

Resource Management in Iot: A Review

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Abstract: The automation of the day-to-day activities increases the requirement to establish networks of sensors and actuators connected to the internet. Hence, the Internet of Things (IoT) play major role in all the area of network formation using internet. The resources need for each thing in IoT has limitations in terms of size of the hardware, communication channel due to huge quantity and cost restriction. Hardware resource constraint demands the restrictions of Operating System and software in the things of IoT. As the result, resource management becomes the challenge to efficiently utilise the IoT for sensing the environment, data process, analyse, prediction, communication and automation.

Index Terms: Internet of Things, protocol, resource management

I. Challenges of Resource Management in IoT

Resource management in IoT includes maximise the productivity by optimistic utilisation of each resource. In [1] the power, storage and bandwidth of the device are the most vital resources to be optimised. Consequently, the proper management of device computation, deployment of things in IoT network, communication channel reduces the energy consumption in turn achieves efficient resources management. Figure 1 represents the clustering of the existing categories of solution for resource management.

II. Protocol Optimisation

The challenges aforementioned requires the following protocol optimisation: i) Deployment ii) perception layer iii) Communication iv) Data Process v) Application.

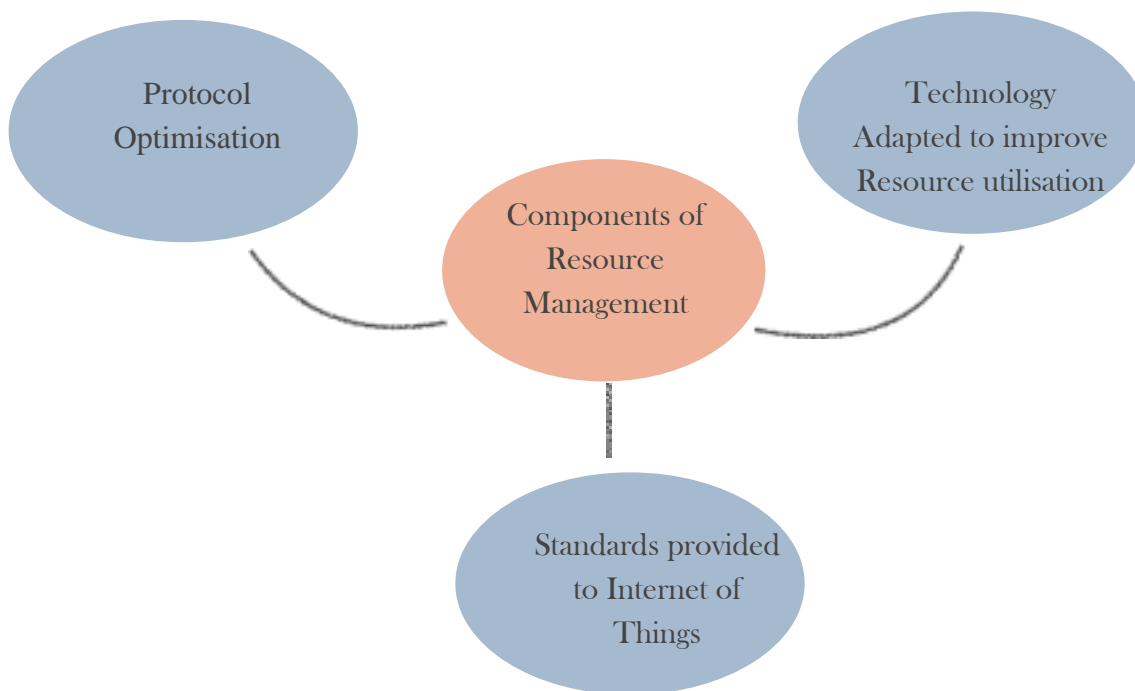


Figure 1 : Components of Resource Management in IOT

In the deployment protocols the low power protocols LoRa, NB [6] achieves the best energy efficiency[2]. The LoRa is a used for unlicensed spectrum and NB developed for licensed spectrum. After the proper deployment, the decision on data acquisition in the perception is the great challenge for resource management. Appropriate choice of routing algorithm for communication decides the efficiency of the networks in terms of internet usage and power utilization to exchange data. Data process protocols [3] makes decision on the parameters such as data aggregation, select appropriate edge device for data processing when the IoT incorporates the cloud [4,5] and so on. The Constrained Application Protocol(CoAP) is one of the best protocol to achieve fast and efficiency for resource constrained devices.

III. Technology and Standards

Apart from the protocols, some of the technology and standards also available, which also supports the resource management in IoT. The virtual resources technology in edge computing devices support the resource constraint devices to overcome the physical device limitations via CoAP[2]. The standards for communication based on the distance also reduces power consumption. There are short and long-distance standards are available. The Near field communication, Ultra Wide Communication standards for short-distance communication, whereas 6LowPAN[9], WirelessHART[8] based on Zigbee(IEEE 802.15.4) are some

of the long-distance standards deployed for resource constraint device networks. In IoT devices, the selection of Real Time Operating System (RTOS) also supports the resource management. The factors consider here decide the efficiency of IoT network by performing resource management.

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