

## **Portable Automated PBX System**

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### **Introduction**

Voice over Internet Protocol (VoIP) technology lets you to use the Internet to make and receive telephone calls. VoIP is available in a wide range of services such as free VoIP services. For VoIP, a broadband Internet connection, plus a traditional phone and an adapter or a VoIP-enabled phone; or VoIP software on your computer is required.

Lot of benefits can be obtained from the VoIP; such as it reduces travel and training, helping employees stay connected to each other, reduce phone charges and have a single network for voice and data therefore it simplifies the managing and reduce costs. Access phone system's features at home or at client offices, in airports and hotels anywhere with a broadband connection.

Since the phone calls are made over the Internet Protocol, the base price for VoIP is often less than that of traditional phone lines and also it is adding new dimensions and altering business communications in a big way. Succinctly stated, VoIP converts analog voice signals into digital data packets to facilitate two-way transmission of conversations in real time (James A, 2010). However equipments used to implement VoIP networks are costly. Therefore customers need to spend more money for a branded Private Branch Exchange (PBX) system. Existing systems are lack of mobility and portability since they are massively large to use as portable devices. Therefore this research project was aimed to develop a system to implement portable, low cost and automated PBX system to be used within a Local Area Network (LAN).

### **Methodology**

System was implemented to use in Linux environment. dyanmips and dynagen servers were used to manage the VoIP by including Analog to Digital Signal conversion and vice versa.

First one Linux distribution was installed in flash memory chip to create a portable device. Then dynamips and dynagen servers were installed to the Linux distribution. Next, branded router image was implemented and configured to run on the dynamips and dynagen servers to connect with the LAN.

In the next phase of the project, separate accounts were created for each device to manage and transfer VoIP telephony services in the configured router. Initially the system was tested with the Software phones to check the routing. After that Analog Telephone Adapter (ATA) was configured with the system to manage the Analog phones to take calls within a LAN by using Session Initiation Protocol (SIP). Finally the completed system was tested for both Software phones and the Analog phones.

Figure 1 depicts the main system flow of the implementation mainly with six modules. Call Route System (CRT) is the place where the server (Cent OS (Linux), dynamips/dynagen and Router) was configured. Main system configurations were configured and included in the CRT module. Graphical User Interface (GUI) for the system router was configured in the GUI module. All the GUI configurations can be implemented with this module. This module provides the facility to monitor the overall system health. GUI module provides the user friendly environment.

Digital/Analog module was used to convert Analog data to Digital data and Digital data to Analog data. Analog Call Invoker/Receiver and Digital Call Invoker/Receiver modules were used in the system to connect Analog Telephones and Digital Telephones respectively. Therefore with this proposed system it is possible to use both Analog and Digital phones to receive and invoke a call.

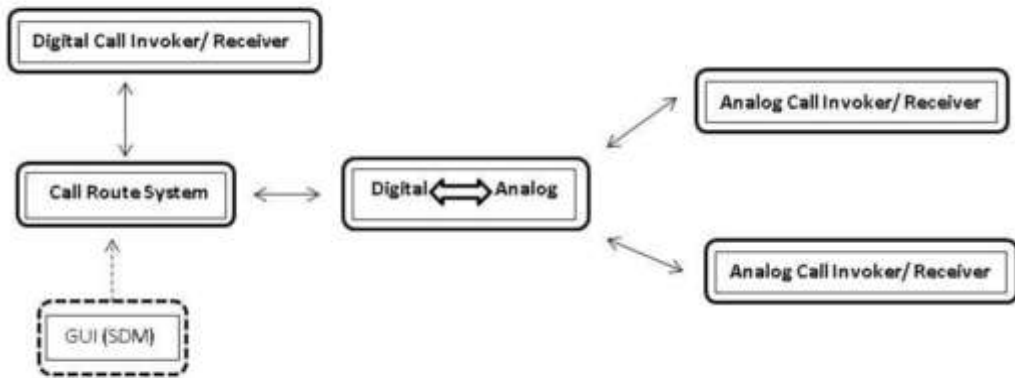


Figure 1. Main system flow.

## Result and Discussion

System was successfully implemented to manage VoIP for both Analog and Software phones with a configurable GUI. Each component of the system was tested with simulation software eg: Packettracér, and with protocols eg: ICMP (Internet Control Message Protocol), SIP (Session Initiation Protocol). And remote access configuration for both graphical environment and console environment were tested.

## Conclusions

Modern Personal Computers (PC) consists with more processing speed and calculating speed it can be used as powerful machines in the LAN. Universal Serial Bus (USB) flash memory chips can be used as portable device it is a convenient place to install an Operating system. Since Linux distributions are more compatible and portable with many hardware platforms it was possible to install one of the Linux distributions (CentOS) to the USB flash memory chip. Analog voice was detected from the analog phone and routed through ATA to convert in to digital format. Routing was takes place through the configured router available in the USB flash drive.

## References

James A., 2010. Importance of VoIP Phone System. Retrieved August 2013, from the World Wide Web: <http://ezinearticles.com/?Importance-of-VoIP-Phone-System&id=5275968>