

CONTROLLING THE HOST PERIPHERAL DEVICES VIA INTERNET

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Abstract :

In this paper the host peripheral devices such as (lights, cooling systems, heating systems, or machines ..., etc) are controlled by a personal computer (pc) via parallel port (LPT), this computer must be connected to the network as server and other computers connected to the network as clients. These computers can control the host peripheral devices via network software. The aim of this paper is to control the host peripheral devices from any location in the world if the server is connected to the internet.

السيطرة على الاجهزة المحيطة بالحاسب عن طريق الشبكة العنكبوتية

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المستخلص:

تم في هذا البحث السيطرة على الأجهزة المحيطة بالحاسب الشخصي مثل (المصابيح، أجهزة التبريد، أجهزة التدفئة، أو المكائن،...الخ) عن طريق المنفذ المتفرع. ثم تم ربط الحاسب الشخصي إلى الشبكة كخادم (Server) و كذلك ربطت مجموعة حواسيب أخرى إلى الشبكة كعملاء (clients). يقوم العملاء بالسيطرة على الأجهزة المحيطة بالخادم (Server). الهدف من هذا البحث هو السيطرة على الأجهزة المحيطة بالخادم (Server) من أي موقع في العالم عن طريق الشبكة العنكبوتية (Internet) إذا تم ربط الخادم بالشبكة العنكبوتية.

Introduction:

The most popular network architecture for local area networks (LANs) is the Ethernet. The Ethernet interface is a cable bus which runs over copper or fiber. The copper interfaces use either a coax line or differential twisted pairs, while the fiber runs use fiber-optic cables. The Ethernet network is defined by IEEE 802.3[1]. The Ethernet standard uses **Manchester** Encoding and Decoding as shown in figure.(1)[2]. Access control is gained via Carrier Sense, Multiple Access with Collision Detect (**CSMA_CD**). Preamble Field: A 56 bit pattern of alternating ones and zeros which are used to synchronize the receiver clock to the incoming data packet. SFD Field: Start Frame Delimiter Field, indicates the beginning of the frame; [10101011] as shown in figure.(2).[3]

⁺ Received on 27/4/2010 , Accepted on 22/2/2011 .

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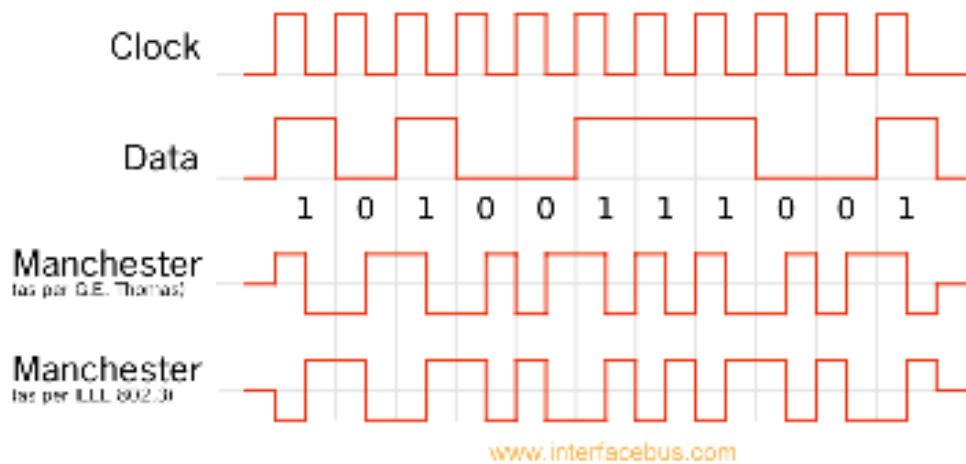
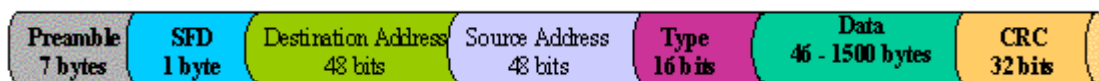


Figure.(1): Manchester encoding



Figure(2): The Ethernet frame format

A unique 6-byte (48-bit) address that is usually permanently burned into a network interface card (NIC) or other physical-layer networking device and that uniquely identifies the device on an Ethernet-based network (MAC address). A new standard that allows Ethernet and Transmission Control Protocol/Internet Protocol (TCP/IP) to be used for automation networks within industrial plants[4]. The client/ server network consist of many connections among multiple computers one of them work as administer and the others as users[5]. Server and clients have IP, and Port addresses. Both sides will be communicating in case that they use the same channel which set number of port. The Program that communicates in these application must reference the number of port every time because the system has lots of program communicating, as shown in figure.(3).

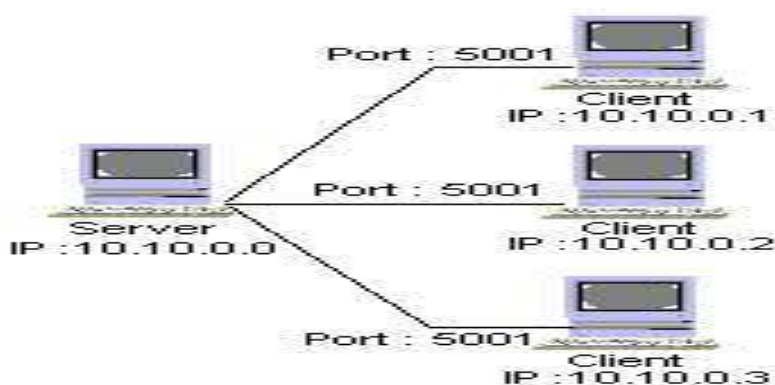


Figure.(3): Client/ server network

Controlling the parallel port via network:

The parallel port and supporting software routines for data transfer and hand shaking have long become standards for printers communication. It consists of an 8-bit output data, 4- bit

input/ outputs control lines, and 5-bit input status lines [6][7]. It is possible to controlling the parallel port through the network, which is required the following parts: network server software to run scripts to take user controls, and executable file to control the computer, this application software can be written using one of the programming language such as C, C++, VC++, or VB, ... etc.[8] as shown in figure.(4)

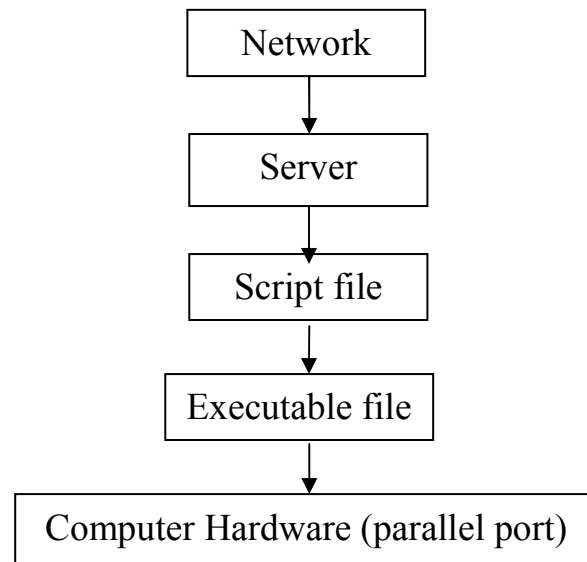


Figure.(4): Block diagram of parallel port controlling Through network

The hardware and Software description:

In this paper the parallel port used to control the home devices (lights, heating system (heater), and cooling system (fan)) by using the interfacing circuit as shown in figure.(5). Table (1) shows the component of the controlling circuit.

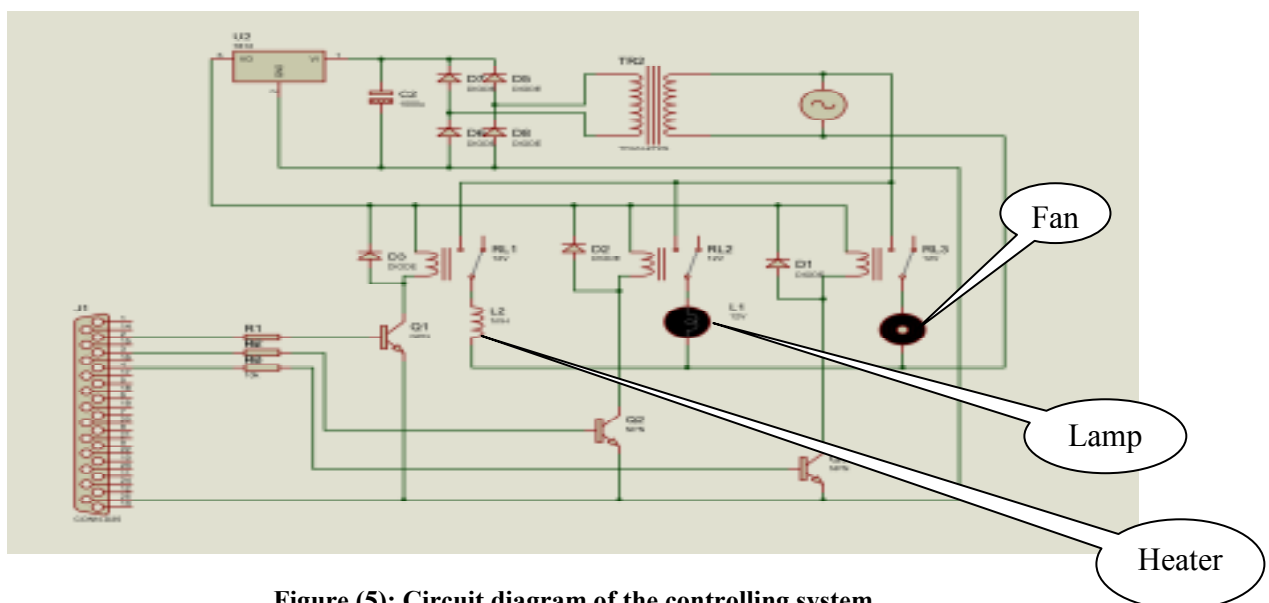


Figure.(5): Circuit diagram of the controlling system

Table.(1): Control circuit components

object	symbol	value
Resistors	R	1K Ω
Capacitors	C	1000 μ f/35V
Diodes	D	2N4007
Transistors	Q	BC107
Relays	RL	12VDC/10A
Regulator	U	7812
Transformer	TR	220V primary,16V/2A secondary

The first step is started by connecting the computer server and clients by a local area network (LAN), as shown in figure.(6), then the network is programmed by using VB.6 language.

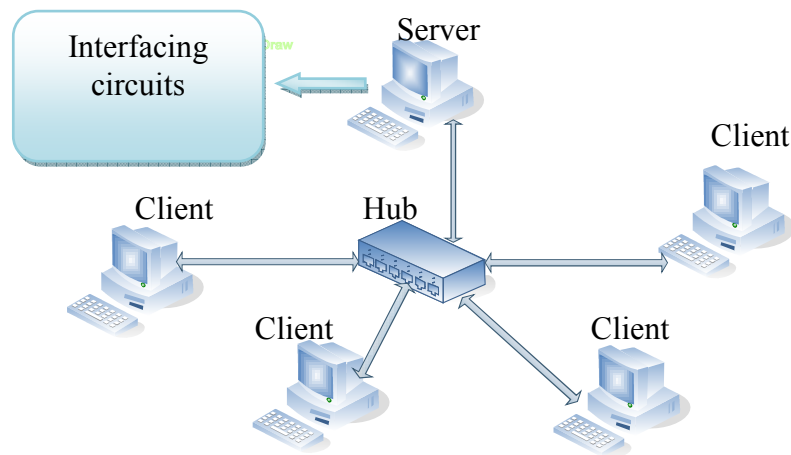


Figure.(6): Network diagram of the system

A network application protocol typically has two parts or "sides", a client side and a server side. The client side in one end system communicates with the server side in another end system for many applications, a host will implement both the client and server sides of an application. If Host (A) initiates the Telnet session (so that a user at Host A is logging onto Host (B)), then Host (A) runs the client side of the application and Host (B) runs the server side. On the other hand, if Host (B) initiates the Telnet session, then Host (B) runs the client side of the application. An application involves two processes in two different hosts communicating with each other over a network. The two processes communicate with each other by sending and receiving messages through their *sockets*. A process's socket can be thought of as the process's door: a process sends messages into, and receives message from the network through its socket. When a process wants to send a message to another process on another host, it shoves the message out its door. The process assumes that there is a transportation infrastructure on the other side of the door that will transport the message to the door of the destination process [9] as shown in figure.(7).

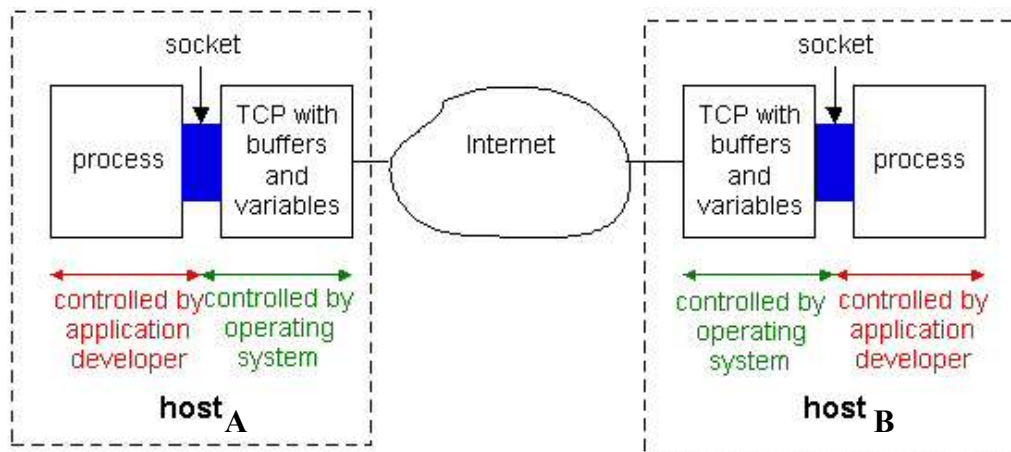


Figure.(7): Application processes, sockets, and the underlying transport protocol.

In order for a process on one host to send a message to a process on another host, the sending process must identify the receiving process. In the Internet applications, the destination host is specified by its IP address. In addition to knowing the address of the end system to which a message is transfer, a sending application must also specify information that will allow the receiving end system to direct the message to the appropriate process on that system. A receive-side port number serves this purpose in the Interne [10]. Figures (8),(9) represent the client and server flowchart.

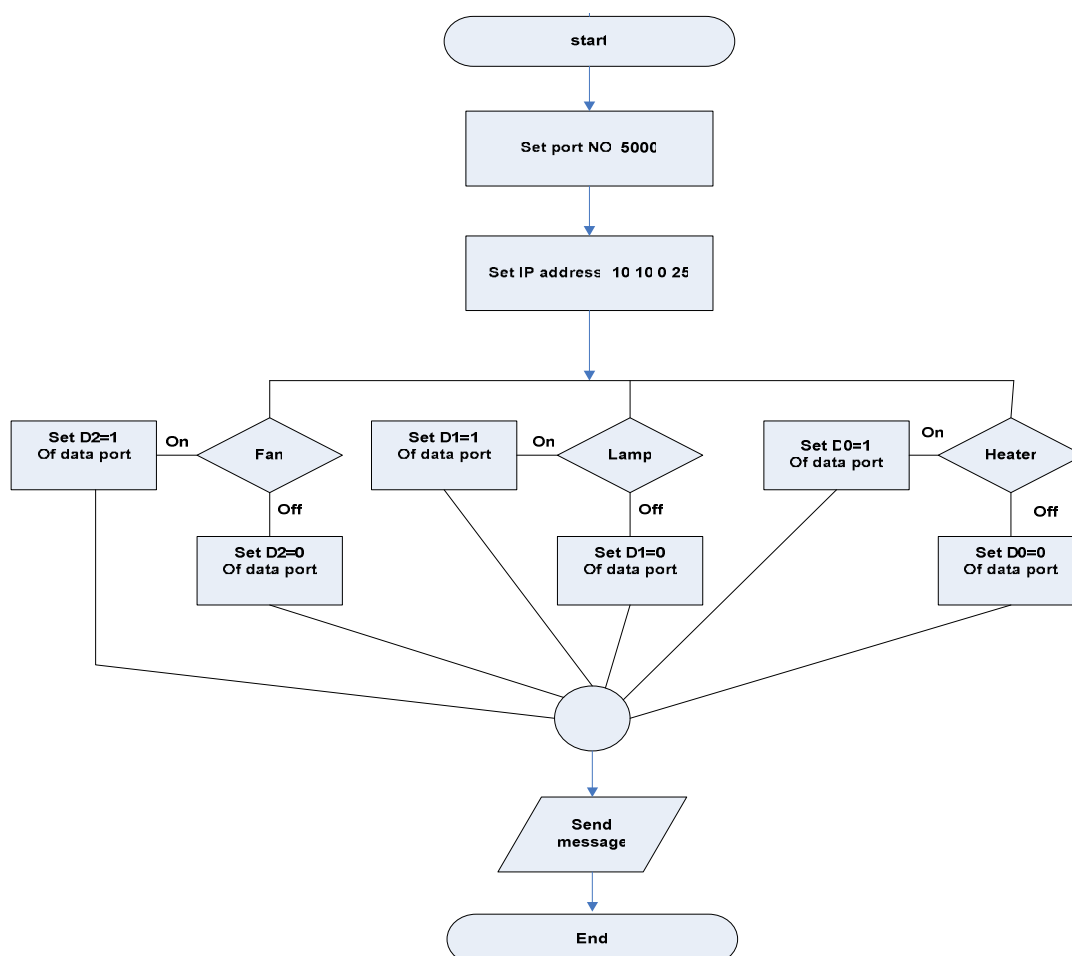


Figure.(8): Client flowchart

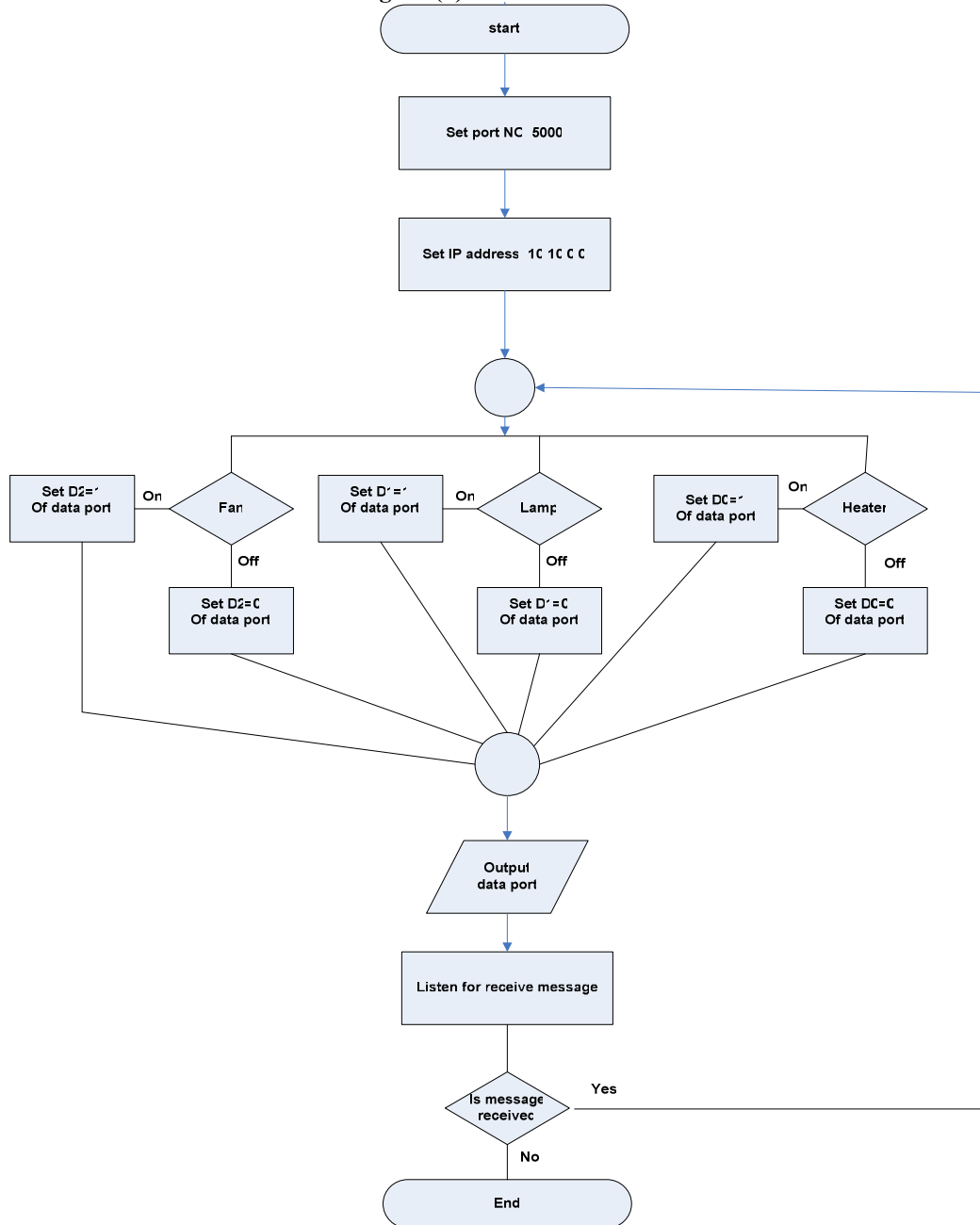


Figure.(9): Server flowchart

In VB.6 the function Winsock control, it is used in programming to communicate with TCP/IP protocol the communication must have Server and Client programs. The 1st event must be done as Server is verifying signal from Client. In this section Event Click of the button named cmdListen will be used.

```

Private Sub cmdListen_Click()
    Winsock1.LocalPort = txtPortSvr.Text
    Winsock1.Listen
End Sub
  
```

The second event as Client will respond by sending signal to Server.

```

Private Sub cmdConnect_Click()
    Winsock1.RemoteHost ="10.10.0.25"
  
```

```

Winsock1.RemotePort = "5000"
Winsock1.Connect
End Sub
Actually, Server with Client can communicate, let's send Data.
Private Sub cmdSend_Click()
    Winsock1.SendData ()
End Sub
Sub Winsock1_DataArrival(ByVal bytesTotal As Long)
    Dim StrValue As String
    Winsock1.GetData StrValue
End Sub

```

The following two figures (10),(11) will represent the client and the server form that appear after executing the program.

Figure.(10): Client side program

Figure.(11): Server side program

Both programs server, and client can control the peripheral devices of the server. The system can be controlled from any location if both the server and client are connected to the internet, as shown in figure.(12).

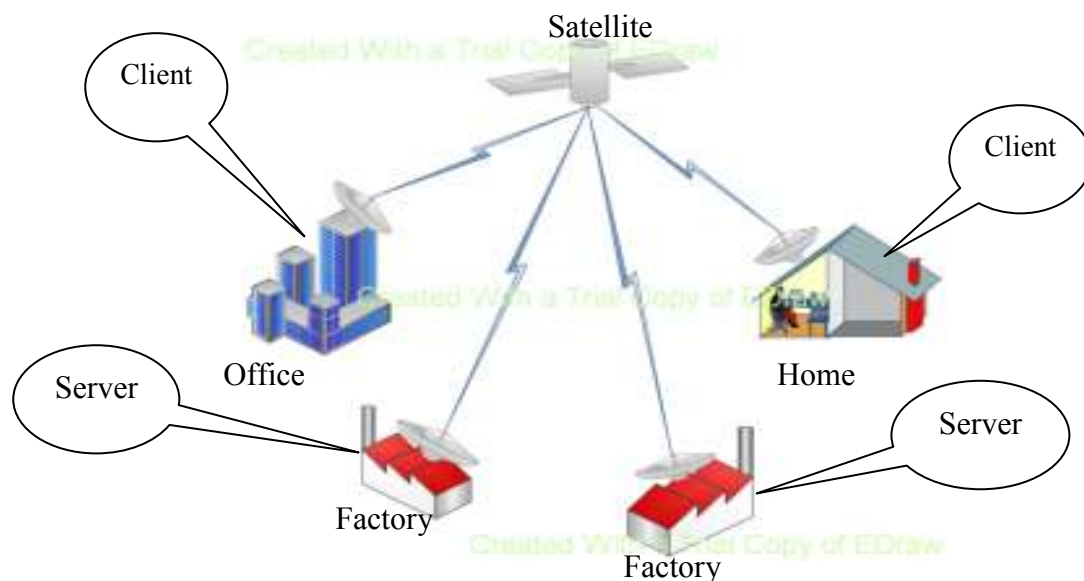


Figure.(12): host controlling devices via internet

Conclusions:

In this paper host peripheral devices (light, fan, and heater) have been controlled via network when connecting the host as server in the network and the other computers as clients, where both the client and server can control these devices.

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