

Bidirectional Communication With EPABX for Hotel Management Software (HMS) using Handshaking Protocol

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Abstract— The Hotel management system software bi-directionally connects to EPABX through handshaking protocol. The EPABX is named as NEOS. Earlier we were using long strings to get connected to EPABX which was very time consuming as well as tedious task and experts were required. For the reason HMS is introduced which will give all facilities to user at single click without the guidance of experts. The facilities such as check in/out, dialing right, alarm, temporary check-in/out and billing are provided to the user [1]. The Proposed system comprise of 5 modules i.e. serial com driver, interpreter, application, GUI and database, which will help for the communication between HMS and EPABX. System is compatible which makes the work flexible, easy and reflex.

Rest of the paper is divided into: Introduction, Related work, proposed model, Features of HMS, Flow of system, Research methodology, Advantage, Application, Conclusion and future work.

Keywords— HMS (hotel management software), EPABX (Electronic Private Automatic Branch Exchange), SLT(Single line telephone), KTS(Keytelephone system), hyperterminal.

I. INTRODUCTION

The EPABX stand for Electronic Private Automatic Branch Exchange. That is electronic exchange which is privately owned and automatic. It is also known as PBX and PABX [2]. It acts as a switch which is connected to 'n' number of telephones [1].

HMS is an ideal software solution that can be used at hotels, motels, resorts, lodges, hostel, and military guest houses. HMS includes all features required in hotel management software, Hotel reservation software call accounting, and hotel point of sales.

HMS is designed to ease the functioning of users at the front desk of the Hotel. Instead of traditional way of using EPABX function by telephone programming, the HMS provides a very user friendly Interface. Apart from this it creates a very valuable database of the customers also logs all the call made by the guests at the Hotel. During the Guest check out it provides the functionality of generate printed invoice for the guest. By making use of EPABX we receive the benefits such as flexibility, productivity, integration and cost optimization. NEOS EPABX enables you to get connected to the telephone network in multiple ways including ISDN PRI, SIP, GSM and ANALOG.[1]

HMS can be interfaced with NEOS EPABX with bi-directional handshaking messages. The NEOS EPABX links to a HMS via an RS-232 interface which the serial port is making a physical connection between the systems [1].

II. RELATIVE WORK

EPABX is used for conducting various features for any hotel. It offers great services to a guest. EPABX comes with

many hotel specific features. In earlier system, EPABX operators are required for operating the EPABX to use in hotels. Operators are related to switchboard operators. Operator had to manually connect a caller to their destination. Hotels employ operators which are expert in telephone programming and in using hyper terminal for programming. This job is tedious; it is not possible for people who are not having knowledge about this programming. PBX operators are not always front desk agents; they have to communicate with all the departments of Hotel. For providing various facilities, operators are programming EPABX via single line telephone (SLT), key telephone system (KTS) and through Hyper Terminal.

In single line telephone and key telephone system, telephone programming is done which includes dialing of various codes for different operations of hotel. The single line telephone system and key telephone system are very similar to each other the only difference between both of them is that in KTS, one can view the code dialed on the LCD as they are fed into the system and is thus able to recognize and rectify any mistake that occurs while dialing the codes this is one of the advantage of KTS over SLT.

In earlier system programming through telephone has mandatory fields which will be repeated for all codes like program code prefix, program code suffix and password. For programming purpose these fields follows the sequence in which first prefix (say #69) then it is followed by password (say 1234) then by code which was different for each operation and at the last suffix(say *).

The programming on hyper-terminal uses commands which are difficult to remember, these commands are like DOS commands.

The programming through telephone has certain mandatory fields which will be repeated for all codes. These are as given below: Program Code Prefix: 69 + Password Program Code Suffix: *

To program the NEOS through the hyper terminal, the COM1 port of NEOS has to be connected to the serial port of the computer. The COM port settings to be verified for using hyper-terminal is as stated below:

- Baud 9600
- Stop bits 1
- Data bits 8
- Parity None

There are basically three sets of commands used in hyper terminal that are display, set, clear. Display – Used to observe the set parameters for a particular feature, Set – Used to program/set the parameters for a particular extension/system, clear – Used to delete the parameters set for a particular feature.

There are various codes written by operator for providing hotel features of EPABX, for Example

Example 1: To allot the dialing rights during the day mode as well as the night mode Code required for entering on hyper-terminal is;

69 + PW + 000 + CoS Tb (01-32) + * + 15+ Day Fun (04) + Night Fun (04) + *

Day/Night Fun: 0 Intercoms

- Local
- Local with Mobiles 7x, 8x, 9 x
- STD
- ISD

Hyper terminal code: set class 19 15 40

Example 2: for check in operation-

#69 +PW + 304 + Ext No. + * where PW is password

Hyper terminal code: SET CHECKIN <extension no.>

So for each feature of hotel there exist different code and remembering those codes is Difficult for operator. Also the programming is in numeric form so if by mistake the Operator puts different digit the operation performed will be different, so operator is required to be more careful while programming on hyper-terminal.

Limitations:

As we have seen in existing system that there are many codes for programming through

Hyper-terminal and telephone, the job of operator is hectic.

There are various problems in the existing system like,

- 1) Strings are used for connectivity with EPABX system
- 2) Telephone commands which will include various numbers, prefix code and suffix codes are dialed.
- 3) Hyper Terminal commands are used, which are like DOS commands are tedious to remember. It will include various

fields for which tables are need to be remembered like CoS prefix table, etc.

4) Time consuming task.

5) There is need of operator to handle programming through HyperTerminal and key telephone system; receptionist cannot perform operation through programming. Expert operator is required.

6) The details of billing are not stored in system, the old entry get cleared after again check-in is done in the same room.

7) If the system is rebooted due to some malfunctioning backup of programming can be recovered but it will not provide all details like call record, user defined voice messages and music.

III. PROPOSED SYSTEM

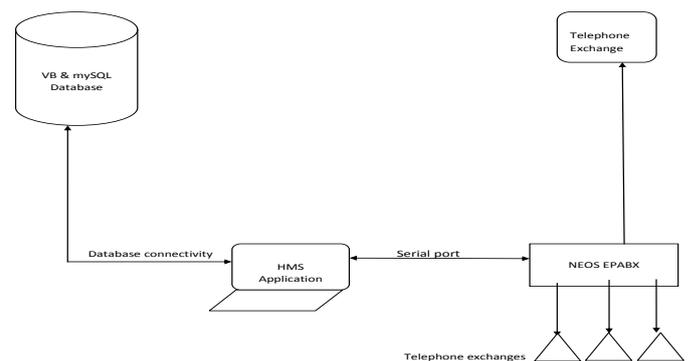


Fig1: architecture of system

NEOS EPBX acts as switch where ‘n’ numbers of telephones are connected to it and one trunk line connects it to the telephone exchange [1]. Our HMS system is connected to NEOS EPABX through a serial driver. All the commands transfer to & fro the application of the system. The database is of our HMS software helps to store the data and operations performed and facilities used and provided.so that we have a backup of our data history. The GUI of the HMS helps the user to interact with the software varies easily.

The proposed system comprises of five modules as follows:

- serial com driver:

It helps in two way communication and transmission of data between EPBX and HMS.

- Interpreter:

Interpreter interprets the string and converts the higher level language to machine level language and vice versa. It acts as intermediate layer between the higher level and lower level.

- Application:

It acts as intermediate between HMS and EPBX. It takes and gives commands from user and EPBX.It increase the flexibility and atomicity.

- GUI:

It is interface which is use for the interaction of user with our software. All the facilities are provided by the hotel are shown in the GUI which is access in single click.

- Database:
- All the history of operation performed and facilities use by the user is stored in the database. With the help of these data stored in database it eases the task of billing.

Working:

HMS can be interfaced with NEOS with bi-directional handshaking. For bi-directional handshaking, no setting is required at NEOS side. HMS has to send the handshaking packet to NEOS & NEOS will acknowledge the same. Following are the messages for establishing bi-directional handshaking.

[a] NEOS Power up Message - from NEOS

This message is required if HMS is already working on the computer & NEOS is started later. This message is sent by NEOS to inform HMS that NEOS is switched on and ready to accept the requests from HMS.

The moment HMS receives the NEOS POWER UP MSG, HMS has to send the handshaking message i.e. %H\$. If HMS is not sending the handshaking packet, link between NEOS & HMS will not be established.

This will ensure the uplink between NEOS and HMS. This message is sent only once when NEOS is switched on.

FIELD	LENGTH	COMMENT
STX	1	START OF TEXT
MESSAGE TYPE	1	'Y'
ETX	1	END OF TEXT

[b] HMS Power on Message - From HMS

This message is sent by Client application to inform NEOS that client application has been activated. If the NEOS system is also running then it will revert back to Client application with Power on ACK message. This will ensure that link between NEOS & client application is active. This message can be sent any number of times.

The Message Format is:

FIELD	LENGTH	COMMENT
STX	1	START OF TEXT
MESSAGE TYPE	1	'H'

ETX	1	END OF TEXT
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[c] HMS Power up Ack Message - From NEOS

This message is sent by NEOS to acknowledge the Client application for power on message. This message informs Client application that NEOS is also switched on and is ready to accept requests from the Client application. The moment Client application receives the ACK message from NEOS; Client application should send a 'Call negative Ack message' to NEOS to retrieve any un-acknowledged outgoing call detail.

The Message Format is:

FIELD	LENGTH	COMMENT
STX	1	START OF TEXT
MESSAGE TYPE	1	'h'
ETX	1	END OF TEXT

Hotel Feature Description:

Hotel management software can be integrated with the NEOS. On integrating the HMS with NEOS, following features can be utilized through HMS –

- a) Checking-In a room (include Budgeting)
- b) Local / STD / ISD Rights
- c) Outgoing calls details
- d) Incoming calls details
- e) Checking-Out a room [3]
- f) Wake up alarm
- g) Temporarily Check-In / Check-Out

[1] Check in Message from HMS

The Check-In message is sent from HMS to the NEOS.

Important:

If budgeting is enabled on the desired extension, defined amount will be treated as the budgeting Amount.

[2] Dialing Rights Message – From HMS

Dialing rights message is sent from HMS to the NEOS to change the dialing rights of the guest.

[3] Out Going Call Details Message – From NEOS [3]

The Out Going Call details Message is sent by the NEOS to the HMS and carries all the information about the call made from any of the subscriber line.

[4] Incoming Call Details Message – From NEOS [3]

The Incoming Call details Message is sent by the NEOS to the HMS and carries all the information about the call made from any of the outside line.

[5] Check out Message – From HMS

This Message is sent from HMS to the NEOS and it changes the CHECK-OUT status of a room / extension. If a

room / extension are checked-out, that extension cannot access trunk lines for outgoing calls.

[6] Wake up Alarm Message – From HMS [3]

This Message goes from HMS to the NEOS & carries the request for a wake up alarm service for the desired room.

NOTE: Also note that alarms can be set for next 24 hours only. If above message is sent at 12:40:00 or later (as per NEOS time) than Wake up call will be performed on the next day only. To cancel an alarm setting on an extension, following packet will be sent with the minute 60 -

[7] Temporary Check In/Out Message - From HMS

This Message is sent by HMS to the NEOS & carries the request for a temporary check in/Out to change only Class of service as per normal Check in/out request respectively. For all the Messages send by HMS to NEOS, NEOS will verify Receipt and validity of the Message with room number in form of HMS ACK or NACK message.

[G] HMS ACK Message - FROM NEOS

This message ensures that request made by HMS is valid as also the room Number is correct. This message is also referred to as GO AHEAD Message to avoid conflict with CALL

ACK Message. HMS ACK is sent by NEOS only when the message is validated and processed. For better performance HMS should wait for go-ahead Message from NEOS.

H] HMS NACK Message - From NEOS

This message is also referred to as Error Message from NEOS, so as to avoid confusion with CALL

NACK Message. This message informs HMS that request made is invalid or Room Number is incorrect. For better performance HMS has to generate an Error Condition on some terminal to Report. The Error Message ensures that request is not processed

IV. FLOW OF SYSTEM

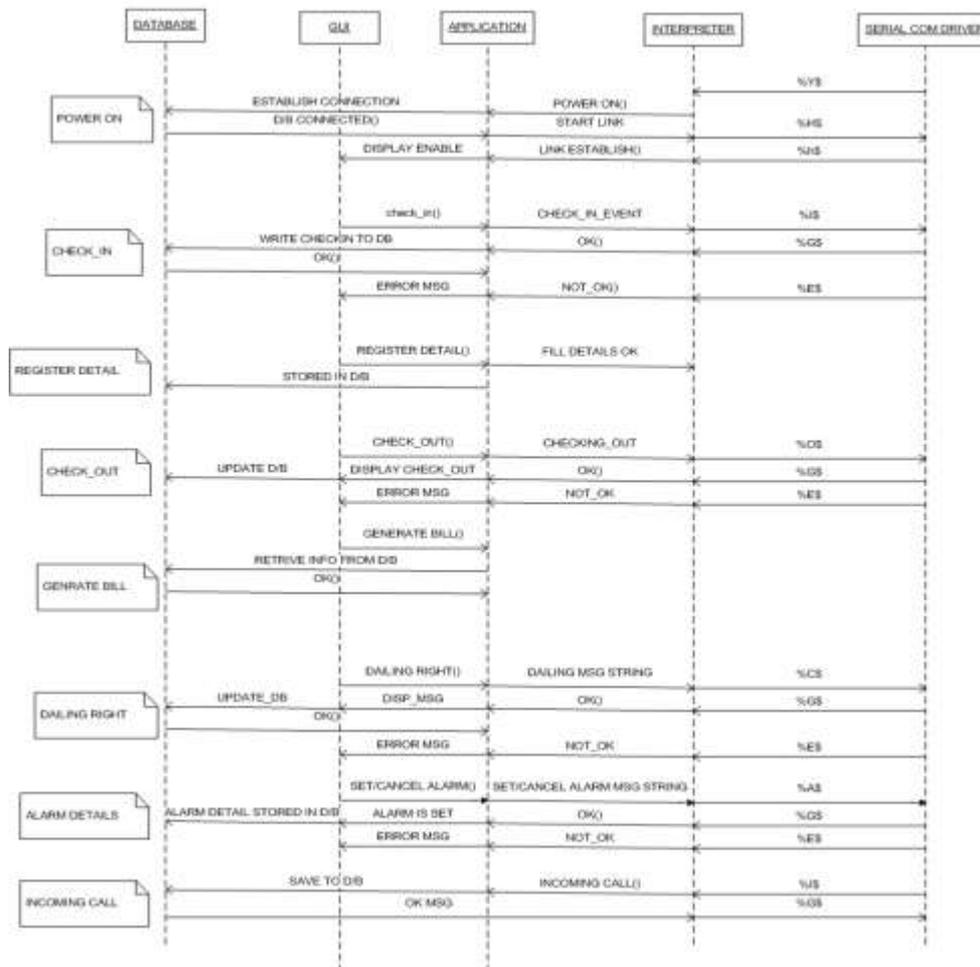


Fig2: flow of system

V. RESEARCH METHODOLOGY

Prerequisites for the HMS Application

Processor	P3 600 MHz or higher (With Higher configuration you will get faster popup on clients)
Memory	At least 256 MB RAM, 512 MB RAM Recommended
Hard Disk Space	At least 2 GB free space for HMS Application
COM Port	A 9 pin working serial COM Port OR USB Port
RS 232 Cable	For interfacing with the EPABX Hardware OR USB to Serial converter for USB port
CD ROM drive	For installing the HMS
High Speed LAN	For connecting with the clients

VI. ADVANTAGES

The advantages provided by HMS software are the following:

- 1) The HMS application is easy to use, provides interface to user for providing various hotel services.
- 2) No need to remember Hyper Terminal command, COS table values, prefixes, codes for dialing purpose.
- 3) Consumes less time for processing the services.
- 4) There is no any need of operator to handle programming through HyperTerminal and key telephone system; receptionist can perform operation through programming. Expert operator is not required.
- 5) The details of billing are stored in system, also the details of old entry is available.
- 6) If the system is rebooted due to some malfunctioning backup of programming can be recovered.

VII. APPLICATIONS

Following are the applications of the system-

- Automatic wake up calls and reminders
- Call budgeting
- Call cost calculations
- Room status display
- Guest check in/out
- Outgoing Incoming Call Details
- Temporary check-in/check-out
- Bill generation
- Local / STD / ISD Rights

VIII. CONCLUSION

- The available EPABXs tend to have a long list of user codes that are very difficult to remember. HMS is designed to ease the functioning of users at the front desk of the Hotel and connectivity of HMS to EPABX helps to maintain and store the database efficiently.
- It is fast, secure and user friendly

IX. FUTURE SCOPE

The following Features also we can develop in our system.

- [1] Printer interface:
Printers available in market are USB printers. No PBX can directly interface with USB printer.
- [2] Entries of other bills; Room rent, Food, Laundry, Tax etc. should be possible from Telephone or Operator console & then same can be printed during check-out as Final bill.
- [3] Guest Name entry & printing accordingly.
- [4] Easy implementation for Room-to-Room calling
- [5] Mini-HMS by modifying Response.
- [4] Printers are connected to PC & PBX interfaces with PC using USB or LAN port.

Considering above understanding the requirement stated below:

Entries of other bills ; Room rent, Food, Laundry, Tax etc. should be possible from Telephone or Operator console & then same can be printed during check-out as Final bill. Needs reconsideration, as the above requirement was given considering there are no PC's in the small Hotels & printer should be directly interfaced to the PBX. If the PC's are available then there is no point in having these bill entries through telephone as they would be simpler using PC, HyperTerminal/ HMS using Response.

X. REFERENCES

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