Transfer Static Electric Charge in form of Data Packets from One Mobile Phone to Another using ARP Protocol

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Abstract-*The Phone batteries are essential part of a Mobile phones, is need to charge after its get Discharged. An electric charge is stored in chemical form in a mobile phone battery The charge which is stored in the mobile phone batteries is static. This paper focuses on the technology of converting static electric charge into data packets and transmitting it from source to destination (i.e. from one mobile to another mobile) over a network through an Address Resolution Protocol (ARP) protocol. This Paper Focuses on How Mobile Phone send a battery from one device to another Mobile phone. ARP is a protocol for mapping an Internet Protocol address to a physical machine address that is recognized in the local network.*

Key Words:Electric charge, ARP protocol, Wireless Transmission, Signals, Data Packets.

1. INTRODUCTION:

A battery is essential part of the any device. It needs charging once it discharge. Nowadays we are facing a problem of battery discharge in mobile phones. This research paper presents transmission of battery power from one mobile phone to another using ARP protocol.ARP protocol is nothing but Define Protocol for sending a data packet from one device to another.In mobile phone battery a power is stored in the form of electric charge because of which battery charges and discharges.Wireless charging is introduced recently. It is also called as inductive charging.Inwireless charging signals are transferred from one device to another device with the help of transmitter over short distance. But it is not possible over long distance.In the technology presented in this paper, transfers a data packet instead of transmission signals.A receiver will get messages when receiver is in network and accept a packet and decode it.

2. LITERATURE REVIEW:

2.1 ARP Protocol:-

An Internet is made of a combination of physical networks connected by Internetworking devices such as routers. A packet starting from source host passes through several different networks before finally reaching the destination host. The hosts and routers are recognized at the network level by their logical (IP) addresses. However, packets passes through networks to reach these hosts and routers. At the physical level, the host and routers are recognized by their physical addresses (is a local address). It must be unique locally, but it is not necessarily to be unique universally. Anytime a host or router has an IP address to send to another host or router, it has the logical (IP) address of the receiver. But the IP datagram must be encapsulated in a frame to be able to pass through the physical network.

A mapping means creating a table that associates logical address with physical address. There are two types of mapping- Static(creating a table that associates logical address with physical address.) and Dynamic.

In dynamic mapping- Host knows the logical address of another Host, it can use a protocol to find the physical address of another host. Two protocols have been designed to perform dynamic mapping: - ARP and RARP.

ARP- Address Resolution Protocol (ARP) is a protocol for mapping an IP address to a physical machine address that is recognized in the local network. A sender needs the physical address of the receiver so sender may transmits a packets. The host or router send an Arp query packet. It includes Physical and IP address of the sender and the IP address of

the receiver. Because sender does not know the physical address of the receiver, the query is broadcasted over the network show in fig-1.1.a.

Every host or router on the network receives and processes the ARP query packet, but only the intended recipient recognizes its IP address and send back an Arp responses packet. The response packet contains the recipients IP and physical address. The packet is unicast directly to the sender by using the physical address received in the query packet shown in fig-1.1.b [1]

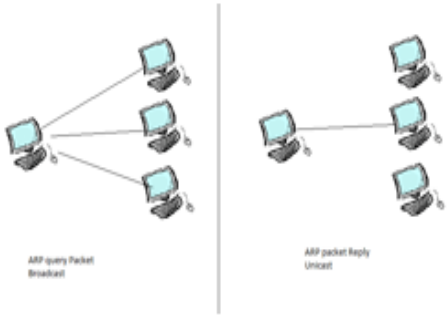

Fig 1.1.a: ARP query request Fig 1.1.b ARP reply

ARP Packet Format-

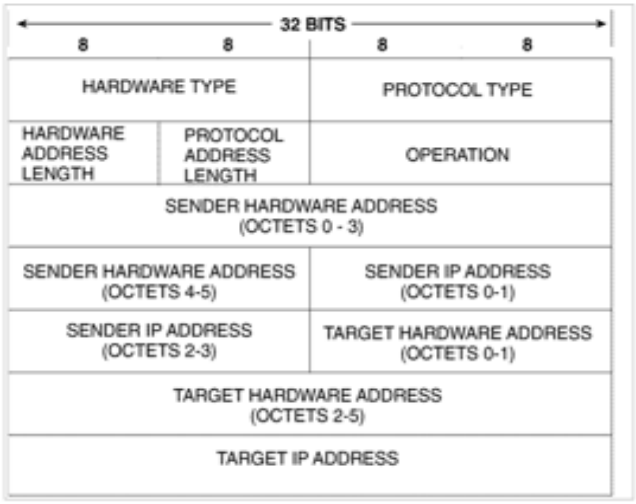

Fig 1.2 ARP Packet Format [2]

A packet is directly encapsulated in data link layer

1. Hardware Type: This is a 16-bit field defines type of the network on which ARP is running. Each LAN has been assigned an integer based on its type. For example, Ethernet is given type 1, ARP can be used on any physical network.
2. Protocol type: this is a 16-bit field defines the protocol. For Example, The value of this field for the Ipv4 protocol is 080016.
3. Hardware Length: this is an 8-bit field defines the length of the physical address in bytes. For example, for Ethernet the value is 6.
4. Protocol length: this is an 8-bit field defines the length of the logical address in bytes. For example for the ipv4 protocol the value is 4.
5. Operation: this is a 16-bit field defines type of packet. Two packet types are defined. ARP Request (1) and ARP reply (2).
6. Sender hardware address; this is variable length field defines the physical address of the sender. For example for Ethernet the field is 6 bytes long.
7. Sender protocol address: this is a variable-length field defines the logical address of the sender. For the IP protocol, this field is4 bytes long.'
8. Target hardware address: this is a variable-length field defines the physical address of the target. For example, for Ethernet this field is 6 bytes long. For an Arp request messages, thus field is all 0s because the sender does not know the physical address of the target.
9. Target protocol address: this is a variable-length fields defines the logical address of the target. For the ipv4 protocol, this fields of 4 byte long.[1]

2.2Wireless Charging:-

Wireless charging (wireless power transfer) uses electromagnetic fields to transfer power from a transmitting source to a receiving device for the purposes of charging (or recharging) a battery without the use of a physical connection.

Wireless charging uses an inductive or magnetic field between two objects which are typically coils to transfer the energy from one object to another object. The energy is transfers from the energy source to the receiver where it is typically used to charge the battery in the device.

This makes wireless charging or inductive charging ideal for use with many portable devices such as mobile phones and other wireless applications. The system is essentially a flat form of transformer - because this makes it easier to fit into the equipment in which it is to be used. Many wireless battery charging systems are used in consumer items where small form factors are essential.

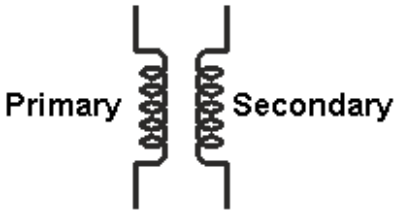

Fig2.1: Concept of wireless charging [3]

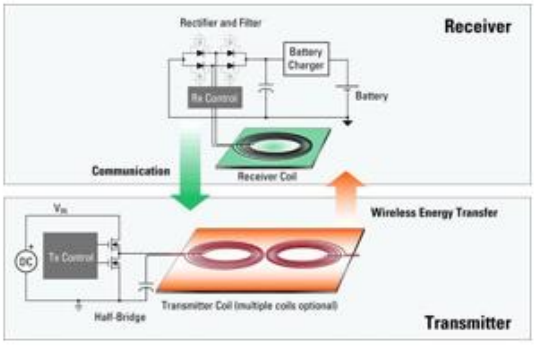

Fig 2.2: Circuit Diagram [4]

The primary side of the transformer is connected to the energy supply that will typically a mains power source, and the secondary side will be within the equipment where the charge is required.In many applications the wireless battery charging system will consist of two flat coils. The power source is often contained within a pad or mat on which the appliance to be charged is placed. [3]

Working of Wireless Charging:-

Wireless charging is based on the magnetic resonance, or Inductive Power Transfer. This is a process of flowing electric current between two coils, to produce an electromagnetic field.The below Fig 2.3simplifies the process of wireless charging and power transfer.

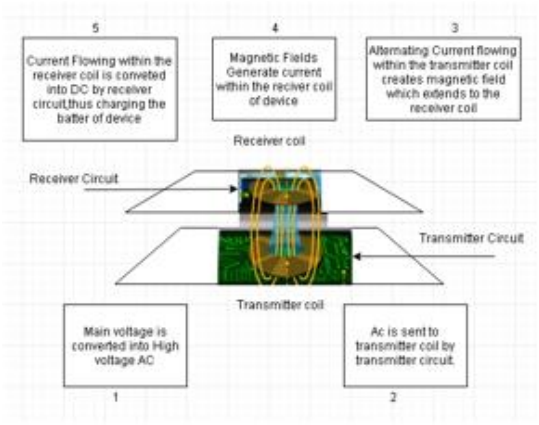

Fig 2.3: Working of wireless charging [3]

- Mains voltage (Power) is converted into high frequency alternating current (AC).
- AC is sent to the transmitter coil by transmitter circuit. The AC then generates a time varying magnetic field in the transmitter coil.
- AC flowing within the transmitter coil produces a magnetic field, which implements to the receiver coil (when within a specified distance).

- The magnetic field generates current within the receiver coil of the device. Energy is transmitted between the transmitter and receiver coil is also referred to as either magnetic or resonant coupling and is achieved by both coils resonating at the same frequency.
- Current flowing within the receiver coil is converted into direct current (DC) by the receiver circuit, which can then be used to charge the battery.

It's through this process that power is safely transferred over Short distance between 2 devices. [3]

3.HOW ACTUALLY IT WORKS:-

The evolution of this technology is to takes numbers that represents the discrete signals and group them together in a data packet and send it similar to the way computers send and receive information to the Internet.

3.1Transmission side:-

As per the newton's law of electricity, energy neither be created nor destroyed. It's simply converted from one form to another. Batteries make energy portable. In our mobile battery, energy will stored in form of chemical energy which is havingelectric charge to charge or discharged the batteries.

This chemical energy is converted into electrical energy.Batteries transform chemical energy into electrical energy.There are many different types of batteries, but almost all have three basic components: positive electrode (cathode), negative electrode (anode) and electrolyte, which separates these two terminals.The electrolyte is a chemical medium that allows the flow of electrical charge between the cathode and anode, When a device is connected to a batteryWhen the positive and negative electrode are connected so that electrons (electricity) can flow between them, chemical reactions occur at the electrodes. These reactions release extra electrons at the anode which flow to the cathode.The chemical reactions occurbetween the electrolyte and the cathode and between the electrolyte and the anode that create a flow of electrical energy to the device.Different types of batteries use different materials for the three components. [5]

Now we have electrical charge in form of electrical energy. Using a device called "Transducer", that's generates analog electrical signals from electrical energy.A transducer is a device that converts one form of energy to another. Usually a transducer converts a signal in one form of energy to a signal in another, where electrical signals are converted to and from other physical quantities (energy, force, torque, light, motion, position, etc.).[6]

Now we have analog signals that made from transducer,an analog signal is converted into digital signal that is digital form by using ADC converter.An analog-to-digital converter is a device that converts a continuous physical quantity (usually voltage) to a digital number (0's and 1's) that represents the quantity's amplitude as shown in Fig- 3.1.1. An ADC can be determined as two processes: sampling and quantization. Sampling converts a voltage signal into a discrete (sequence of real numbers). Quantization is process of taking a real number with an approximation from a finite set of discrete values, which is necessary for storage and processing by numerical methods. [7]

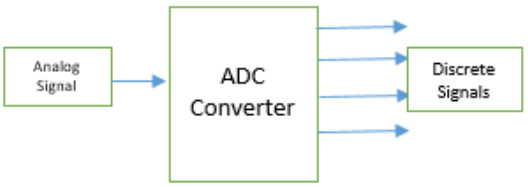

Fig 3.1.1: Block Diagram of ADC

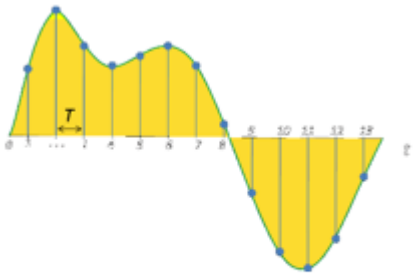

Fig 3.1.2: Sampling [8]

A digital form means a digital signal is a signal that represents a sequence of discrete values. A digital signal with only two possible values and describes an arbitrary bit stream. A digital signal is a physical quantity that is alternating between a discrete set of waveforms. Alternatively, a digital signal may be considered to be the sequence of codes represented by such a physical quantity. [10]

With the help of ADC we make electrical charge in the form of discrete value that is 0 and1.Anything different from this is

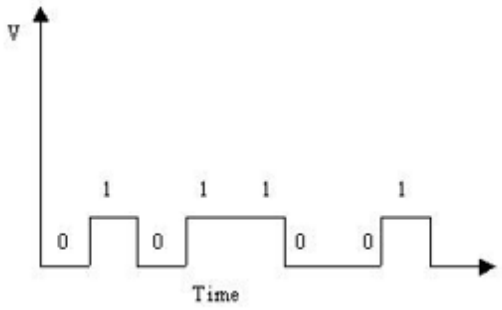

Fig 3.1.3: Discrete Signals [9]

discarded.

These discrete value are now merge into a data packet of ARP protocol which we are going to transfer to other mobile device.Take numbers that represent the discrete signals and group them together in a data packet similar to the way computers send and receive information to the Internet.

3.2Receiving Side:-

A receiver will collect data packet which contains a discrete values these value are converted into analog signals with help of DAC converter then we get an analog signal.

A digital-to-analog converteris a function that converts digital data (usually binary) into an analog signal-current, voltage, or electric charge as shown in Fig-3.2.1. Unlike analog signals, digital data can be transmitted, manipulated, and stored without degradation.[11].these signal are now converted into electrical energy with the help of transducer

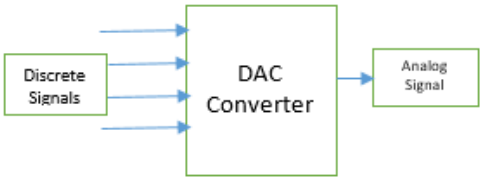

Fig 3.2.1 Block diagram DAC

device.

Now finally we have electrical energy which further converted into chemical energy and charge which is form of discrete values is converted into chemical energy and stored in battery of another mobile phone.

During a discharge the anode releases electrons to the negative terminal and ions in the electrolyte through an oxidation reaction. Also at the positive terminal, the cathode accepts electrons. The electrolyte puts the different chemicals of the anode and cathode into contact with one another, the chemical potential can equilibrate from converting stored chemical energy into useful electrical energy. These two reactions happen simultaneously, the ions transport current through the electrolyte while the electrons flow in the external circuit, and generates an electric current. And charge the battery of mobile phone. [11]

So In this way One mobile Phone send a particular amount of battery(Electric Charge) in form of data packets to another Mobile Over network.

4.CONCLUSION

From the above research we can share a Mobile battery power in form of electric charge in between two devices placed at long distance. Using ARP protocol we can use a security over transmission. And charge will flow uniformly without dropping single electric charge. It provides static electric charge transmission.

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