoT energy efficient.

Keywords: Internet of things (IoT), wireless sensor network (WSN), battery backup, Energy efficient.

I. INTRODUCTION

Internet of things Internet of Things in general ability of network devices to sense and collect data from the world around us, and then share that data across the Internet where it can be processed and utilized for various interesting purposes. The large-scale implementation of IoT devices promises to transform many aspects of the way we live. For consumers, new IoT products like home automation components smart home [1], smart cities etc. Other personal IoT devices like wearable fitness and health monitoring devices and network enabled medical devices are transforming the way healthcare services are delivered. Some observer sees IoT connecting everything "smart" world. While other warns IoT taking towards dark world surveillance, privacy and security violations, and consumer lock–in.

In fact, one of the most important elements in the IoT is wireless sensor networks (WSN). That helps in connecting both WSN and other IoT elements go beyond remote access, as heterogeneous information systems can be able to collaborate and provide common services [2]. The idea of internet of things (IoT) was developed in parallel to WSNs. Internet of things was devised by Kevin Ashton in 1999 [3] and refers to uniquely identifiable objects and their virtual representations in an "internet-like" structure. IoT and WSN are base technology areas for ongoing and emerging standardization areas by the IEC (International Standards and Conformity Assessment services to solve global problems in electro technology) like smart grid, industry and smart cities, it is important for IEC to have a good understanding of them, the standardization environment and the specific needs [4]. Supplying power to these IoT devices and their network connections can be expensive and logistically difficult. Portable devices require batteries that someday must be replaced. Although many mobile devices are optimized for lower power usage, energy costs to keep potentially billions of them running remains high.

In this paper survey on different energy efficient protocol use in IoT and some of the challenges face by IoT.

II. CHALLENGES

An easy way to Internet of things (IoT) communications of things with internet such as making everything smart, smart cities, smart home ,offices fig.1 etc. With the rapid technological development of sensors, WSNs will become the key technology for IoT. As we all know to connect things needs sensors to sense and collect data that data is send for further processing through internet. Major problem in IoT, sensors battery backup which helps to route the data. Intermittent connectivity [7] Due to the limited battery life, there is always a danger of change in the network topology. Intermittent connectivity can also be experienced due to the highly mobile devices, which get disconnected from the network when they move.

As IoT in future everywhere connecting everything its network also become vast everywhere deployment of IoT which will be embedded in devices. Under such situation lack of energy backup will affect communication stops as soon as battery over.

Most of the devices use in IoT are multi-hop communication are low powered devices they uses relay for transmission of data from source to destination. It is use for load balancing. If keep topology reconfiguration in control. Also use to increase fault tolerance, reliability, QOS

Another challenge in IoT is connecting all technologies use in IoT together such as WSN, network, WiFi, zigbee all together using common standard protocol. Heterogeneity is in IoT

Scalability as IoT use wireless sensors for communication .therefore its network some time get large some time reduce .it is also an effect the routing

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Energy hole, create energy hole when the death of the node in network which may create problem in routing. It can't be replace the battery of node nor can remove it. FIG 2. Congestion control protocol is very neccacary as IoT connecting everything network having large traffic, due to which congestion occur if not solve the problem for long time battery will get drain. So needs protocol for congestion control, Security issues are always come across with dishonest of participant. As IoT involves large number of things or world is communicating through IoT. Security becomes important IoT routing security .Security is need at all layers link layer, network layer and security layer for secure communication. For devices with resource limited small devices its difficult secures all layers. Therefore it is necessary common security mechanism or key is necessary between all the layers ,cross layer concept should be consider for redesigning IoT for internet security protocol

III.REVIEW OF LITERATURE

All paragraphs must be indented. In [5] Vellanki M et.al analysis IoT connectivity the most significant issue is Network Energy Consumption. To solve the issues need an energy efficient network routing that can seamlessly transmit data between various devices, systems and servers. Proposed NLEE (Node Level Energy Efficiency**)** Protocol .under two metrics results are analysis

- Node Level Energy Efficiency: when the node reach the shortest path the threshold energy, the path with maximum energy from all average paths is selected and data packets transmit to second shortest path. Average path is again spelled and communication comes to stop as when energies of all the nodes reached to threshold energy. short path is find using NLEE algorithm
- Residual Energy of Nodes: compare the propose protocol NLEE with other internet of things protocols Optimized Ad-hoc On-demand Multipath Distance Vector with Internet of things (AOMDV-IOT) , and energy-efficient probabilistic routing (EEPR)

Show that residual energy ratio decreases with increase of number of sensor nodes protocols. However, NLEE has maximum residual energy has compared with other competing approaches.

In [6] Yichao Jin et.al say the existing solutions for non dynamic network condition example homogenous traffic .however traffic is dynamic each time traffic application changes or for new application arrives. Data path is required for efficient delivery of various types of data. Routing packets based on link quality and connectivity can improve communication reliability but it does not necessarily lead to energy efficient routing. For reliable communication and energy efficient communication energy of battery power nodes is important to keep it alive in such resource constrained network. To overcome some of this Proposed CCR protocol. CCR's operation includes three main functions: trigger function, in dynamic network environments, most routing protocols periodically update their routing information and keep the routing table up to date. This, however, incurs additional control overheads. In resource constrained networks with lossy links, these signalling messages should be controlled in order to conserve limited on board node energy. Objective function is executed on objective node to find suitable next hop node for each traffic content among neighbors. And routing updates with loop detection function. A simulation based study was first carried out in order to evaluate the performance of the proposed CCR protocol with the conventional methods. A global network lifetime maximization tree algorithm (referred to as Static Tree hereafter) and the traditional centralized processing scheme (referred to as central here-after) were chosen for comparation. Energy consumption: Simulations were run to identify the contribution of each of the data processing, flash read/write and communication operations to the total energy consumption. The per round energy consumption of processing, flash read/write and communication operations and, the sum total of these. The energy consumed by communications significantly dominates the energy consumed by the other operations. The central algorithm gathers all the data at the sink and then carries out processing as a result of which it exhibits the highest communication cost. By taking advantage of content-centric data aggregation to reduce the volume of data that needs to be transported, CCR saves more than half of the energy spent on communication in comparison to the Central approach, about a third in comparison to Static tree. Network life time: CCR is compared with static and central approach find CCR save energy compare to other two.

In [7] K´assio Machado et.al work and analysis IoT connectivity of smart devices every time at any place this can possible only with wireless sensor networks(WNS) but main problem in WNS is restricted battery as IoT in large network connectivity. Address the problems of ensuring reliability, together with energy-efficiency and load balancing in flat-based (homogeneous nodes) WSN/IoT architectures, by proposing an extended version of a routing protocol based on energy and link quality information (REL) . REL aims to overcome the drawbacks that allow the data transmission with low latency, packet loss, and high reliability, as well as a fair distribution of wireless resources, while increasing the network lifetime, for various flat-based IoT applications, such as smart parking, intrusion detection, and monitoring of river flows. Simulation results by comparing with AODV(Ad hoc on demand distant vector) and LABILE(Link Quality-Based Lexical Routing) protocols in large-scale networks with a high node density, the results showed that REL increases the network lifetime by up to 26.6%, latency by 17.9% and packet delivery by 12%,compared with AODV and LABILE.

In [8] Algimantas Venˇckauskas et.al elabrates SSL (secure sockets layer) protocol standard for secure internet connection extra energy cost of encrypting and authenticating of the application data with SSL is around

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15%. For IoT devices energy resources are limited cost of energy is very important factor. In this paper we present the adaptive to energy consumption SSL protocol. the core of purposed adaptive SSL protocol data transmission security which provides objectives security, data protection, cryptography algorithm and key length that gives an adaptive level of security. Processor in client device function with verity of performance mode with different energy consumptions. In paper the experiment, measured the energy consumption and execution time encryption algorithms and hash functions used in the SSL protocol by changing the CPU multiplier. Experiments result show, that the proper selection of the security level and CPU multiplier, can save up to 85% of the energy required for data encryption. The SSL protocol pareto-optimal solution set, which provide necessary security.

[9] Sheeraz A. Alvi et.al analysis the current research and development activities have been restricted to scalar sensor data based IoT systems. and overlooked multimedia things , there have been no consideration of green communication or carbon footprints reduction using the RPL routing protocol. This paper author's works in IoT on RPL for multimedia communication (IoMT) and issue for Information and Communication Technology community is increase in CO2 emissions, which mandates green communication to reduce energy consumption and carbon footprint emissions. The proposed Green-RPL protocol. RPL create a Destination Oriented Directed Acyclic Graph (DODAG) to maintain network topology. DODAG contains

Multi-hop paths from leaf nodes towards the root node. leaf nodes choose a preferred parent considering an objective function which is minimized or maximized as per application requirements based on some routing metrics (e.g. ETX, OF0, Node-Energy, etc) representing quantitative path cost. Proposed protocol compares with the objective functions OF0 and ETX. Proposed Green-RPL routing protocol minimizes carbon footprints emission and energy consumption, and supports application specific Quos requirements by considering various constraints while selecting routes towards the root node cost.

[10] Samia Allaoua Chelloug analysis the problem of energy efficiency in IoT .in this paper by purposed an Energy-Efficient Content-Based Routing (EECBR) protocol for the IoT that minimizes the energy consumption. The middleware is a basic component in the IoT architecture. It handles heterogeneity issues among IoT devices and provides a common framework for communication. More recently, the interest has focusing on developing publish/subscribe middleware systems for the IoT to allow asynchronous communication between the IoT devices. Here comparison between EECBR and other geographic routing schemes that use to the position information for deciding on the next forwarder which should be located in the way between the source and the destination. The variance between the remaining energy and the initial ones is very small in EECBR. Allows extending the lifetime of IOT sensors.

Table -1: COMPARISON OF PROPOSED PROTOCOLS

Proposed Protocols	**Energy efficient Life time battery**	**Latency**	**Security**	**QOS**	**reliability**	**Environmental friendly**
NLEE	Yes	No	No	No	No	No
CCR	Yes	No	No	No	yes	No
Based on energy and link quality information (REL).	yes	High	No	No	Yes	No
Adaptive SSL	yes	No	Yes	No	No	No
Green-RPL	Yes	No	No	Yes	No	Yes
EECBR	Yes	No	No	No	No	No

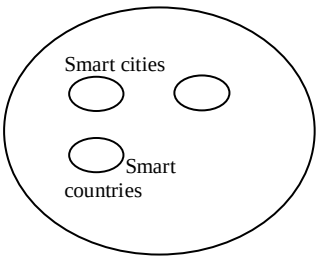

FIG 1: SMART WORLD WITH IoT DIVIES

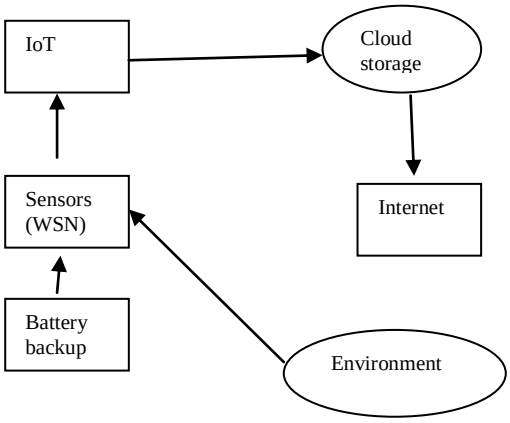

Fig 2: Wireless Sensors With Battery Back Up

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IV. CONCLUSION

Internet today covering all aspect of our life's. With development of technology like wireless sensor networks able to senses environment when this two technology and few other all together form IoT. It's something that does not make use of human interference to large extend.

This paper we try to analysis some of the open challenges in IoT that still does not have standard solutions.

Paper also tries to covers a survey on energy efficient protocols in internet of things.

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