CUSTOMER INTERACTION MANAGEMENT USING AMAZON CONNECT IVR

Project report submitted in partial fulfillment of the requirement for the degree of Bachelor of Technology

in

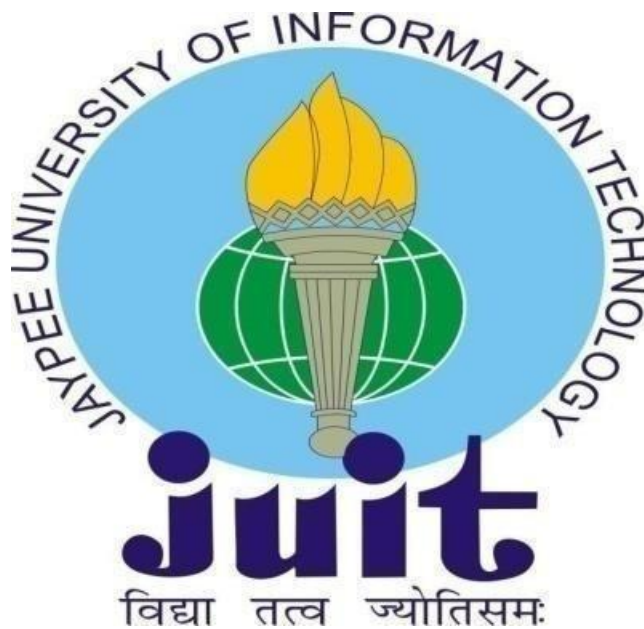**Computer Science and Engineering**

By

(KUSHAGRA (181376))

Under the supervision of

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to

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CERTIFICATE

I hereby declare that the work presented in report entitled **"CUSTOMER INTERACTION MANAGEMENT USING AMAZON CONNECT IVR**" in partial fulfillment of the requirements for the award of the degree of B Tech in Computer Science and Engineering submitted to the Department of Computer Science and Engineering, Jaypee University of Information Technology, Waknaghat ,Solan is an authentic record of work carried out by "Kushagra (181376)" during the period from February 2022 to June 2022 under the supervision of **Dr Monika Bharti**, Department of Computer Science and Engineering, Jaypee University of Information Technology, Waknaghat ,Solan.

Kushagra

(181376)

This is to certify that the above statement made is correct to the best of my knowledge.

	Nandigama Jyothsna
(College Supervisor Signature)	(Company Supervisor Signature)
Supervisor Name : **Dr. Monika Bharti**	Supervisor Name : Nandigama jyothsna
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Dated:	Dated

ACKNOWLEDGEMENT

Firstly, I express my heartiest thanks and gratefulness to almighty God for his divine blessing makes it possible for us to complete the project work successfully.

I am really grateful and wish my profound indebtedness to Supervisor Dr Monika Bharti Assistant Professor (CSE/IT) Department of Computer Science and Engineering, Jaypee University of Information Technology, Wakhnaghat,Solan. Deep Knowledge & keen interest of my supervisor in the field of "CUSTOMER INTERACTION MANAGEMENT USING AMAZON CONNECT IVR " to carry out this project. Her endless patience, scholarly guidance, continual encouragement, constant and energetic supervision, constructive criticism, valuable advice, reading many inferior drafts and correcting them at all stages have made it possible to complete this project.

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Finally, I must acknowledge ,with due respect, the constant support and patience of my parent

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ABSTRACT

This report describes the internship that I did with "COGNIZANT TECHNOLOGY SOLUTIONS", during the period of February to June 2021. The project assigned to me was "CUSTOMER INTERACTION MANAGEMENT USING AMAZON CONNECT IVR ".

The report itself sheds light on the various process and concepts I have learned as a full-time intern. The primary objective of the internship was to learn software that are related to creating an IVR and make the use of IVR to deal with the customer interaction with different types of assigned ways.

During the project Amazon connect was used to make random calls by the user that were directed to the particular department according to there needs, not only that it also works on the particulars of the timings and the error/end of call for the user.

Other than this, I was trained on SQL and Java for database management.

1.1 INTRODUCTION

IVR (Interactive Voice Response) is a telephone feature that allows customers or employees to engage with a computer system by dialling a number with their voice or touch-tone.

Instead of going via a human operator, your automated telephony system can have basic conversations with your callers utilising Interactive Voice Response, which saves both their and your agent's time.

An interactive voice response (IVR) system can help you direct calls to the right person. The IVR can direct customers to the proper department through a series of options and decisions. When they do get a human voice, it will be someone who is ready to help them with their problems.

IVR system responses are played back in response to user input. These could be audio responses that have been pre-recorded

1.2 PROBLEM STATEMENT

One of the issues with an organisation is creating a simpler method for dealing with client issues and processing them in a more convenient location when they wish to speak with one of the organization's representatives.

Many large organisations still use call centres, and some are switching to IVR (interactive voice response) solutions to solve their problems.

We also look at one of the surveys to see what the advantages are:

Customers will greatly benefit from this. According to a Zendesk survey, 69% of respondents said they wished to address issues without the need for human contact.

Before making a decision, 63 percent would look for solutions through a company's digital channels.

1.3 OBJECTIVES

An interactive voice response (IVR) system can help you direct calls to the right person. The IVR can direct customers to the proper department through a series of options and decisions. When they do get a human voice, it will be someone who is ready to help them with their problems.

The following are the goals of developing an IVR solution rather to a traditional call centre approach:

i.Use screen pops to transfer relevant client information from IVR dialogues to the desktops of IVR agents, resulting in more effective and efficient service.

ii.Using interactive voice response (IVR) systems to manage incoming phone calls, collect information about consumer demands, and route calls to the appropriate department

iii.Combining computer telephony with IVR software enhances call flow and efficiency.

METHODOLOGY

Due to the large number of requested and incoming calls from diverse users and customers, it can be difficult to separate them simply by connecting them to a random individual. This is where contact flows and IVR come into play.

By sending the customer to the appropriate department and connecting him with the exact person he requires.

The IVR programme follows the same tree structure as the Windows system's directories and files. A call flow diagram is the name for this structure in the IVR.

ORGANIZATION

ABOUT COGNIZANT

Cognizant (Nasdaq-100: CTSH) is one of the world's leading professional services companies, transforming clients' business, operating, and technology models for the digital era. Our unique industry-based, consultative approach helps clients envision, build, and run more innovative and efficient businesses. Headquartered in the U.S., Cognizant is ranked 194 on the Fortune 500 and is consistently listed among the most admired companies in the world.

India is a crucial piece of our global business strategy, with global delivery centres in Mumbai, Bangalore, Chennai, Coimbatore, Gurgaon, Hyderabad, Kochi, Kolkata, and Pune.

Domain	: Information technology consulting company
Company website	: https://www.cognizant.com/
CEO	: Brian Humphries (1 Apr 2019–)
Revenue	: 1,680 crores USD (2019)
Founded	: 26 January 1994
Headquarters	: Teaneck, New Jersey, United States
Subsidiaries	: Soft Vision, TriZetto Group, Inc. (The), MORE
Founders	: Kumar Mahadeva, Francisco D'Souza

COMPANY'S MARKET PRESENCE

1. Automotive
2. Insurance
3. Banking
4. Life Sciences
5. Capital Markets
6. Manufacturing
7. Communications, Media & Technology
8. Oil & Gas
9. Consumer Goods
10. Retail
11. Education
12. Transportation & Logistics
13. Healthcare
14. Travel & Hospitality
15. Information Services
16. Utilities

SERVICES PROVIDED BY THE COMPANY

1. Application Services & Modernization
2. Enterprise Application Services

3. Artificial Intelligence

4. Internet of Things

5. Cloud Enablement

6. Quality Engineering & Assurance

7. Cognizant Infrastructure Services

8. Digital Strategy

9. Cognizant Security

10. Business Process Services

11. Core Modernization

12. Enterprise Services

13. Digital Engineering

14. Industry & Platform Solutions

15. Digital Experience

16. Intelligent Process Automation

The Business Aligned Project provides real-time problem-solving experience using Agile methodology.

Cognizant has teamed up with Udemy to create world-class learning videos for the changing workplace. These Udemy courses are organised into a learning path, allowing you to plan and learn according to your preferences.

The application also connects you with Subject Matter Experts so that you can get professional advice on your learning questions.

COGNIZANT IN INDIA

Cognizant registered its Chennai, Tamil Nadu, India branch on January 20, 1994 under the legal name Cognizant Technology Solutions India Private Limited. Bangalore, Chennai, Coimbatore, Gurgaon, Noida, Hyderabad, Kochi, Kolkata, Mangalore, Mumbai, and Pune are the company's other offices.

Cognizant is one of the world's leading professional services companies, transforming clients' business, operating and technology models for the digital era. On its 2021 rankings of Top Companies, LinkedIn ranked Cognizant #2 in India. LinkedIn said that the Top Companies are investing in employee success, career development, and equity and inclusion to ensure they continue to be among the best workplaces for employee growth now, and in a post-pandemic world.

"We are happy be named to the LinkedIn Top Companies list in India," said Rajesh Nambiar, Chairman and Managing Director, Cognizant India. "As we transform the companies the world relies on, our people are our differentiator. We are focused on supporting the many ways our associates can make a positive impact at Cognizant – on their clients, on society, on each another and on their own lives."

Cognizant Named a Top Employer in India by LinkedIn and Forbes Magazine, Launches Humanitarian Effort, Operation C3, in Support of India's Fight Against COVID-19

Cognizant commitment to Indian society stems from the long-term presence in the country and the over 200,000 Indian associates to whom the company owes much of its success. Earlier this week, Cognizant made a new commitment: to help the country and its people overcome the humanitarian crisis created by the pandemic. Named Operation C3: Cognizant Combats COVID-19, the effort includes donations of $1.5 million (approximately INR 10 Crores) through the Cognizant Foundation to operationalize response efforts with partners across India; and an additional $2 million (approximately INR 15 Crores) in emergency funding to UNICEF in India to help address acute shortages in life-saving oxygen, and to deploy medical and testing supplies.

In addition to the above, earlier this month, Cognizant announced that it would cover the vaccination cost of more than 600,000 people in India, including its more than 200,000 full-time employees and their dependents in the country, as well as approximately 50,000 people comprising contingent staff such as contract, support and security personnel, and their families.

Cognizant has notched two other "Best Employer" accolades in recent months, both awarded by Forbes Magazine: "World's Best Employers" and "Best Employers for Diversity."

"We are incredibly proud to be named to these Forbes lists for Best Employers," said Shantanu Jha, Chief People Officer, Cognizant India. "For us, it means that we are creating conditions where every person can thrive, and we work relentlessly to ensure we lean into that commitment. Through our network of associate groups, Diversity and Inclusion programs and leadership accountability measures, we are ensuring our people feel connected to the organization and to one another. We want them to feel empowered to share their ideas and perspectives, and comfortable showing up as their true and authentic selves."

Cognizant India is one of Cognizant Technology Solutions' most notable global distribution centres, and it plays a key role in market outsourcing, as well as consulting and IT-related solutions.

ABOUT COGNIZANT ACADEMY

As Cognizant continues its path to become 'fit for growth,' Cognizant Academy contributes towards that goal by enabling associates who would make that happen.

Being the in-house learning and development wing of the organization, Cognizant Academy is focused on making associates future-ready through role-based and business-aligned learning solutions.

Generation Cognizant (Gen C) Program encourages you to be more autonomous learners during guided self-learning hours, completing the learning objectives on your own pace and style, and get ready for the hands-on practice time

Academy at a glance:

533
L&D professionals

World-wide presence:
India, North America, GGM

Dedicated Capability Academies

State-of-the-art
learning tools and platforms

Harnessing the power
of curiosity and growth mindset

Figure 1: Academy at a glance

The Gen C learning programme provides young talent with a complete learning route that allows them to interact with Subject Matter Experts (SMEs), gain a better understanding of the business environment, and groom themselves.

Learner Autonomy is emphasised by Cognizant, in which students take charge of their own learning using the available tools and resources. The emphasis is on "learning" rather than "teaching." Prepare to begin on your own educational journey.

The purpose of Cognizant Academy is to foster a lively learning culture and climate. Academy reflects the spirit of collaboration between the organisation and individual colleagues in order to achieve a common goal.

PROGRAM HIGHLIGHTS

- The complete learning journey is formalized using adult learning principles, where problem solving and applying the skills gained are given more importance than conceptual learning.

- Learner Autonomy is encouraged via Flipped Classroom, where the learning platform offers world class learning resources, and students would not be constrained by tutelage of an instructor.

- Get mentored by SME, whose motivation and guidance will help you accelerate in the learning journey.

This program encourages you to be more autonomous learners during guided self-learning hours, completing the learning objectives on your own pace and style, and get ready for the hands-on practice time.

SELF-LEARNING TIME	PRACTICE TIME
Going through the Learning Objectives	Getting guidance from Subject Matter Expert
Trying to accomplish the learning objectives by accessing learning resources	Deep diving on to the learning concepts and solve a problem statemen

LEARNING JOURNEY:

The learning journey contains 2 stages, followed by a Business Aligned Project.

STAGE 1 –CIM DOMAIN BASICS

- SQL programming and Soft Skills
- Java Programming and Soft Skills

STAGE 2 –BUISNESS UNIT

- Amazon Connect (Amazon Web services) - Basic Introduction
- Amazon connect - Contact flows (In briefs)
- Digital Technologies

Business Unit is providing for an experience of real time problem solving in Agile methodology.

Cognizant has collaborated with Udemy to provide world class learning videos for the evolving future of work. These Udemy programs are woven into a learning path, empowering you to plan and learn at your style.

The program also connects you with Subject Matter Experts to get the professional guidance on your queries in the learning journey.

The program continuously evaluates if you can apply those self-learnt skills to solve a business problem. Depicted below are the three key learning components, which are distributed across the learning journey for the purpose of continuous evaluation.

SCHEDULING OF LEARNING COMPONENTS

This curriculum will take 12-16 weeks to complete. Every day, starting on day one of the programme, the GEN C will have various learning components to accomplish.

The day-by-day timetable will be included in the complete student handbook. All of the learning components must be completed according to the day-by-day plan. These elements will be automatically scheduled in your unique learning paths according to the schedule.

INNOVATIVE LEARNING MODELS IN 2022

The Gen C (Generation Cognizant) Program stretches across the entire timeline of a campus hire's learning journey from the time he/she accepts the offer letter from the company -to the first year of his/her tenure in the organization. There is a robust learning strategy put in place across each of the stages.

- Modern Flipped Classroom
- Branding @ Campus Events
- Leader Engagement
- Heartfulness Workshops & Webinars Active Volunteering

TECHNICAL COURSES AND BEHAVIORAL TRAINING :

Course Name	Communication & Social Skills
Course Type	Soft Skill
Course provider	MicroLearn Ltd
Instructors	Nan
Requirements	Absolutely none.
Course Content	The Communication and Social Skills range is designed to help staff become more confident and effective in their communications, when speaking, listening, writing and presenting data.

Course Name	Active Listening Masterclass

Course Type	Soft Skill
Course provider	MicroLearn Ltd
Instructors	Everett Bowes, Brand Strategist
Requirements	1. An open mind, and willingness to improve yourself. 2. A desire to improve your business (and personal) relationships.
Course Content	1. Transform your leadership. 2. Increase workplace efficiency. 3. Radically boost employee retention. 4. Improve team dynamics. 5. Understand the negative impact of multitasking while listening. 6. Learn why we are physically drained after hours of active listening. 7. Learn the pitfalls that interfere with active listening, and how to avoid them. 8. Learn how to instill confidence in others while they are speaking, and why. 9. Improve your promotional advancement potential. 10. Learn how improvements in conversation skills can impact your organization

Course Name	Effective Email Communication: Enhancing Your Voice at Work
Course Type	Soft Skill
Instructors	Nikki Woodford, Education and Innovation Specialist
Requirements	1. You should be able to use a computer at a beginner level. 2. You should have experience with email.

Course Content	1. Understand the nature of email communication
	2. Understand the importance of knowing intended audience
	3. Know appropriate structures for email messages
	4. Know strategies for managing email inbox
Course Name	Java Database Connection: JDBC and MySQL
Course Type	Technical
Instructors	Chad Darby, Java Spring Instructor
Requirements	1. Students should have basic knowledge of Java progamming.
	2. Students should have basic experience with MySQL
Course Content	1. Connect to a MySQL Database with Java
	2. Submit SQL statements to insert, update and delete data
	3. Handle SQL parameters with Prepared Statements
	4. Calls stored procedures and handle various parameter types
	5. Read and write BLOB and CLOB data files
	6. Configure your database connection information with properties files

Course Name	Amazon Connect
Course Type	Technical
Instructors	Mohan Kumar , Technical Architect(Cognizant)
Requirements	Students should have basic knowledge of Java/Python progamming.
	Students should have basic experience with MySQL(if spreadsheet

	used)
Course Content	Learn about types of queues Learn about how to create contact flows. Learn to use real time caller authentication

CHAPTER - 2

2.1 LITERATURE SURVEY

A thorough examination of the utilization of interactive voice response (IVR) was carried out. IVR is a telephone interviewing approach in which a high-quality recorded interactive script replaces the human speaker, and the respondent responds by pressing the keys on a touch telephone (touch-phone).

IVR offers a number of benefits, including cost savings, autonomy, confidentiality, access to specific demographic groups, increased data quality, standardized interviewing, multilingual interfaces, and detailed longitudinal assessments. Despite this, IVR has only been used a few times. Information services, reminder calls, monitoring, assessment, experimentation, interventions, and surveys have all been studied previously.

The systematic examination of voice, multilingual interfaces, touch-phone prevalence, survey response rates, use by the elderly, and acceptance are all areas that have gotten minimal attention.

2.2 REQUIREMENTS

In this we are going to list all the requirements that are needed in the model. The various Tools, Technologies and Libraries which are used

2.2.1 TOOLS AND TECHNOLOGIES AND LIBRARIES

Java programming language :

Java is a popular programming language for creating web apps. For nearly two decades, Java has been a popular choice among developers, with millions of Java programmes in use today. Java is a platform-independent, multiplatform, object-oriented, and network-centric programming language.

Java is a free and adaptable programming language that may be used to create localised and distributed software. Java is commonly used for the following purposes:

1)Game development: Java is used to create many popular mobile, computer, and video games. Java is used to create even modern games that incorporate complex technologies such as machine learning or virtual reality.

Java is frequently referred to as WORA (Write Once, Run Anywhere), which makes it ideal for decentralised cloud-based applications. The Java programming language is used by cloud providers to run apps on a variety of underlying platforms.

SQL programming language:

MySQL is the board shell and a community database. It provides a user interface for us to connect to the database.

The application is used for a wide range of purposes, including data warehousing, online trading, and logging. Despite this, the most common application of MySQL is to create a web information base.

Amazon Connect :

Amazon Connect is a cloud-based omnichannel contact centre. In just a few minutes, you can set up a contact centre, add agents from all over the world, and begin connecting with your clients.

Using multichannel communications, you may provide individualised experiences for your customers. For example, based on client preferences and projected wait times, you can dynamically offer chat and voice communication. Meanwhile, agents may manage all consumers from a single interface. They can, for example, talk with consumers and generate or respond to tasks that are assigned to them.

Amazon Connect is an open platform that you may use to connect to other enterprise apps like Salesforce. You can also use the AWS ecosystem to create new experiences for your customers.

CHAPTER 3
SYSTEM DEVELOPMENT

SOFTWARE DEVELOPMENT LIFECYCLE

A Software Development Lifecycle Model describes the types of activities carried out at each stage of a software development project, as well as how the endeavours are related to one another.

1.Software Development Life Cycle is abbreviated as SDLC.

2.It is also known as the Software Development Process.

3.SDLC is a complex series of tasks that are completed at each phase in the product improvement process.

4.A global standard for programming wheel of life measures is ISO/IEC 12207. It is stated to be 5.the streamer that organises all of the tasks required for programming creation and management.

TYPES OF SDLC

1. Sequential

2. Iterative and Incremental

SEQUENTIAL SOFTWARE DEVELOPMENT

A sequential development model expresses the software development process as a continuous, progressive flow of activities. This implies that any stage in the advancement, interaction should start when the past stage is finished. In principle, there is as such no cover of stages, yet by and by, it is useful to have early input from the accompanying stage.

ADVANTAGES	DISADVANTAGES

1. Cost Effective	1. Rigid
2. Less time taking	2. Absence of central authority
3. Suitable for different geographical positions	3. Lack of intuitiveness
4. It's linear	4. No centrality of the client
5. Maximized customer satisfaction	
6. No pre knowledge required	

WATERFALL MODEL

In the Waterfall model, the maturing ventures are completed one after another. In this model, test ventures only occur after all other maturing activities have finally been out righted. Its diagrammatic portrayal looks like a course of cascades.

V-MODEL

Disparate the Waterfall model, the V-model mingles the test operations all round the development process, executing the principle of before time testing.

SCRUM

Each replay assumes to be rather small (e.g., hours, days, or a few weeks), and the trait redoes are correspondingly trivial, such as one or two intensifications and/or hardly some new features.

INCREMENTAL AND ITERATIVE DEVELOPMENT

The incremental model is a type of programming development that divides requirements into multiple independent modules during the product development cycle. Every module in this replica goes through the requirements, intent, execution, and trial stages. Each subsequent arrival of the segment increases the magnitude of the previous discharge. The interaction continues until the full skeleton has been reached.

You can start with a fraction of the product determinations and work your way up to the major adaption of the product using the Iterative Model. If there is a need to change the product after the primary form, another rendition of the product is created with a different emphasis. The Iterative Model's arrival will result in a distinct and fixed period known as a cycle.

This replica encourages people to return to earlier stages, where the differences are made subtly. The venture's final yield was applied to the varnish of the Software Development Life Cycle measure.

SOFTWARE TESTING

Software testing is a broad term that encompasses a variety of activities and employment. Execution is merely one of these responsibilities.

The following is what software testing entails:

1.assesses the software's quality
2.the possibility of software breakdown during operation is minimised
3.Execution of Software Testing

TEST PROCESS

Nobody has an all-encompassing programming test measure, but there are fundamental test exercises without which testing would be more hesitant to achieve its stated goals.

TEST LEVELS

Test levels are groups of test exercises that are grouped together and overseen. Each test level is a test interaction occurrence. Different exercises in the product development lifecycle are used to identify test levels.

TEST CASE WRITING

A bunch of preconditions, inputs, activities (where relevant), anticipated outcomes and post conditions, created dependent on test conditions. It involves

1. Test Case Title
2. Pre-Conditions
3. Test Steps
4. Expected Results
5. Test Suite
6. Test Environment
7. Actual Results
8. Status
9. Defect Report

Defect Report - Documentation of the event, nature, and status of a deformity. Wherein a blemish or inadequacy in a work item where it doesn't meet its prerequisites or particulars is a deformity.

JAVA

Java is a widely used programming language that is built on classes, organised around objects, and designed to have as few execution conditions as possible. It is expected to allow application developers to write once and run anywhere (WORA), implying that organised Java code can execute on any platforms that support Java without the need for

recompilation. Beginning in 2019, Java was one of the most often used programming languages on GitHub, especially for client worker web apps.

REAL WORLD APPLICATIONS

There are numerous spots where Java is utilized in reality, beginning from an online trading site to android applications, from logical application to money related applications like electronic exchanging frameworks, from games like Minecraft to work area applications like Eclipse, Netbeans, and IntelliJ, from an open-source library to J2ME applications, and so forth.

JAVA VIRTUAL MACHINE

Java Virtual Machine (JVM) is a motor that gives runtime states to push the Java Code or applications. It switches over Java byte code into machines language. JVM is a masterpiece of Java Run Environment (JRE). In other programming dialects, the compiler will produce machine code for specific structures. In any case, Java compiler produces code for a Virtual Machine

DATA TYPES

PRIMITIVE DATA TYPES	NON-PRIMITIVE DATA TYPES
Primary data forms include integer, character, short, large, float and double.	They comprise classes, interfaces, and arrays.

OBJECT-ORIENTED PROGRAMMING SYSTEM

Object-oriented programming System (OOPS) is a programming perspective ward on "objects" that contain data and procedures. The essential part of thing masterminded composing PC programs is to construct the flexibility and common sense of activities. It joins data and its conduct (techniques) in a singular area (object) makes it all the more clear how a program works.

CONCEPTS OF OBJECT-ORIENTED PROGRAMMING SYSTEM

Class: It is a conference of near components. For instance, you had a class called "Costly Cars". Its properties (data) can be cost or speed of these vehicles. While the systems may be performed with these vehicles are driving, easing back down, etc.

Objects: An object can be designated as a development of a class, and there can be different adaptations of a class in a program. For example - seat, bike, marker, pen, table, vehicle, etc.

Inheritance: Classes can share, acquire or "acquire" properties and techniques that have a place with existing classes. This allows you to reuse existing code and reduces the time you spend coding. A class that gets from another is known as a derived class or a young person class. A class that shares its properties and methodologies is known as a base class or parent class.

Polymorphism: alludes to the capacity of a strategy to be utilized in various manners, that is, it can take various structures at various occasions (poly + morphs). There are two sorts of polymorphism: compile time polymorphism and run time polymorphism.

Compile time (static) polymorphism happens when a technique is over-burden; that is, the point at which the contention utilized with the strategy is changed. This is done to get various outcomes. A case of this would propose various names for being the President of a nation, which would get you various outcomes each time – yet they would in any case be known as the President.

Run time (dynamic) polymorphism happens when the techniques itself are changed. At the point when you needn't bother with a President yet a Prime Minister, you would need to supersede the current strategy.

Abstraction: Information deliberation alludes to the procedure of just showing applicable properties and techniques to deal with an item, while concealing the rest. Information deliberation lets you lessen the multifaceted nature (clearly) of a program and is an enormous bit of leeway offered by classes in OOP dialects.

Encapsulation: Embodiment alludes to keeping objects with their strategies in a single spot. It likewise ensures the trustworthiness of the information – keeps it from being

unnecessarily modified by confining access to the information, ideally by concealing it from outside components.

INTERFACES IN JAVA

Like a class, an interface can have techniques and factors, however the strategies pronounced in an interface are naturally unique (just strategy signature, no body).

1. If a class executes an interface and doesn't give strategy bodies to all capacities indicated in the interface, at that point the class must be announced theoretical.
2. A Java library model is, Comparator Interface. On the off chance that a class executes this interface, at that point it tends to be utilized to sort an assortment.

EXCEPTION HANDLING

The Exception Handling in Java is one of the incredible instrument to deal with the runtime blunders so typical progression of the application can be kept up.

The java.lang hrowable class is the root class of Java Exception order which is acquired by two subclasses Exception and Error.

Types of Exceptions:

1. Built-in Exceptions
2. User Defined Exceptions

JAVA EXCEPTION KEYWORDS

Try	The "try" watchword is utilized to determine a square where we should put an exemption code. The attempted square should be trailed by either get or at last. That is to say, we can't utilize the square alone.
catch	The "catch" square is utilized to deal with the exemption. It must be gone before by the attempt square which implies we can't utilize the catch square alone. It tends to be trailed by a long last square later.
finally	The "finally" square is utilized to execute the significant code of the program. It is executed whether a special case is dealt with or not.
throw	The "throw" catchphrase is utilized to toss a special case.
throws	The "throws" catchphrase is utilized to announce exemptions. It doesn't toss a special case. It determines that there may happen to be a special case in the technique. It is constantly utilized with strategy signature.

STRINGS

String is an arrangement of characters. In java, objects of String are permanent which implies a steady and can't be changed once made.

1. char charAt(int list) - Restores the character at the predefined list.
2. int compareTo(Object o) - Examines this String to another Object.
3. int compareTo(String anotherString) -Examines two strings lexicographically.
4. int compareToIgnoreCase(String str) - Examines two strings lexicographically, disregarding case contrasts.
5. String concat(String str) - Connects the predefined string as far as possible of this string.
6. boolean equals(Object anObject) -Looks at this string to the predetermined item.
7. int indexOf(int ch) -Returns the list inside this string of the principal event of the predetermined character.
8. int indexOf(String str) -Restores the file inside this string of the primary event of the predefined substring.

9. int lastIndexOf(int ch, int fromIndex) -Restores the file inside this string of the last event of the predetermined character, looking in reverse beginning at the predefined record.

10. int lastIndexOf(String str) -Restores the file inside this string of the furthest right event of the predetermined substring.

STRINGBUFFER

Java StringBuffer class is an alterable (modifiable) string. The StringBuffer class in java is similar to the String class with the exception that it is impermanent. For example, it very well may be changed.

CONSTRUCTOR	DESCRIPTION
StringBuffer()	makes an unfilled string support with the underlying limit of 16.
StringBuffer(String str)	creates a string support with the predetermined string.
StringBuffer(int capacity)	creates an unfilled string support with the predefined limit as length.

ARRAYS IN JAVA

An array is a holder object that holds a fixed number of estimations of a solitary kind. The length of a cluster is set up when the exhibit is made. After creation, its length is fixed.

In Java all exhibits are powerfully allocated.

Exhibits can contain native's information types just as objects of a class contingent upon the meaning of cluster. If there should arise an occurrence of natives information types, the real qualities are put away in bordering memory areas. If there should be an occurrence of objects of a class, the genuine items are put away in the load section.

COLLECTIONS IN JAVA

Collection framework in Java provides an architecture to handle and manipulate objects. It has implementations for various data structures, which have very different use cases

some are faster for storage or retrieval others store data in a certain way and so on. Java collection is a bundle of single objects. It provides many interfaces like Set, List, Queue, HashSet, etc.

ARRAYLIST

ArrayList class in java is a resizable array which very similar to vectors in C++. It is implemented in java.util package. ArrayList provides many different functions for manipulating ArrayList from adding elements, removing elements, sorting elements.

JAVA DATABASE CONNECTIVITY WITH MYSQL

To interface Java applications with the MySQL database, we have to follow 5 after advances.

In this model we are utilizing MySql as the database. So we have to know the following information for the MySql database:

1. Driver class: The driver class for the MySql database is com.mysql.jdbc.Driver.
2. Connection URL: The association URL for the mysql database is jdbc: mysql://localhost:3306/sonoo where jdbc is the API is running, we may likewise utilize IP address. We may utilize any database, in such case, we have to supplant the sonoo with our database name.
3. Username: The default username for the mysql database is root.
4. Password: It is the secret phrase given by the client at the hour of introducing the MySQL database. In this model, we are going to utilize root as the secret key.

INTRODUCTION TO MYSQL

The acronym SQL stands for Structured Query Language. It is a standard language that is used to communicate with databases. SQL is a powerful programming language for working with databases. It works by grabbing and dismantling information bases with information fields in their tables.

MySQL is the board shell and a community database. It provides a user interface for us to connect to the database.

The application is used for a wide range of purposes, including data warehousing, online trading, and logging. Despite this, the most common application of MySQL is to create a web information base.
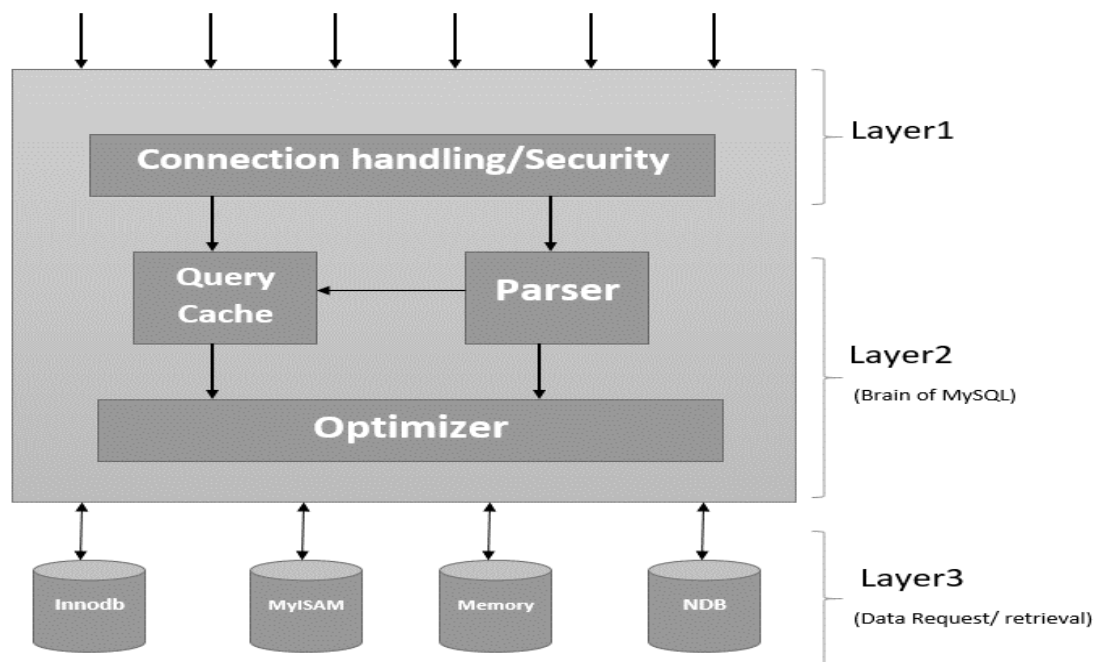

Figure 2: MySQL CLIENT

RELATIONAL DATABASE MANAGEMENT SYSTEM

A relational data set is one that stores statistics in a well-structured group, with lines and segments available. As a result, finding and ingraining evident qualities under the details basis is easier. The social design makes it possible to quickly sprint doubts across tables that are unconnected.

INSTALLATION OF MYSQL

Step1: The initial step is to go to the site www.dev.sql.com and introduce MySQL for the necessary working framework.

Step2: Ensuing to acquaint the MySQL with your system, fire setting up the workbench stage where you can create the inquiries.

Step3: At the point when you open the workbench, a secret phrase brief will spring up and you must enter the root secret word that you made during the establishment procedure.

Step4: Then comes the time when you can make your first database inside the workbench.

DATA DEFINITION LANGUAGE

Information definition language is a grammar for manufacturing and switching data set items like tables, lists, and clients. DDL manifestations are like a PC programming language for setting apart information frameworks, particularly data set blueprints. The common statements used are: CREATE, ALTER, DROP, TRUNCATE.

DATA TYPES

Numeric Data type:

INT: Whole numbers

FLOAT(M,D): Decimal numbers(approx.)

DECIMAL(M,D): Decimal numbers(precise)

Non-Numeric Data type:

CHAR(N): Fixed length character

VARCHAR(N): Varying length character

ENUM('M','F'): Value from a characterized list

BOOLEAN: True or False qualities

Date and Time type:

DATE: Date(YYYY-MM-DD)

DATETIME: Date and time (YYYY-MM-DD HH-MM-SS)

TIME: Time(HH-MM-SS)

YEAR: Year(YYYY)

PRIMARY AND FOREIGN KEYS

PRIMARY KEY	FOREIGN KEY
An essential key is a field in a table which exceptionally recognizes each column/record in a data set table. Essential keys should contain unusual calibre. An essential key segment is not allowed to have NULL qualities. A table has just one essential key, which may contain single or various fields.	This imperative is utilized to forestall activities that would annihilate joins between tables.

MODIFYING TABLES

Tables Can Be Added and Removed "Include COLUMN COL NAME>DATATYPE>" is the language structure to include another segment in the currently created table.

"DROP COLUMN COL NAME>" is the grammar for removing a section from a table.

Furthermore, an abbreviation request is used to remove all data from the tables.

DATA MANIPULATION LANGUAGE

A DML is typically a sublanguage of a larger data set language like SQL, with the DML including a portion of the language's controllers. Read-only data selection is sometimes assumed to be necessary for a distinct DQL, however it is frequently associated with and thought to be a part of a DML. INSERT, SELECT, UPDATE, and DELETE are the most popular DML commands.

JOINS

Joins allow you to retrieve data from multiple tables in a single select statement. There must be a relevant segment between two tables in order to link them. Inward joins, left joins, and right joins are examples of different types of joins.

INNER JOIN	LEFT JOIN	RIGHT JOIN
Inward join will recover information just when there is coordinating qualities in both the tables.	Left join will recover all the information from the left table and the coordinating lines from the correct side of the table.	The correct join will recover the information from the correct table and coordinating columns of the left table.

SUBQUERIES

Subqueries are the inquiries that are settled inside different questions. The subqueries can be utilized in a SELECT, INSERT, UPDATE, or DELETE question. The settled question could be in the WHERE provision or in the FROM. There are two kinds of subqueries to be specific, non-corresponded subquery and related subquery.

NON-CORRELATED SUBQUERY

In this sort of subquery, the inward question can run freely of the external inquiry. Inward questions run first and produce an outcome set and which is then utilized by the external inquiry.

CORRELATED SUBQUERY

In this sort of subquery, the internal question runs for each line in the external inquiry. Here the internal question cannot run freely of the external inquiry.

NORMALIZATION

Standardization is the procedure of effectively sorting out the information into the database. It is fundamentally done to expel the excess information and to just store the related information in a table. The advantages of standardization are:

1. Reduce the extra room
2. Reduce addition, update, and cancellation inconsistencies
3. Improve inquiry execution
4. Reduce the extra room
5. Reduce addition, update, and cancellation inconsistencies
6. Improve inquiry execution

Following are the degrees of standardization:

1st typical structure (1NF)   2nd typical structure (2NF)

3rd typical structure (3NF)   Boyce and Codd typical structure (BCNF)

FIRST NORMAL FORM (1NF)

The standards in the main typical structure are that a table is in the 1NF if:

1. There are no rehashed lines of information
2. The sections just contain a solitary worth
3. The table has an essential key

SECOND NORMAL FORM (2NF)

The standards in the subsequent ordinary structure are that a table is in the 2NF if:

1. They fit in with 1NF.
2. Every segment that is anything, but an essential key of the table is subject to the entire of the essential key

THIRD NORMAL FORM (3NF)

The guidelines in the third typical structure are that a table is in the 3NF if:

1. They fit in with 2NF .

2. Every segment that is not the essential key is just subject to the entire of the essential key.

Amazon Connect :

Amazon Connect is a cloud-based omnichannel contact centre. In just a few minutes, you can set up a contact centre, add agents from all over the world, and begin connecting with your clients.

Using multichannel communications, you may provide individualised experiences for your customers. For example, based on client preferences and projected wait times, you can dynamically offer chat and voice communication. Meanwhile, agents may manage all of their customers from a single interface. They can, for example, talk with consumers and generate or respond to tasks that are assigned to them.

Amazon Connect is an open platform that you may use to connect to other enterprise apps like Salesforce. You can also use the AWS ecosystem to create new experiences for your customers.

Contact Flows in Amazon Connect :

From start to finish, a contact flow describes the consumer experience with your contact centre. To help you quickly set up and run a contact centre, Amazon Connect contains a set of basic contact flows. For your specific case, you may want to design custom contact flows.

Contents

- Required permissions
- Default contact flows
- Sample contact flows
- Contact block definitions

- Create a new contact flow
- Copy and paste contact flows
- Roll back a contact flow
- Associate a phone number with a contact flow
- Contact flow modules
- Create prompts
- Set up contact transfers
- Set up recording behavior
- Set up queued callback
- Import/export contact flows
- Invoke Lambda functions
- Encrypt customer input
- Track events in contact flows
- Use contact attributes
- Migrate contact flows
- Flow language
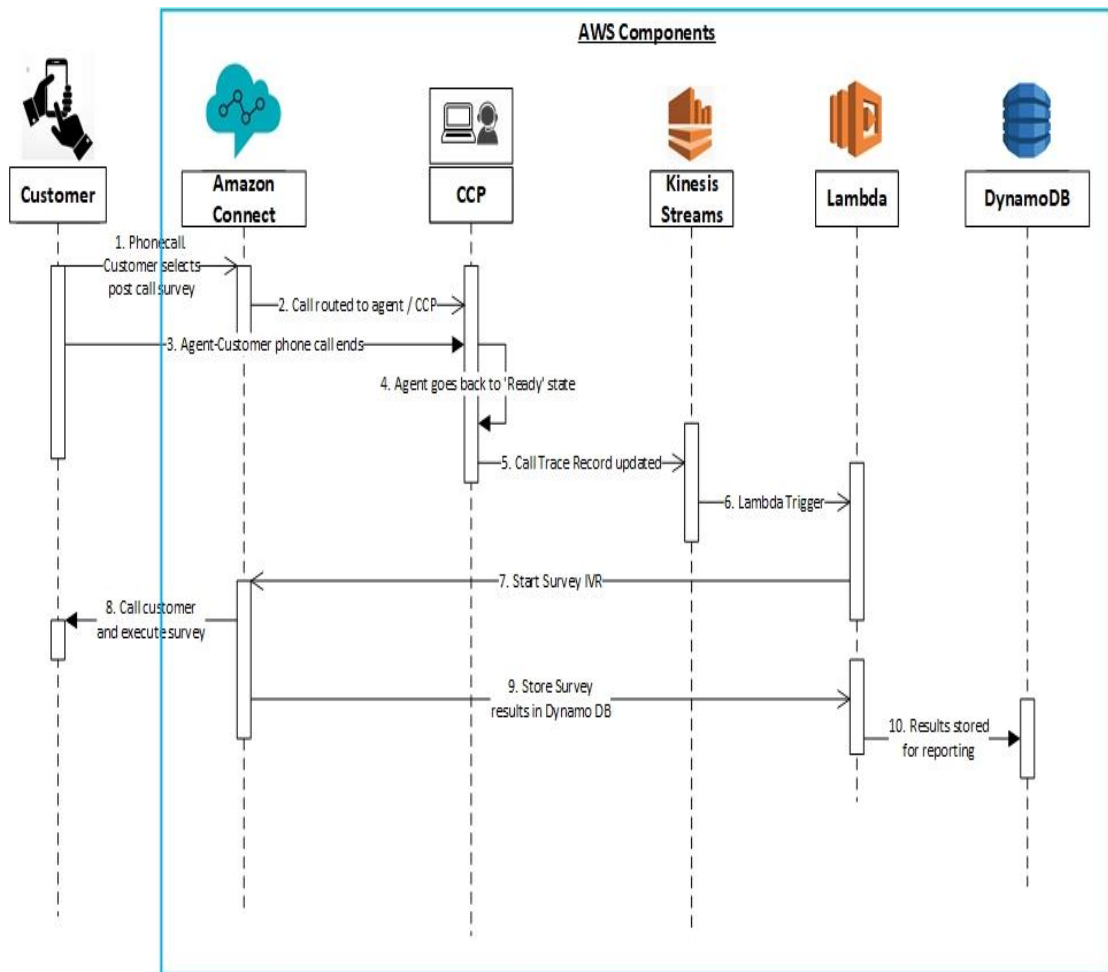
TEST FLOW DIAGRAM FOR AMAZON CONNECT IVR

CHAPTER 4

PERFORMANCE ANALYSIS

I.   **Customer service expenditures were reduced :**

Interactions via chat and SMS are substantially less expensive than IVR. They are, however, a fraction of the cost of live agent phone calls. Automation and self-service usage will rise if managers give their clients options to satisfy their individual needs. As a result, the number of clients looking for help from an agent will decrease. Outbound marketing is an effective strategy for reducing increasing incoming call traffic.

II.   **Effortless business processes :**

Managing a call centre with many departments can be difficult, especially when a large number of clients call in. A major percentage of the managerial effort is delegated to Interactive Voice Response systems, which perform a range of activities.

III. Customer Experience

Customer service interactions have a significant impact on the customer experience. According to our analysis, customers will have to wait 12 minutes to speak with a customer service representative over the phone. And even that is considered a long wait. According to 49 percent of clients, the most frustrating component of phoning customer service is the long wait periods

DIFFERENT STAGES OF CONTACT FLOWS EXPLAINED BY DIAGRAMS:
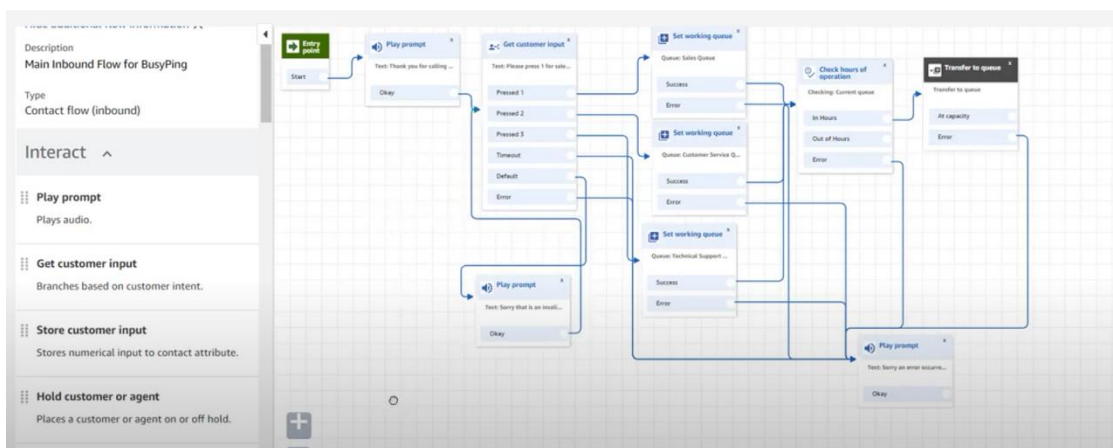
1)
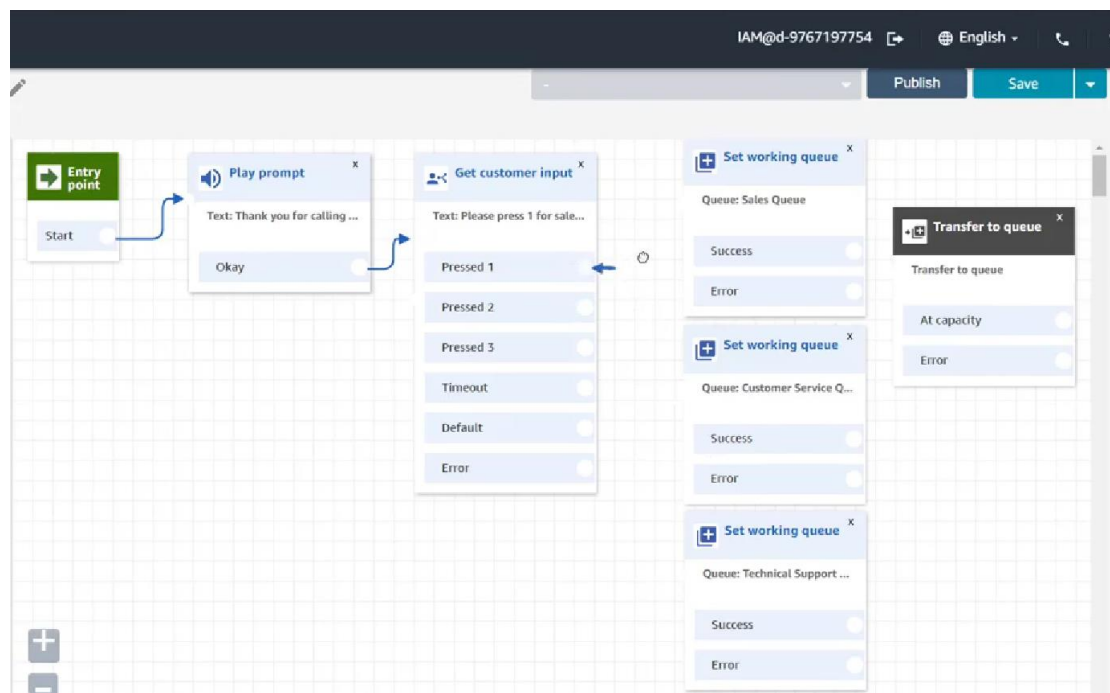
2)
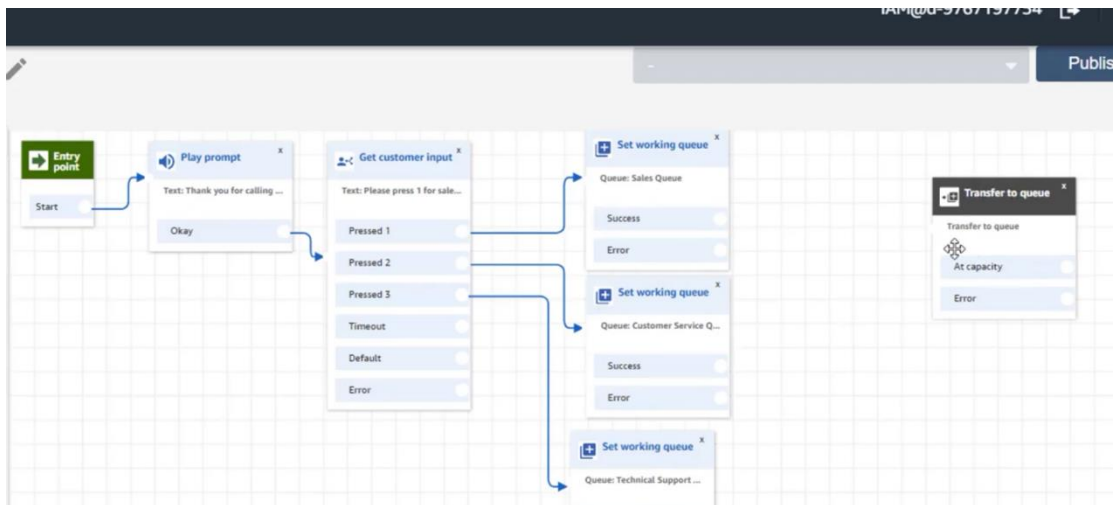
3)

Blocks are used in the above contact flow:

I.Create a work queue. This block adds the contact to the BasicQueue when it arrives.

II.Confirm the business hours. When the queue is active, this block checks to see if the contact has arrived.

III.Return to the queue. The contact is transferred to the BasicQueue using this block.

IV.Play the prompt. This block displays the message "We are not able to take your call right now" if the queue is not open for business, there is a problem, or it is full.

V.Hang up/disconnect. This block is at the end of every flow.

VI.In the above example, what happens when the customer is transferred to queue, but no agents are available to take their call? The **Default customer queue** flow is triggered. It plays music while the contact is waiting in queue.

CONCLUSIONS

Amazon Connect is an omni channel cloud contact centre that offers customers and agents a frictionless and seamless experience. Amazon Connect can help you streamline operations, enhance agent efficiency, and reduce contact centre costs.

Amazon S3 is a scalable, long-lasting, and dependable service for contact centres wishing to construct and run a secure data lake at scale. All of your contact centre data may be stored in the S3 data lake without needing to be reorganised, allowing for faster value extraction and time-to-value. The contact centre data lake can be used by your employees and stakeholders to do various analytics, such as big data processing, real-time dashboards and visualisations, and machine learning (ML), to aid in data-driven business decisions.

A well-organized and efficient contact centre data lake might be a game-changer.

Companies with a large volume of inbound calls and few customer support employees may benefit from virtual reality. IVRs can be altered and improved at any time, and new categories or messages can be added, resulting in a simple, clear, and useful IVR phone experience.

FUTURE SCOPE

IVR systems are simple to set up and are popular among small and mid-sized organisations looking to avoid costly and inconvenient equipment. Customers gain confidence from a well-implemented IVR — picture the joy of approaching a support call with pleasure rather than anxiety.

Cloud-based tools are also continually improving to make the life of agents and customers easier. IVR systems, happily, will continue to play an important role, owing to their scalability and innovation potential. Here are a few significant areas where you may improve your IVR:Application-Programming Interface (API) Based Interaction

Customers are the finest advocates for your company. They are likely to rely significantly on assistance as long-term customers of your product who are continually seeking for methods to maximise ROI. Because this reliance is so important, IVR systems will enhance flexibility by enabling APIs that allow for interface with other companies and apps. These integrations open up a slew of new possibilities for your IVR to intelligently route consumers and deliver more customisation; they also promise contextual awareness, which will improve your customer experience.

Information Extensions

Customer problems come in all shapes and sizes. With an IVR system in place, the most typical client issues, such as account balance inquiries that don't require an agent's assistance, can be handled by an automated response. If, on the other hand, a customer's issue is unique, employees can be ready to solve it right away. Customers can be routed through tighter, more efficient systems with information extensions, which enhance response times and customer satisfaction by providing self-service choices.

Improved User Interface

In the field of customer service, "less is always more" is the mantra of the future. Customers are frequently disappointed by the time they contact a support agent, regardless of how popular the telephone is. Despite the self-service aspect of phone assistance, it's critical to regulate the process so that menu options are kept to a minimum,

marketing messages are avoided, and wait times are kept to a minimum. It's crucial to test and re-test the IVR experience to ensure you're not losing clients..

Business Value and Impact

Businesses gain significantly from having the correct IVR system in place. You can fine-tune your messaging and responses if you can track the campaigns that are driving the conversations. Consumer surveys and tracking marketing and sales activity provide vital insights that will undoubtedly increase customer loyalty.

acquisition, identifying the suitable prospects, assisting sales efforts, and improving revenue methods

APPLICATION CONTRIBUTION

The organizations technical architect and the technical lead gave me an assignment to create a contact flow for our customer so that we can arrange a proper schematic process on where to a customers' call lead.

The various parts that were added are :

1) Creating a timeout situation when the particular key isn't pressed.

2)Creating different queues for technical , sales and financial support people

3)Created a Java database connection using sql

4)Created a capacity member , so the call can be cut if the capacity isn't there.

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APPENDICES

SOME JAVA AND SQL CODES WRITTEN DURING THE TRAINING WHILE GIVING HANDS-ON EXERCISES:

PAN card validation program :

```java
1   import java.util.Scanner;
2   import java.util.regex.Matcher;
3   import java.util.regex.Pattern;
4
5   class PanCard {
6       public static void main(String[] args) {
7           Scanner scanner = new Scanner(System.in);
8           Pattern pattern = Pattern.compile("^[A-Z]{5}(\\d){4}[A-Z]$");
9           String panNo;
10
11          System.out.println("Enter the PAN no:");
12          panNo = scanner.next();
13
14          Matcher matcher = pattern.matcher(panNo);
15
16          if (matcher.matches()) {
17              System.out.println("Valid PAN no");
18          } else {
19              System.out.println("Invalid PAN no");
20          }
```

SQL CODES:

Q : Write a query to display hotel id, hotel name and hotel type of hotels which has not taken any orders in the month of 'MAY 19'. Sort the result based on hotel id in ascending order.

A : select hotel_id, hotel_name, hotel_type

from hotel_details

where hotel_id not in (select hotel_id

from orders

where month(order_date) = 5 and year(order_date) = 2019);

Q : Write a query to display partner id, partner name, phone number of delivery partners whose rating is between 3 to 5, sort the result based on partner id.

A : SELECT partner_id, partner_name, phone_no

from delivery_partners

where rating between 3 and 5

order by partner_id;