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Original Research Article

CTI-IVR BASED ONLINE ORDERING SYSTEM

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Abstract:- CTI-IVR based Online Ordering System is the use of computers to manage phone calls. The term is used in describing computerised services such as those that direct your phone calls to the right department. Ordering manually has been resulting in problems for the customers across the world to purchase goods of their choice. The main problem with manual ordering is huge error rate. If a customer asks for a product which is misinterpreted with wrong product by the attendant; the customer has to pay for the wrong product ordered. This is all because of the Human Intervention which cannot be avoided. One solution for this is increasing the resources which sometimes become costly. So there is a need of more automated systems which have 0% human intervention which leads to proper and error free ordering. CTI means Cloud Telephony Interface. Online ordering is always misunderstood as only ordering over the internet. But CTI is a far different concept than this. CTI just replaces the attendant and the phone lines by automated systems such as the IVR i.e. Integrated Voice Response which takes the user through easy levels to which the user replies using his keypad/keyboard. Thus the error rate from the system side is almost negligible, for such automated systems servers which handle these calls come into picture. Some of them are Asterisk, Elastix or Trickxbox. This paper discusses about the integration of an Asterisk server to implement call handling.

Abbreviations- IP-PBX- Internet Protocol-Public Branch Exchange, SIP- Session Initiation Protocol, AGI- Application Gateway Interface, PIAF- PBX in a Flash. (Used for Skype Integration), PSTN: Public Switching Telephone Network.

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Introduction

Asterisk is a complete Private Branch Exchange (PBX). It runs on Linux, Windows. It uses 4 protocols for Voice Over IP (VOIP) some of them are IAX, SIP. For our systems we deal mainly with the SIP i.e. Session Initiation Protocol. The backbone of Asterisk is its Dialplan.

Dialplan is the script which acts the Action for an event. All the call routing, call holding, speech recognition, TTS, call recording, runtime value collection can be managed and handled. It needs no additional hardware for VOIP. The current released version of Asterisk is 11.5. Asterisk is said to manage infinite calls at a time. But the restriction comes to the configuration of the machine on which this server is deployed. Asterisk 1.2 can handle 220 calls at a time whereas 1.4 is said to handle double the calls that 1.2 could handle. The entire Asterisk server does in case of any incoming PSTN call is that it converts it into a SIP call which can be routed down the network and accordingly data is saved in the database. Asterisk is available on windows and Linux but support for windows is provided by 3rd party vendor and is not a part of Asterisk community anymore. Thus a window does not provide active support. Moreover Asterisk on Linux has less modules and extensions for users. In Linux the number of these extensions has no limit and supports modules call waiting, forwarding and so on. Asterisk can be accessed via web browser by typing the IP on which server is running. It displays a GUI where we can create dynamic number of extensions which is a plus point in Linux. This is where all the modules can be configured. The IP for each extension is set here.

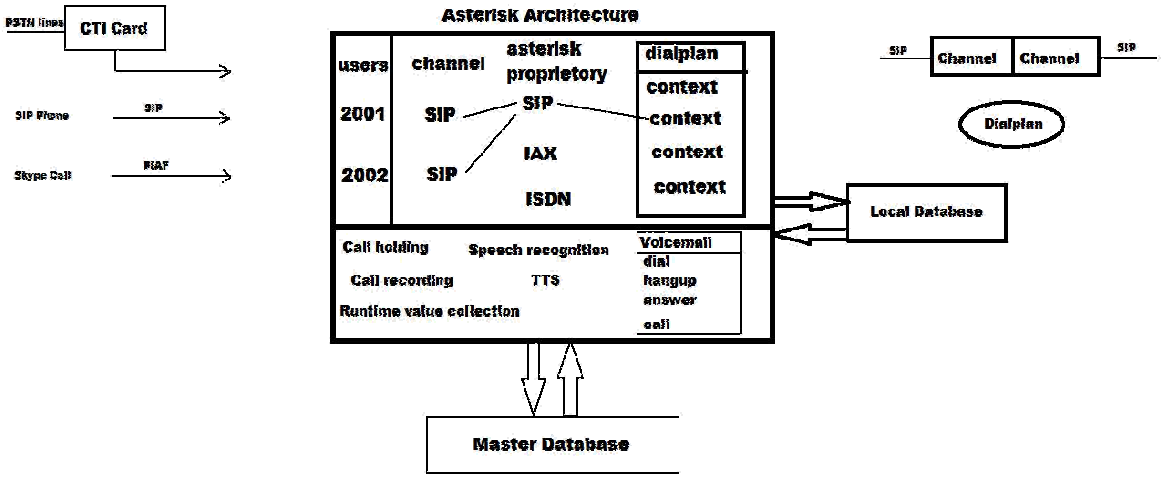

Fig.1 Asterisk server architecture

Installation Of Asterisk

Following are the steps for installation of asterisk.

1. First download the .vdi file of asterisk-Unix compatible which almost 1.4 GB. This file has basic modules of asterisk but no GNOME.
2. The Unix OS which comes with the Asterisk is CentOS.
3. To install Gnome on CentOS 6.4 four basic packages are required to install...

1.) basic-desktop
2.) x11
3.) fonts
4.) desktop-platform.

The command line is:- yum groupinstall basic-desktop desktop-platform x11 fonts

yum install system-config-firewall * -y

yum install gcc-c++ kdelibs-develkactivities-develqjson-devel sip-devel PyKDE4-devel

My-SQL Front

This is the application which is hosted on Windows but can access other OS which is running virtually. Just start the virtual OS which is connected to network. Find the IP address of the virtual machine. Then enter My-SQL-Front configure the database by entering the corresponding database. Now you can create and access all the data and test your database related code.

Configuring The Softphone With Asterisk Server

Download any soft phone readily available

online (say 3CX). Create an extension point of the softphone. Now in the web browser enter the IP address of the virtual machine. This will open the PBX panel. Here you can configure as many extensions you want for multiple users.

Problem Description

Ordering online is the latest trend in society but it has faced tremendous problems lately. If we consider previous ordering systems they needed human intervention either to confirm the order or verify the order. Thus the calls had to be routed to a physical connection. Now if the organization just had 2 actual connections. The others had to be kept on hold. Thus the user gets restless.

This can be reduced by increasing the number of physical lines and attendants but this increases the cost and needs more management. Moreover if the attendant places the wrong product it will lead to users unsatisfied. Thus there is a need of more automated system which has very less or no human intervention.

Solution

The online ordering is briefly categorized into two types:

1). Online user - online application

This type is already been developed but it's not always possible that the user has no connectivity.

2) Offline users - Online applications

So this type is now developed where user just needs to dial a number and he is greeted by an IVR.

He then iterates through IVR and places the order. This is best solutions for the problems rather faced on other system such as wrong order placed due to human error or just get a busy tone on the attendant is busy in answering other customers.

IVR Flow

The user interacts with the system with IVR. The user if is registered in the system then he/she gets the privilege to access and interact with the IVR. this is done to avoid false ordering. The IVR first internally checks if the user is registered by checking the corresponding cust_id of the incoming caller_id. This is the only time when connection with the database is created and opened. Hence forth just the query is fixed. This is done to reduce the latency. If we consider an online ordering system, the registered user is made available with 4-5 options.

The product details are played back one by one and user can select the product and corresponding quantity by giving inputs through the dialpad. Php-AGI integration helps in accessing this data at runtime and processing accordingly. There can be a feature that can be added i.e. a favourite order where the user has his products fixed but can just vary his quantity. User also has the privilege of ordering category wise thus avoiding boredom by accessing those products that he/she doesn't need to order.

The data handled at runtime is stored in the local database. Once the user confirms the order this data is made permanent. The dividing of database is done so that the local database is made to just handle orders of one day that can be undated after a specific time interval. Some promotional offers can also be given to the user so that he can avail all the discounts given by the company. In all this flow the user can easily navigate through whole IVR. The IVR is kept as simple as possible so that user can order instantly.

Software Quality Attributes

1). Affordability:

This software is affordable and is cost efficient. As most of the software as Asterisk server, Linux OS is open source.

2). Scalability:

The software is scalable as it varies the capacity according to the needs or according to the increased number of users. It can handle thousands of calls at a time. Just the barrier is the configuration of OS on which the Asterisk server runs.

3). Maintainability:

The software has the ability to adapt to the changes as the Linux OS is very flexible and can adjust any changes made with the software. Thus maintenance is handy.

4). Efficiency:

Software can do the required processing on least amount of hardware.

Databases

We have used two databases. One which is the local database and the other master. Local database is used to store data for one day whereas the master database houses whole data along with the new products added.

Local database communicates with the master database to verify the users and the products. After specific time interval the local database dumps the whole data to master database. Master database is hosted on the Sales Force cloud and is managed online

Advantages

1). There is no need of greater work force.
2). There is greater customer satisfaction.
3). Less resources is required as the system is automated.
4). This is how the system is efficient enough as not much hardware is required.
5). Human errors are almost negligible as there are less numbers of resources needed.
6). Increased number of sales due to the scalability.
7). Good alternative against ordering systems with human intervention.

Disadvantage

As the CTI-IVR is a new field today it needs to be explored a lot. May be this system will be of less use in the coming future when the Asterisk community advances this server and then changes will be needed to be done in the system to cope up with the changing world.

Applications

This system is highly recommended for product based companies. All those companies who sell their products have a greater use of these automated systems.

Conclusions

By looking forward to make the system easy to handle or use by the users, we have made the system automated using the IVR. The user needs to go according to the IVR flow and give the inputs which take only few seconds of time and the data is stored in the database after the user confirms it. Hence the unwanted data does not get stored on the database.

Acknowledgement

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