

data center provides the data processing, decision making and systematic management. Sensors and the actuators can establish a communication which can be wired or wireless and can be connected in the network among the interconnected things. As per the data sensing the sensors are classified into two types such as ID based sensor and attribute based sensor.

Ubiquitous sensing refers to various sensor technologies serves for sensor actuator layer. Ubiquitous sensing and controlling can be achieved through this. Wireless sensors networks can be integrated with the sensing technologies to transmit the collected data's to the heterogeneous network [3]. The wireless sensing technologies includes RFID, Bluetooth, Zigbee, Ultra wideband, Infra red data transmission. Internet of Things can be explained with the system level features such as device heterogeneity, scalability, data exchange through wireless technologies, energy optimized solutions, localization and tracking capabilities, self organization capabilities, semantic interoperability and semantics and embedded security and privacy preserving mechanism.

3. RADIO FREQUENCY IDENTIFICATION (RFID)

RFID technology is used for the embedded communication that enables microchip designs for wireless data communication. RFID systems can be hardware were it is readers and tags, as well it can be software or else middleware. It consists of many readers and tags. RFID tags are used for specific address and applied to the objects. Using line-of-sight RFID is to monitor and sense the objects which implemented in real time. Without using line-of-sight RFID system can be used to monitor the objects and the entities [2]. By using this real world can be mapped into the virtual world. RFID tags can be passive in most of the cases, active and also semi passive. When sensor networks are incorporated with RFID it can track the status of things in a better way. The objects can be tagged in the network by using the electromagnetic field or electro static coupling.

RFID tag can be configured into three types. First, Passive Reader Active Tag (PRAT) where the reader is passive and the battery which used are active. Second, Active Reader Passive Tag (ARPT) which is used in common. Third, Active Reader Active Tag (ARAT) where both the readers and tags are active [4]. RFID tag is simplified, low-cost and disposable contactless smart card. There are several frequency ranges for RFID which is used for different applications. When the tag

comes into the range of RFID reader it will transmit the attributes and ID to the reader. Fig 2 shows the working of EPC in RFID.

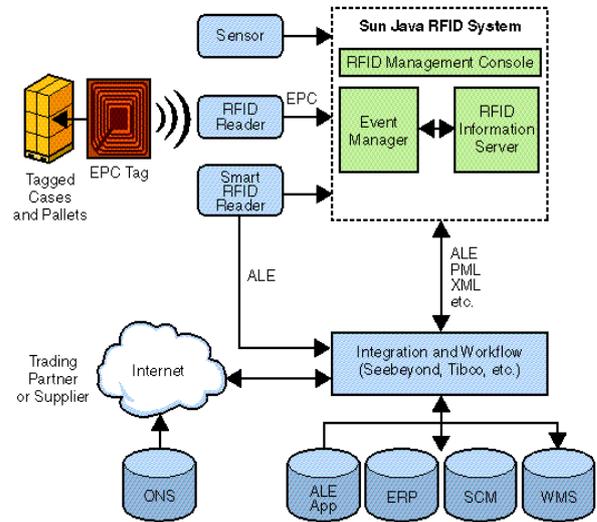


Fig 2: EPC tag in RFID

4. SCADA MIDDLEWARE

SCADA is like a middleware server which can be accessed through a gateway which collects the data from various data buses. It can be accessed in the LAN environment before it is connected to the back systems. Many of the SCADA applications use the wire line connections as shown in Fig 3. Some of the products developed using this SCADA are central data control, elution, Richard zeta and Tritium [5]. SCADA middleware is even used by the OPC middleware to enhance the standards.

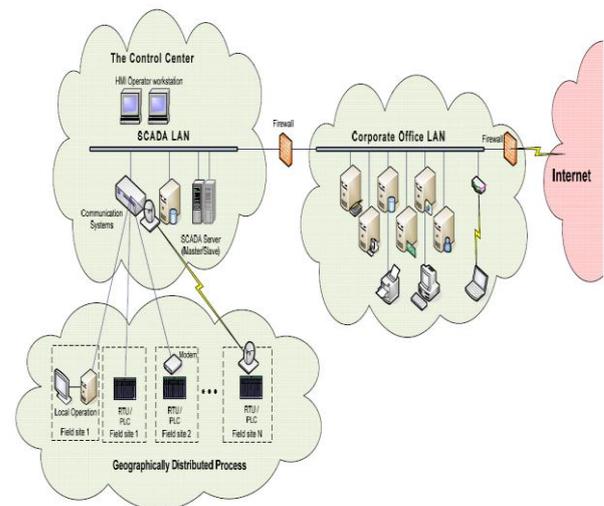


Fig 3: SCADA technology

5. NEAR FIELD COMMUNICATION (NFC)

RFID and NFC are merely similar to each other otherwise it can be said as the integration of the reader into mobile phones. NFC is like a radio communication where the data's can be exchanged by bringing the NFC enabled near to each other. The operating range is based on the size of the antennae in the device. The minimum range of NFC for a device is 20m.

The near field communication is not like the Bluetooth, where it requires pairing for the data to be transferred but NFC doesn't. The NFC between smart objects will be safe because it cannot be operated from a remote login as shown in Fig 4. One of the technologies in NFC is FeliCa technology [6]. FeliCa is called as Felicity Card which is used by RFID. This technology is used in payment cards which are useful in shopping, debiting the amount.

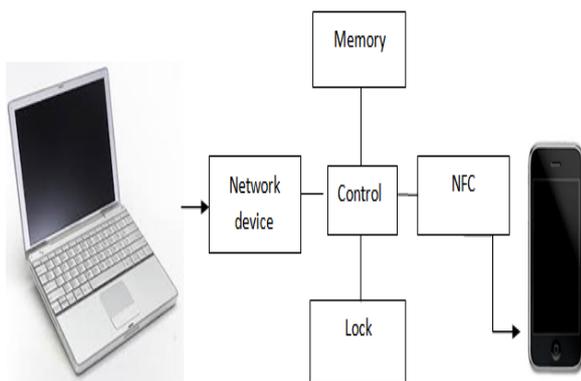


Fig 4: NFC on laptop and mobile phone

6. ZIGBEE

Zigbee is one the ubiquitous sensing technology which is low power, low rate, and short range data transmission for the personal networks [7]. Zigbee mainly characterized by three network topologies such as mesh topology, star topology and tree topology. While deploying the Zigbee enabled devices, those devices will be organised using mesh topology since it can be used to achieve long distance communication through those intermediate devices.

7. CONCLUSION

Thus it is clear from this paper that the Internet of Things is a major factor for integrating different technologies and solutions. The vision of IoT is to map the physical devices with the cyber world. The Radio Frequency Identification (RFID), Scada Middleware, Near Field Communication (NFC) and ZigBee are some of the ubiquitous technologies integrated with the cyber world for future developments in technology and solutions.

8. REFERENCES

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