COM PORT BASED DISTRIBUTED SYSTEM

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ABSTRACT:

Today Distributed Network Systems are very popular due to incompatibility and uncertainty of centralized network based systems. This paper presents peer to peer distributed system. The designed distributed consists of group of PC terminals as node of distributed system. The tool has been developed which is software computer application that handles the communication between nodes of Distributed Systems. COM port based distributed system comprises with distributed terminals. These terminals are internet worked by using the wired communication network. We designed and developed the software tool which comprises with two computer applications as a program. We have mentioned the pin out diagram of RS232 cable. Paper illustrates that how does the data transmission takes place during the data transfer operations. We have transferred three database files which contains the text data. The performance is measured and analyzed. Paper also contains the advantages, disadvantages of COM Port based distributed system.

KEYWORDS :

COM Port, Performance Measurement, RS232, Communication Channel, Distributed Receiving Terminal, Distributed Sending Terminal.

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I. INTRODUCTION

Distributed System is the group of computer terminals which are connected through a computer network to perform the computations to accomplish a specific problem. They are of two types : Peer to Peer (P2P) Distributed Systems and other is Client Server Based Distributed System [5]. The computer communication network used can be wired as well as wireless networks. Present experimental study uses wired network by using COM ports. COM Port Based Distributed System (CBDS) is the group of computer terminals by internetworking the computer terminals through COM ports. The distributed system uses the serial communication cable for data communication[2]. This system has various applications. We have used this distributed system for the data transfer operations. We observed that CBDS requires more time for data transfer operations. This system is suitable for limited area. It uses the C programs as Computer Applications to send and receive the data. The data is transferred and received through RS232 cable[13] network as communication channel[6]. The experimental study comprises with : Objective, design, diagram, working, performance, advantages, disadvantages and application in healthcare [4] data communication. Here we have studied PHC/THO/DHO intra departmental communication with in the buildings. It is observed that the healthcare authorities in district are [1] :

- DHO : District Health Officer in Zilla Parishad at District
- THO : Tahsil Health Officer in Panchatay Samiti at Tahsil
- PHC : Primary Health Centers in Village at Grampanchyat

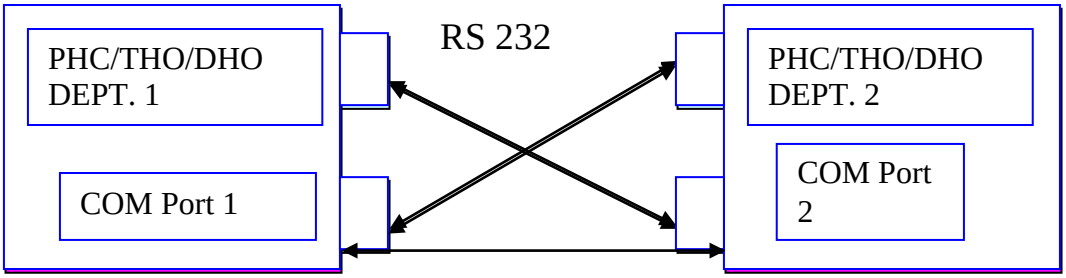
DHO : District Health Officer in Zilla Parishad is posted at District level as responsible user – Authority or Administrator for decision making type of the health and related activities.
THO : Tahsil Health Officer - Authority at Panchyat Samiti is posted at Tahsil level as responsible user for decision making type of the health and related activities.
PHC : PHCs are at located at villages or sub centers where mainly Medical Officers (MO) are responsible for the health and related activities.

II : OBJECTIVE

To design and develop the COM Port Based Wired Distributed System for PHC/THO/DHO unit and measure the performance of data transfer operations by using healthcare communication as an application .

III : DESIGN

The system has been designed is shown in Fig. 1 by using the COM port of Distributed System connected by the RS [RETIMA Standard] 232 cable [12]. Both the COM ports are connected where the connector used is the D-9. C language programs are designed and developed for the both the terminals as Distributed sending Terminal and Distributed Receiving Terminal[15]. These programs are enclosed herewith. This communication is serial data communication [7] . The COM ports shown in Fig. 1 of both the Distributed System terminals of PHC/THO/DHO units have been used for data transfer operation. Here RS - 232 is used for serial input output interfacing. As per the standard, the baud rate of RS-232 is 20 KBPS.



GND:Ground

Fig. 1 : COM Port Based Distributed System

RS232 Pins : Here DB-9 pin connector of the serial input output standard has been used. IBM PC DB-9 Signals with Pin Nos. and their function is shown in Table 1

Table 1 : IBM PC DB-9 : Details of RS232 serial port

Pin no.	Function
1	Data carrier Detect
2	Received Data
3	Transmitted data
4	Data terminal ready
5	Signal Ground
6	Data set ready
7	Request to send
8	Clear to send
9	Ring indicator

COMPONENTS AND NETWORK USED:

CBDS system contains various terminals which are mainly sender computer as sender terminal of CBDS and receiver computer as receiving terminal of CBDS. The specifications of computer hardware and other components used for experimental work are :

- Sender Computer **:** Pentium 4 dual core with E5200 at 2.5 GHZ and 2.1 GB RAM
- Receiving Computer **:** Pentium 4 dual core with E5200 at 2.5 GHZ and 2.1 GB RAM.
- Operating system, used is Windows XP Ver. 3.1 Professional at both the terminals.
- RS 232 cable
- Software tool comprises with Two computer programs as Application 1 and 2 are developed which acts as communication software interface between the terminals.
- Network : As part of networking media both the computers are directly connected through COM Port by using RS232 cable.

IV: WORKING

COM port Based Wired Distributed System is developed as software tool using Turbo C program as a tool. This Distributed System uses COM port for serial data transfer operation. The tool is developed by following research methodology as System Development Life Cycle (SDLC). The other node of the Distributed System i.e. Receiving computer is connected with communication cable. The program which is loaded on sender computer will send the data from self terminal through COM Port cable and the data (i.e. record) will be transferred sequentially in output data file. Note that the empty output file must be created and maintained on receiving computer. The same operation will be carried out till last character will be processed i.e. up to end of data file. For experimental study, we created three text files of size 1.6 MB, 3.1 MB and 6 MB at sender computer. At receiving computer, three empty text files should be created initially. The format of text files is shown in Table 2

Format of Data File :

Table 2 : Format of Text file

District name	Tahsil Name	PHC Name	Year	Month	Target Given	Actual work done	Achievement in percentage
Satara	Karad	Wadgaon	2010-2011	June	40	20	50
Satara	Karad	Wadgaon	2010-2011	July	100	25	40
Satara	Karad	Wadgaon	2010-2011	August	20	10	50
Satara	Karad	Wadgaon	2010-2011	September	10	10	100
Satara	Karad	Wadgaon	2010-2011	October	12	10	87
Satara	Karad	Wadgaon	2010-2011	November	47	20	38
Satara	Karad	Wadgaon	2010-2011	December	41	25	50
Satara	Karad	Wadgaon	2011-2012	January	24	12	50

Table 2 shows the sample text data of PHC database [3] of the family planning cases here target is given each PHC by higher authority and accessing to that they complete course finally report is of achievement is submitted by PHC to higher authorities [9] .

V : PERFORMANCE MEASURED

The performance of this Distributed System is observed manually. Table 3 shows the performance measured [8] by us. Distance between two terminals of the systems is 7 feet on a floor of the PHC/THO/DHO building, Distance can be increased as per the need of the user.

Table 3 : Performance Measurement of CBDS

Sr. No.	File Size	Start Time (Hrs)	End time (Hrs)	Total time (Minutes)	Time per 1 MB (min/MB)
1	1.6 MB	2:48:03	2:55:01	7:2	4.50
2	3.1 MB	2:57:34	3:10:56	14:22	4.58
3	6 MB	3:12:36	3:39:36	27:00	4.50

It is observed that, the time required to transfer 1 MB data is 4.5 minute.

Fig. 2 shows the performance graph of CBDS.

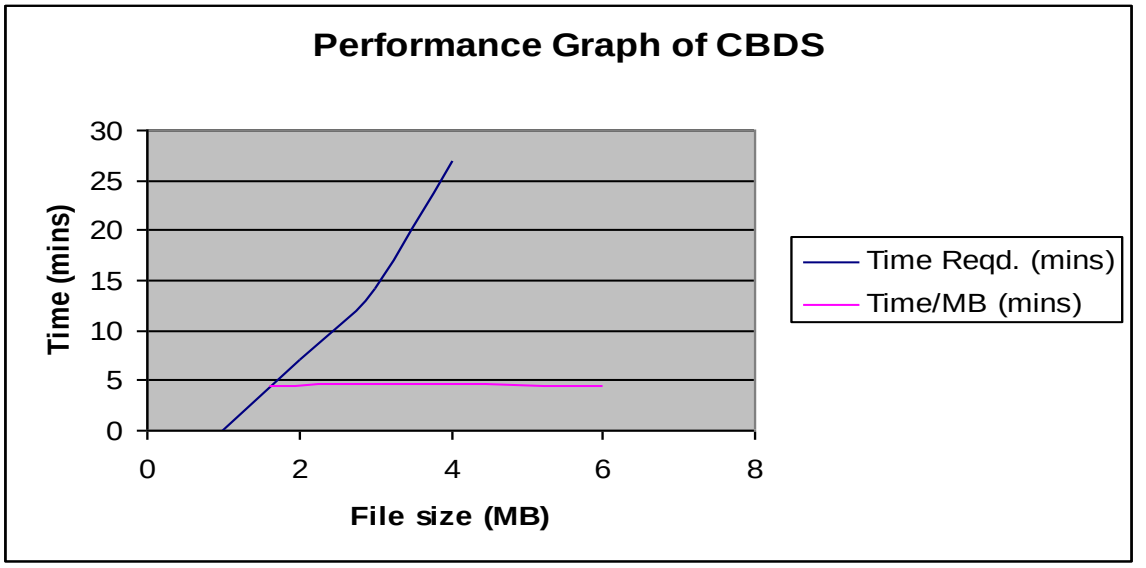


Fig. 2 : Performance Graph of CBDS

As file size increases the time required for data transfer increases shown in Fig. 3 But it has not linear relationship.

VI: COST, TIME, COVERAGE, ADVANTAGES AND DISADVANTAGES

Application cost means the efforts required for the development of tool by using C language for data transfer operations.

- Application cost (Aprx.) : Rs. 1200
- Average Time Reqd. is High
- System does not have Global Coverage

ADVANTAGES:

- It is suitable for small distance or limited area communication.
- It requires application program at both the terminals.
- Performs better data transfer operation

- It is suitable for small distance as limited area of departments of PHC/THO/DHO units.

DISADVANTAGES:

- Application programs are platform dependent.
- Development cost of the system is high if distance is long.
- Data transfer is time consuming process. So it is lengthy.

VII. CONCLUSION

Today the PC terminals are having the COM ports. For data transfer and receive operations we prefer to make use of RS232 cable. Experimental results shows that COM Port based Wired Distributed System covers limited area for data communication. Data transfer time depend on size of file. As this system is wired there is no chances of data loss. For further research we felt that wired network can be replaced with wireless technology such as ZigBee, Wi-fi and Wi-Max and performance may be observed and studied [10,11,14].

VIII. ACKNOWLEDGEMENT

We are thankful to the Health Department of the Satara District, Maharashtra State, India. Authors acknowledge the immense help received from the scholars whose articles are cited and included in references of this manuscript. The authors are also grateful to authors / editors /publishers of all those articles, journals and books from where the literature for this article has been reviewed and discussed.

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COM Port Based Distributed System : C Program as Applications

Application 1

```
/* C Program as application  to transmit data files : com port based distributed system (CBDS) */
#include <dos.h>
#include <stdio.h>
#include <conio.h>
#define PORT1 0x3F8
void main(void)
{
int c;
int ch;

FILE *ft;
ft=fopen("c:\\s.txt","r");
if(ft==NULL)
{
 puts("Cannot open file");
 exit();
 }
outportb(PORT1 + 1 , 0); /* Turn off interrupts - Port1 */

/* PORT 1 - Communication Settings */
outportb(PORT1 + 3 , 0x80); /* SET DLAB ON */
outportb(PORT1 + 0 , 0x03); /* Set Baud rate - Divisor Latch Low Byte */
/* Default 0x03 = 38,400 BPS */

outportb(PORT1 + 1 , 0x00); /* Set Baud rate - Divisor Latch High Byte */
outportb(PORT1 + 3 , 0x03); /* 8 Bits, No Parity, 1 Stop Bit */
outportb(PORT1 + 2 , 0xC7); /* FIFO Control Register */
outportb(PORT1 + 4 , 0x0B); /* Turn on DTR, RTS, and OUT2 */
clrscr();
printf("\nThe file transfer process is started now..... \n");
while(1) {
  ch=fgetc(ft);
  if (ch==EOF)
  break;
  else
  outportb(PORT1, ch);
  } /* Send Char to Serial Port */
  printf("file has been sent succesfully");
  fclose(ft);
}
//* **********END OF PROGRAM 1 **********/
```

Application 2

2 . /* C program as application to receive data using com port based distributed system (CBDS) */

```
#include <dos.h>
#include <stdio.h>
#include <conio.h>
#define PORT1 0x3F8
void main(void)
{
int c;
int ch=0;
FILE *fr;

fr=fopen("d:\\r.txt","wt");
if(fr== NULL)
  {
   puts("can not open file");
   exit();
  }
outportb(PORT1 + 1 , 0); /* Turn off interrupts - Port1 */

/* PORT 1 - Communication Settings */
outportb(PORT1 + 3 , 0x80); /* SET DLAB ON */
outportb(PORT1 + 0 , 0x03); /* Set Baud rate - Divisor Latch Low Byte */
/* Default 0x03 = 38,400 BPS */
outportb(PORT1 + 1 , 0x00); /* Set Baud rate - Divisor Latch High Byte */
outportb(PORT1 + 3 , 0x03); /* 8 Bits, No Parity, 1 Stop Bit */
outportb(PORT1 + 2 , 0xC7); /* FIFO Control Register */
outportb(PORT1 + 4 , 0x0B); /* Turn on DTR, RTS, and OUT2 */
clrscr();
printf("\n Wait file will be receiving \n");
while(ch!=90)
 { c = inportb(PORT1 + 5); /* Check to see if char has been */
/* received. */
if (c & 1) {ch = inportb(PORT1); /* If so, then get Char */
     fputc(ch,fr);
}
}fclose(fr);
}
```

/* *********END OF PROGRAM 2**********/