

IMPLEMENTATION OF TRANSCODER FOR EFFECTIVE VOICE COMMUNICATION

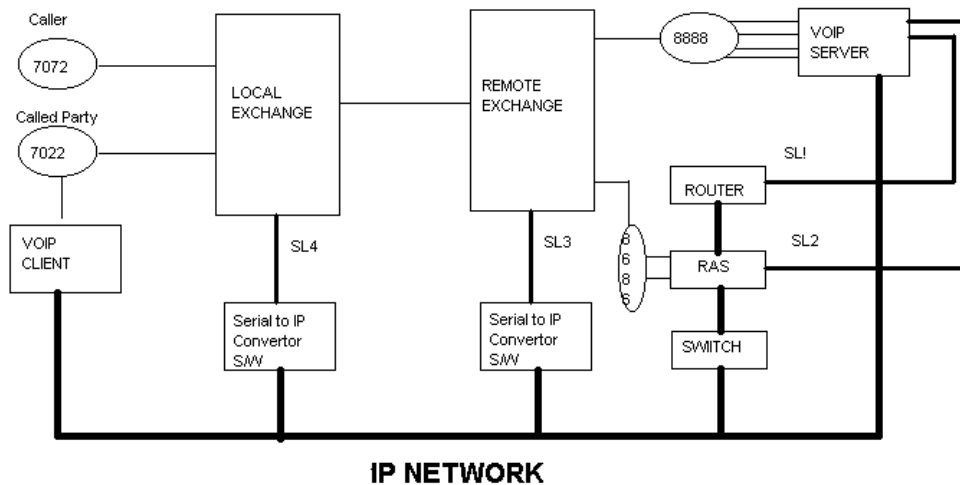
Study of System

Scope of the Development Project

This product will be used in conjunction with the VoIP server, wherein its purpose is to convert the digital voice in ADPCM G.723 format to the format supported by GSM 6.10 and vice versa. The extended version of the Transcoder can be used as an independent VoIP application for voice communication.

The Existing System

Status Quo



Many a times it happens that you call a person and you find that the other person is busy. Most probable cause can be that the other person is connected to the Internet through the Dial-up connection. The person connected to the internet has no way to know about this i.e. to get a notification of the call and ultimately the communication is not established.

The internet telephony system presently used in India uses the ADPCM encoding format for sending the digitized voice over the IP channel. But ADPCM format requires at least bandwidth of 32 Kbps for efficient communication. However the current bandwidths available on the Dial-up connections rarely exceeds 28 Kbps. So we require a format through which we can send digitized voice using less bandwidth.

1. Voice over IP protocol required for Voice Transmission

<http://www.voip-calculator.com/protocols.html>

2. How Stuff Works - VOIP

<http://computer.howstuffworks.com/ip-telephony1.htm>

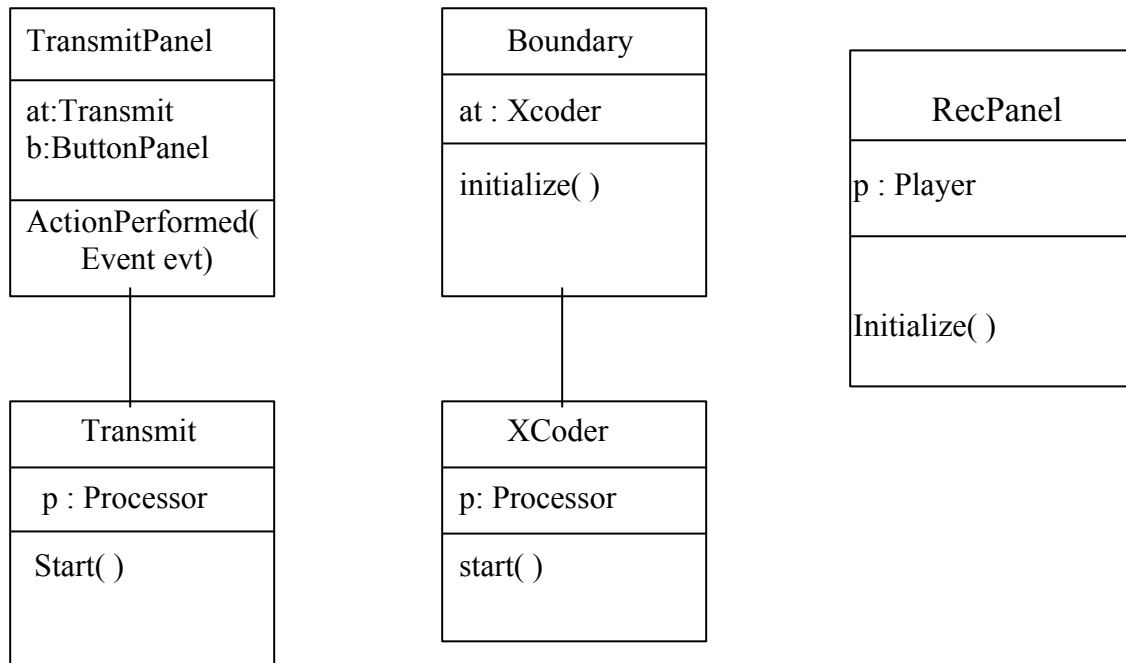
3. Scourias, John; Overview of the Global System for Mobile Communications

<http://ccnga.uwaterloo.ca/~jscouria/GSM/gsmreport.html>

4. <http://www.tldp.org/HOWTO/VoIP-HOWTO.html>

Design of System :

Class Diagram



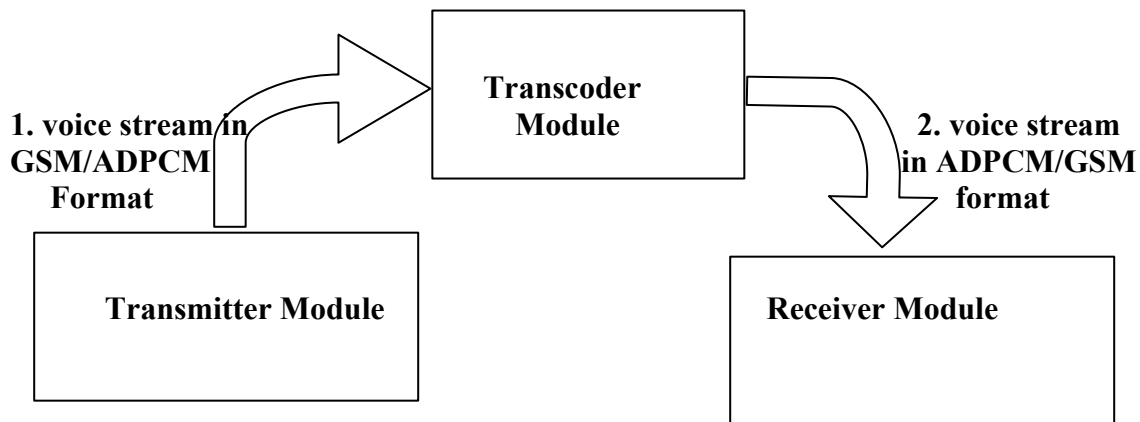
Architectural Pattern Used In the Project

Pipes and Filters

In Pipes and Filters the data is processed in streams that flow through pipes from Filter to filter. Each filter is a processing step.

Main Filters in our project are:

1. Transmitter module.
2. Transcoder module.
3. Receiver module.



The flow of the stream is depicted above.

Transmitter Module: It consists of a GUI for the user for selecting the format of the voice stream transmitted also the destination of the stream. It also consists of a Transmit class that actually performs the transmission task.

It consists of the following two classes :-

TransmitPanel.java – For GUI, it also provides an option for choosing the format of transmitted voice.

Transmit.java – This class does the actual work of transmitting voice in the specified format.

Transcoding Module: It consists of a Boundary class that receives the input stream, checks for the Format of the input stream and passes it to the Xcoder class wherein it is transcoded into another format and transmitted to the receiver.

The classes here are :-

Boundary.java

Xcoder.java

Receiving Module: It consists of a RecPanel class which has a GUI provided for the user to specify the port from which to receive also it creates a player to play the received stream.

The only class here is :-

RecPanel.java - It receives the transcoded voice from the server and plays it at the receiver end

Coding

Transmitter Module:

It consists of the following two classes :-

TransmitPanel.java –

Code for GUI, it also provides an option for choosing the format of transmitted voice.

Transmit.java –

This class does the actual work of transmitting voice in the specified format, to the destination.

Transcoding Module:

The classes here are :-

Boundary.java -

It receives the input stream, checks for the format of the input stream and passes it to the Xcoder class.

Xcoder.java

This class transcodes the received voice stream into another format and transmits it to the receiver.

Receiving Module:

The only class here is :-

RecPanel.java -

It has a GUI provided for the user to specify the port from which to receive also it creates a player to play the received stream.

Test Cases

ADPCM File(Byte)	GSM File(Byte)	Compression ratio (ADPCM/ GSM)
i) 73050B	28985B	2.520 : 1
ii) 35162B	13970B	2.516 : 1
iii) 26970B	10720B	2.515 : 1

GSM File(Byte)	ADPCM File(Byte)	Compression ratio (GSM/ADPCM)
i) 8706B	21564B	0.403 0:1
ii) 9096B	22588	0.4026:1