



A Survey on Application Layer Protocols for Internet of Things (IoT)

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Abstract: Internet of Things (IoT) or Web of Things (WoT) is emerging technology and it wireless network between two or more smart objects or smart things connect via Internet. IoT classified in two type first is inside of IoT and second side is outside of IoT. In inside of IoT consider as protocols in IoT. In outside of IoT consider as sensor, actuators, etc..., those are physically possible. In inside of IoT consider as Protocols and IoT have their own protocol stack. Protocol stack have different layer like Application layer, Transport layer, Internet layer and Physical/Link layer.

The judgmental role goal of IoT is to ensure effectual communication between two objects and build a sustained bond among them using different application. The application layer responsible for providing services and determining a set of protocol for message passing at the application layer. This survey understand application layer protocol like CoAP, MQTT, AMQT, XMPP and RESTFUL. Also describe some of the new protocols in application layer protocol. Which type of architecture (like request/response, client/server and publish/subscribe) and security (like DTLS, TCL/SSL and HTTPS) support in those protocols.

Keyword: Internet of Things (IoT), Application layer protocols, CoAP, MQTT, AMQT, RESTFUL, Web-socket.

I. INTRODUCTION

Internet of Things is environment where small smart devices are connected always, anytime and anywhere with each other via internet. A question is every one mind why we use IoT?, because of IoT enable all kinds of devices to connect together and share information seamlessly and number of things connected to the Internet is more than people present on earth that reason we used IoT. Those things or objects is small embedded devices that must contain low power and low cost also. Generally IoT classified in two type first is outside of IoT and second is inside of IoT. In outside of IoT types physically possible, outside of IoT are RFID (Radio Frequency Identification), WSN (Wireless Sensor Networks (for example Sensors and actuators)), Addressing schema, DSA (Data Storage and Analysis) and Visualization[2]. Those five element enable IoT component enable physically.

Another side of IoT is outside of IoT, in this type include protocols. IoT have its own protocol stack, their different than other protocol stack like OSI model and TCP/IP protocol stack. IoT model protocol Stack show in figure below. Figure show different layer of model layer like Application layer (Protocols are COAP, MQTT, AMQP, XMPP, RESTFUL and Web-sockets), Transport layer (Protocols are UDP and DTLS), Internet layer (Protocols are RPL and 6LoWPAN) and Physical/Link layer (protocols are IEEE 802.11 series and IEEE 802.15 series) [7]. In this survey paper we talk about only application layer, In general manner IoT application layer protocols just replace TCP/IP application layer protocols in IoT framework.

Definitions - The Internet of Things (IoT) is the inter-networking of physical devices, vehicles, buildings, and other items-embedded with electronics, software, sensors, actuators, and network connectivity that enable these objects to collect

and exchange data[1]. In short IoT connect with each and every object and communicate with each other anywhere and anytime, so IoT do just like Machine to Machine (M2M) communication. In other word Internet that make things or Objects are smart call IoT.

Layer	Protocols
Application Layer	CoAP, MQTT, XMPP, AMQP, RESTFUL, Websockets
Transport Layer	UDP, DTLS
Internet Layer	RPL, 6LoWPAN
Physical/Link Layer	IEEE 802.15 Series, IEEE 802.11 series

Figure 1: IoT protocols stack

II. RELATED WORK

Internet of Things (IoT) is emerging technology. Show in previous section inside of IoT describe as protocols. By studying paper regarding IoT and IoT protocol related IETF standards paper show application layer protocols focus basically on message exchange between applications and the internet [2]. Most of paper summarize some the most important standard that are provide different stander organizer. It also provides a discussion of different IoT challenges including mobility, scalability. In other survey paper show different layer like transport layer used or provide security in application layer protocols. Internet layer protocols like RPL (Routing for low power and lossy network) and 6LoWPAN (IPv6 over Low Personal Area Network). 6LoWPAN used in