Unified Contact Center Reporting in AWS

Point of View

Dec-2023

Contents

01

Overview

Objective
Benefits of being serverless,
Common data sources in contact center Data transformation workflow

02

Architecture

Logical Architecture
Technical Architecture

03

Data Pipeline & Security

Ingest, Stage, Transform, Analyze/Visualize, Archive
Security

04

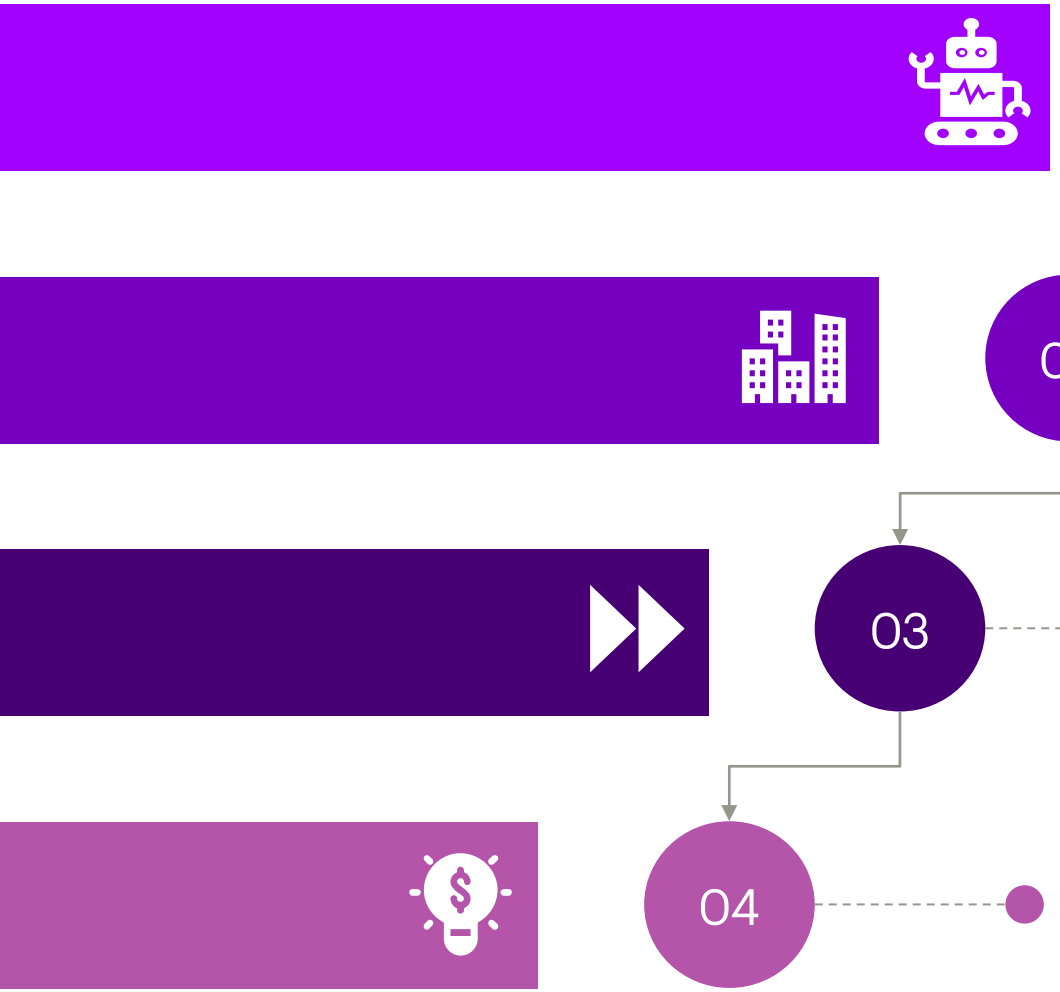
Result

Key Takeaways

Objective


Contact Centers
Continuously generates petabytes of data, but how that data is used can make all the difference to the organization
Needs
Gain useful insights from this data, which can help in improving customer service
Challenge
Most contact centers lack a unified platform where reporting data can be stored and leveraged for analytic needs
Solution
A cloud-based architecture for a serverless data platform that contact centers can utilize for reporting and generate insights

Benefits of being serverless



01 Enables agile and self-service data onboarding

02 Freedom from infrastructure management

03 Rapidly build data processing pipelines

04 Economically Feasible

Contact center applications & platforms generate a lot of data which often remains unused

Common Data Sources in a Contact Center

IVR

CRM

NLU/Speech Bots

CTI

Agent Desktop

Chatbots

WFM

Call Recordings

Data transformation workflow

Raw Data

Raw data from multiple contact centre data sources in the form of plain text, csv etc

01

Staging Table

Filtered, Sorted, Merged Data is pushed to Staging Table

02

Analytics Model (CAR)

Customer Analytical Record(CAR) provides consolidated data view of customer

03

04

Analytics Model (JAR)

Journey Analytical Record (JAR) provides a view of customer journey across channels

05

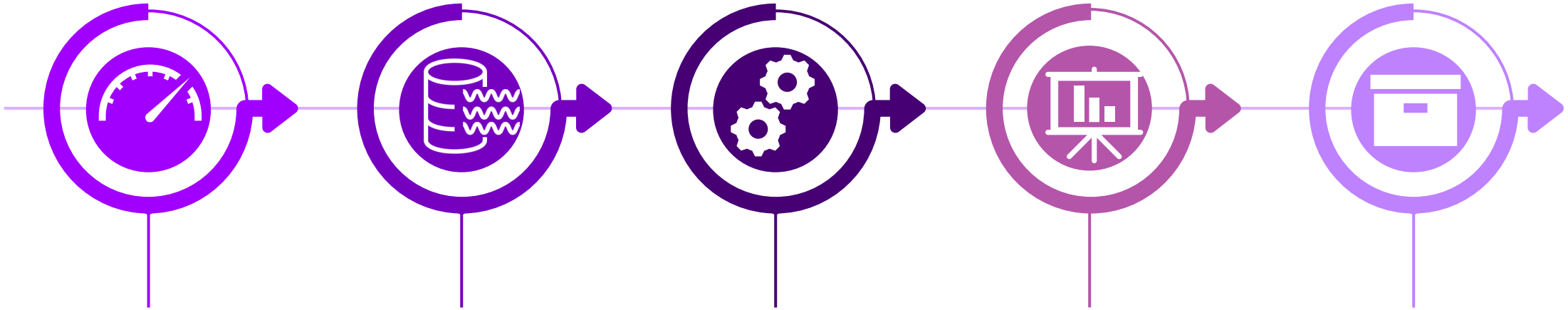
Reporting/ Dashboards

Storytelling/ Narrative

Advanced Analytics

Logical Architecture

Proposed architecture consists of a stack of 5 layers, where each layer is composed of multiple components. A layered, component-oriented architecture promotes separation of concerns & decoupling of tasks



Data Ingestion

Simple self-service data ingestion into the data lake landing zone and provides integration with other stages

Data Staging

Provides the opportunity to perform data housekeeping and cleansing prior to making the data available for analysis

Data Transformation

Prepare data. Merging of data sources, aligning formats, converting strings to numerical data, or summarizing of data.

Analytics & Visualization

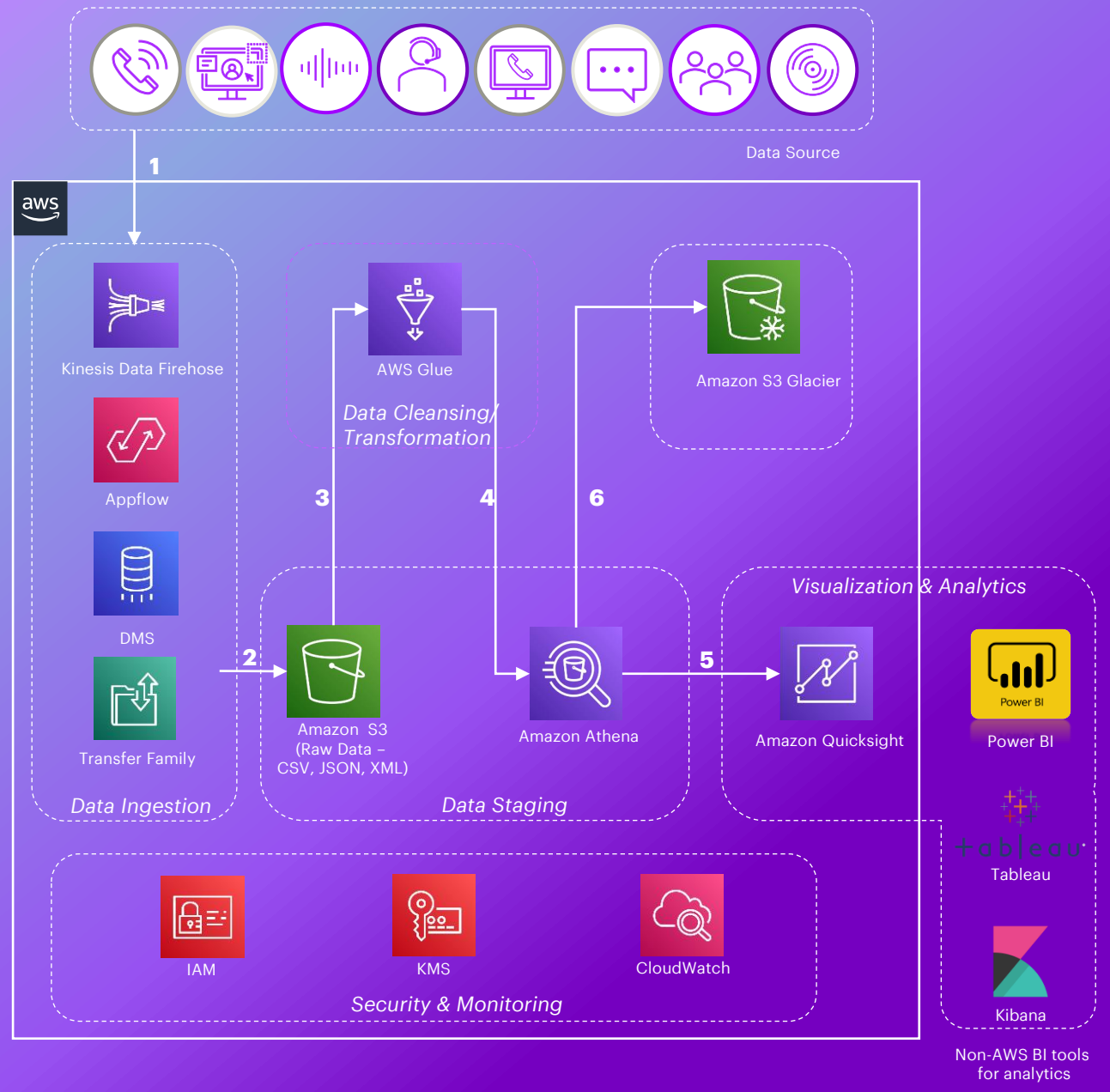
Analytics involves generating results from the data; visualization is about exploring data and communicating results from analysis to decision-makers

Data Archiving

Long term preservation of data for re-use

Technical Architecture

1. Data from CC applications ingested to AWS using multiple ingestion services
2. Raw Data is ingested into S3
3. Data is then verified, validated and transformed using AWS Glue workflow
4. Curated data is stored into Amazon Athena
5. Visualizations are built in Quicksight (or other tools) based on data from Athena
6. Data is archived into S3 Glacier for long term preservation

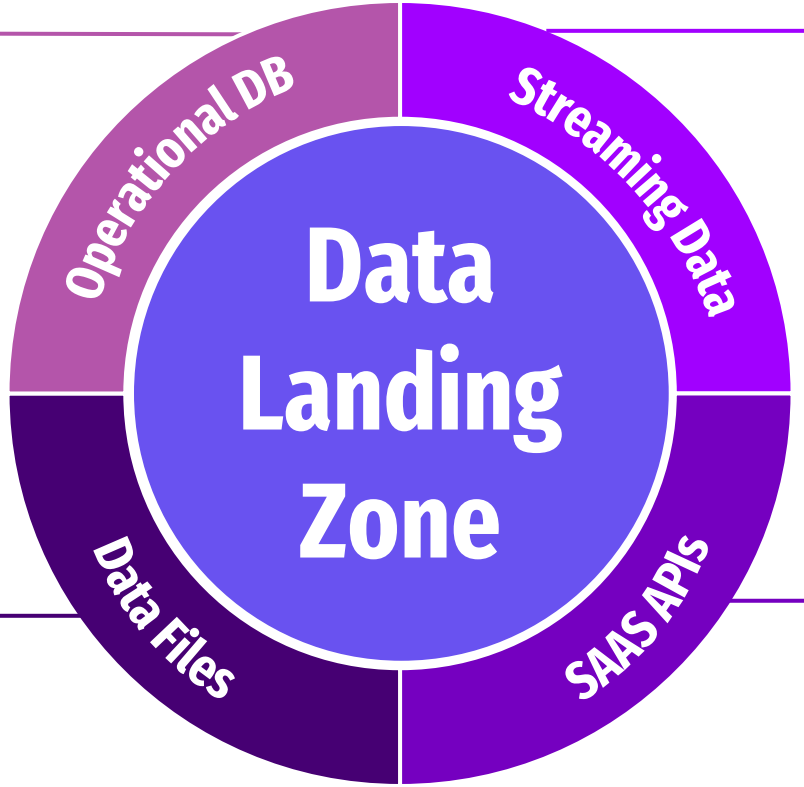


Data sources and ingestion services

Ingest | Stage | Transform | Analyze/Visualize | Archive

AWS DMS

DMS Connects to a variety of operational RDBMS and NoSQL databases and ingest their data
E.g., Customer details



AWS Kinesis

Streaming data can be clickstreams, application and infrastructure logs and monitoring metrics can be ingested using Kinesis
E.g., IVR Call logs, Browser Logs, Agent Desktop Clickstream

AWS Transfer Family

AWS Transfer Family supports secure FTP endpoints and natively integrates with Amazon S3
E.g., Call recordings

Amazon AppFlow

AppFlow connects to SaaS applications such as Salesforce, ingest data and store it

Staging the data

Ingest | **Stage** | Transform | Analyze/Visualize | Archive

1. Place the data housed in multiple systems or locations into a landing zone and make it available for other components in the pipeline

2. Amazon S3 offers a robust destination for this housekeeping mechanism. The staging files in S3 can be classified and protected using object tags

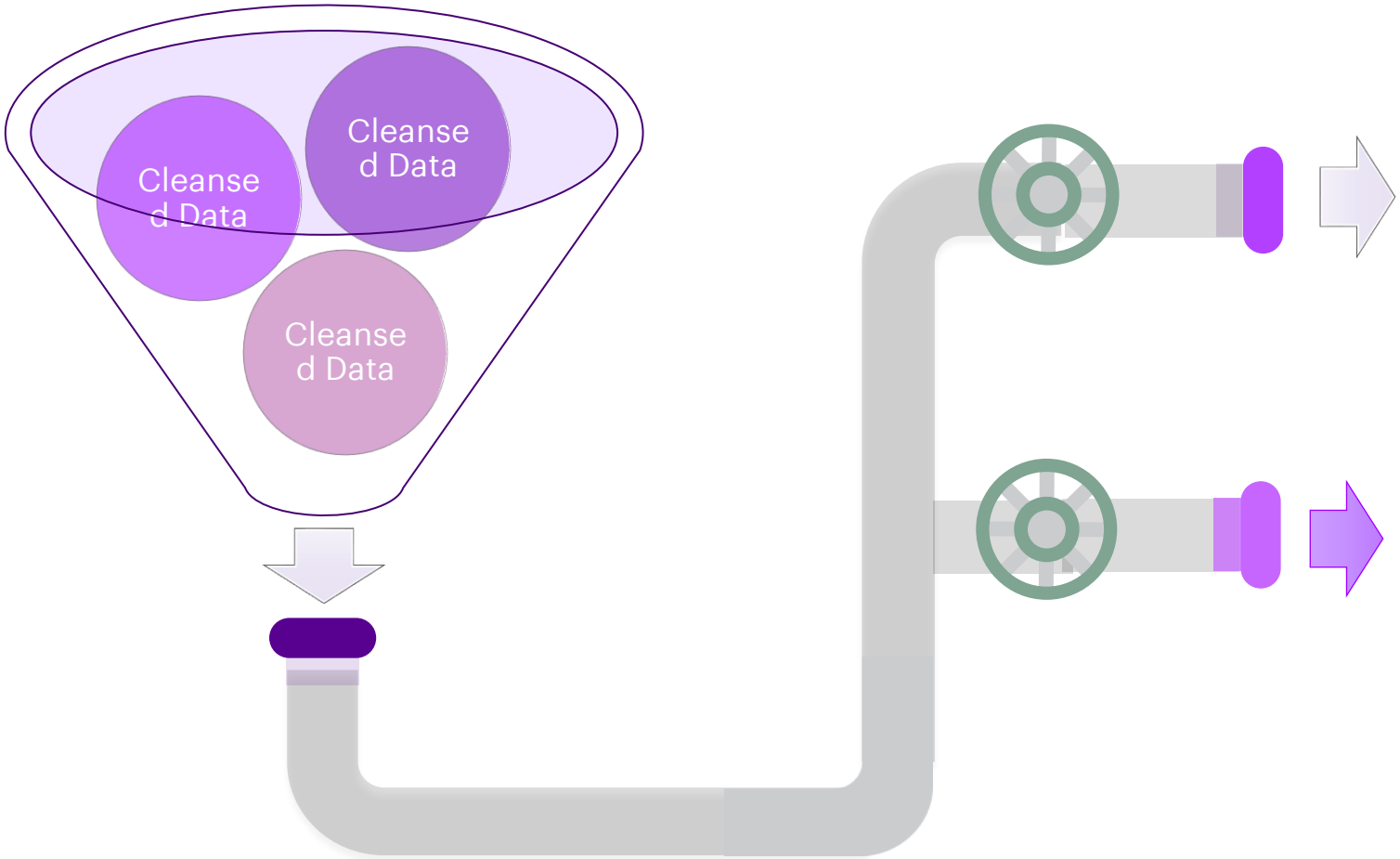
3. Next step in staging is to cleanse the data in staging files to a format that is optimized for analytics. E.g., Remove unwanted data, translate call recordings to text, convert date format etc.

4. The cleansed data is stored into Staging tables in Athena

Transform the data

Ingest | Stage | **Transform** | Analyze/Visualize | Archive

Transform the data so it's optimized for analytics. We propose CAR–JAR (Customer Analytics Record/Journey Analytics Record) data models for transformation, which is optimal for generating customer 360-degree view. This data can act as a single source of truth for every customer and every interaction with contact center



Customer Analytics Record (CAR)

	Data 1	Data 2	Data 3	Data 4
Customer 1				
Customer 2				
Customer 3				
Customer 4				

Journey Analytics Record (JAR)

	Data 1	Data 2	Data 3	Data 4
Interaction 1				
Interaction 2				
Interaction 3				
Interaction 4				

Customer analytics using CAR model

Ingest → Stage → Transform → **Analyze/Visualize** → Archive

Customer Analytics is the process of collecting and analyzing behavioral customer data across a range of channels, devices, and interactions. These analytics give you the insight necessary to form strategies, products, and services that your customers will want to engage with. Customer analytics record (CAR) table is a customer DNA which helps build a single customer view

- Increase personalization
- Send the right message at the right time
- Focus the right campaigns to the right audience
- Make sure experiences throughout the customer journey are positive
- Aid product development, and marketing and sales as a whole

>

Sl.No	Level	Variable	Description
1	Customer Identificaton	Cust_ID	Unique Customer ID
2	Demographics	Occupation	Occupation
3	Demographics	Age	Age
4	Demographics	MaritalStatus	Marital Status
5	Demographics	Ethnicity	Ethnicity
6	Demographics	GrossAnnualIncome	Gross Annual Income
7	Demographics	EmploymentType	Employment Type
8	Geographic	CountryName	Country Name
9	Geographic	Region	Region within Country
10	Customer Relationship	Tenure	Tenure
11	Value	OverallRevenue	Overall Revenue
12	Channels Summary	CommonChannels	Common Channels
13	Device Type	Device	Preferred Device
14	Products Aggregates	Product 1	Product 1
15	Products Aggregates	Product 2	Product 2
16	Products Aggregates	Product 3	Product 3
17	Risk / Flags / Arears	HighRiskCustomer	High Risk Customer
18	Risk / Flags / Arears	CustomerRestriction	Customer Restriction
19	Geographic	BranchNumber	Branch Number
20	Customer Segmentation	CustomerSegmentID	Customer Segment ID
21	Customer Identificaton	GlobalCustomerID	Global Customer ID
22	Geographic	CustomerCountryRelationship	Customer Country Relationship
23	Customer Relationship	VVIP	VVIP Customer
24	Customer Relationship	PremierCustomer	Premier Customer
25	Customer Relationship	CommercialorPersonal	Commercial or Personal
26	Customer Relationship	IsDigitalEligible	Eligbile for Digital
27	Customer Relationship	BranchVisits	Branch Visits
28	Risk / Flags / Arears	FinancialRiskCustomer	Financial Risk Customer
29	Products Overview	NumberofTotalProducts	Total No of Products

Journey analytics using JAR model

Journey Analytics is the process of understanding the impact of every interaction a customer has with your business. It involves gathering information from every part of the journey and analyzing the journey for pain points and successes. It provides a view of user journeys to track and analyze how customers engage business using multiple channels

- Better agent assistance using customer interaction history
- Improved Customer Experience
- Cross channel capabilities
- Opportunities for call deflection & digital adoption

Sl. No.	Level	Variable	Description
1	Channel Interaction	ChannelType	Interaction Channel: IVR, WebChat..
2	Channel Interaction	UniversalSessionId	Universal Session Id across channels
3	Channel Interaction	SessionId	Unique Session Id for the interaction generated by Channel
4	Channel Interaction	CUST_ID	Unique Customer Id Number
5	Channel Interaction	SessionStartTime	Customer initiation/Start time for each Leg
6	Channel Interaction	InteractionStartTime	Agent/Bot interaction Start time
7	Channel Interaction	InteractionEndTime	Agent/Bot interaction End time
8	Channel Interaction	SessionEndTime	Agent End Time, post call after wrapup
9	Channel Interaction	HoldTime	HoldTime
10	Channel Interaction	AgentId	Agent Identifier
11	Channel Interaction	AgentSkillId	Assigned Skill for interaction
12	Channel Interaction	Department	The departmetn which the agent belongs to
13	Channel Interaction	Team	The team which the agent belongs to voice or a chat team
14	Channel Interaction	IntentCategory	Customer Intent
15	Channel Interaction	Intent	Customer Intent
16	Channel Interaction	JourneyStep	This captures the different channels opted by the customer/journey flow
17	Channel Interaction	IsResolved	Interaction Resolved Flag
18	Channel Interaction	IsTransferred	Interaction was transferred to another entity
19	Channel Interaction	ChannelTypeTransferred	Channel Type transferred to
20	Channel Interaction	IsDigitalOffered	This is the flag only applicable for IVR
21	Channel Interaction	IsDigitalAccepted	This is the flag only applicable for IVR
22	Channel Interaction	AgentIdTransferred	Transferred Agent Identifier
23	Channel Interaction	AgentSkillIdTransferred	Assigned Skill for interaction after Transfer
24	Channel Interaction	ExitReasonCode	Reason for exiting the channel
25	Channel Interaction	InteractionNotes	Interaction wrap up notes
26	Channel Interaction	IsTransferredToSurvey	transferred to CSAT queue? yes/no
27	Channel Interaction	CSATScore	Customer Satisfaction score given
28	Channel Interaction	IsCallBack	To analyse the callbacks
29	Channel Interaction	CallBackSessionId	To analyse the callbacks
30	Channel Interaction	SessionDuration	This provides the time of overall journey
31	Channel Interaction	CustomerDuration	This provides the time spent by customer start to end
32	Channel Interaction	AgentDuration	This provides the time spent by agent start to end
33	Channel Interaction	InteractionDuration	This provides the time spent in interaction between agent and customer
34	Channel Interaction	QueueTime	This provides the time spent in queue

Here is a sample analysis....

Ingest → Stage → Transform → **Analyze/Visualize** → Archive

What are the preferred interaction channels for different age groups?	a) Query unique **Cust_ID** from CAR table for the required age groups (teenagers, senior citizens) etc. b) For each **Cust_ID**, check the count of **ChannelType** for every interaction in the JAR table c) Identify the **ChannelType** with highest count
What is the main reason for VVIP customers to contact customer care?	a) Query unique **Cust_ID** for VVIP customers from CAR table b) Filter each **Cust_ID**, check the count of **IntentCategory** from JAR table c) Sort the intents in the descending order of count
Identify the reason for repeat calls	a) For every unique **Cust_ID,** query **Session_Id** with same **IntentCategory** in JAR table b) Sort **Session_Id** in ascending order of **InteractionStartTime** c) Increment a repeat call counter against an **IntentCategory**, if difference between two consecutive **InteractionStartTime** for that intent is less than 3 days d) Identify the **IntentCategory** with max number of repeat call counter value.

Data visualization tools

Ingest | Stage | Transform | **Analyze/Visualize** | Archive

Contact center reporting should be easy to understand and tell a story that everyone, from agents to managers, will be able to use as a tool to support their discussions. For this purpose, we need to leverage tools offering interactive visualizations. There are tools with pre-built templates with graphs and charts that will enable you to create complete reports in the form of dashboards that are adaptable to multiple devices.

Amazon Quicksight

Serverless BI solution with native integration to the proposed architecture

Tableau

Tableau, a Salesforce company, is recognized as a Leader in Gartner's Magic Quadrant (Jan 2023).

Power BI

Unified, scalable platform from Microsoft enterprise business intelligence (BI). Recognized as Market Leader in Gartner's Magic Quadrant (Jan 2023).

Kibana

Open-source data visualization dashboard software for Elastic Search

AWS QuickSight

Ingest | Stage | Transform | **Analyze/Visualize** | Archive

QuickSight is a cloud-scale business intelligence service that can natively connect to Amazon Athena for visualizing data

Scale from 10 users to 10,000, all with no infrastructure to deploy or manage.

Uses machine learning to help you uncover hidden insights and trends in your data, identify key drivers

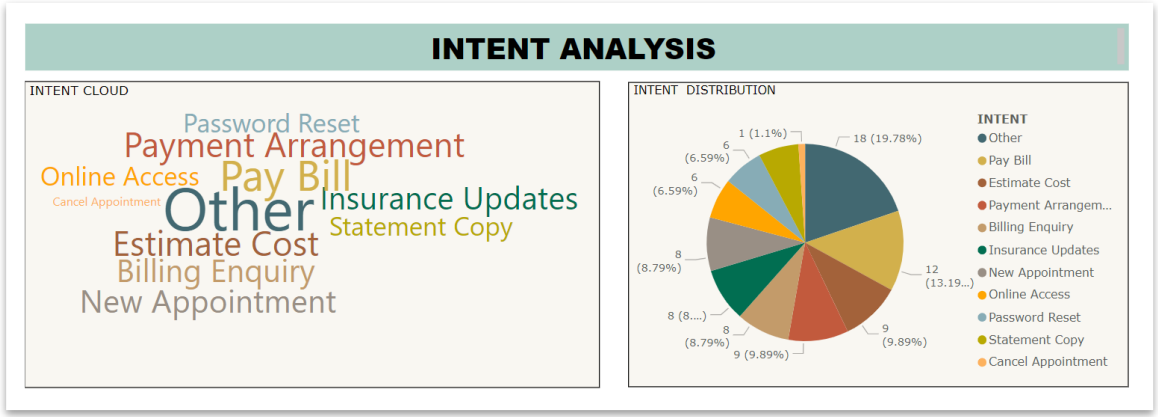
With ML insights, you can avoid spending hours manually analyzing and investigating

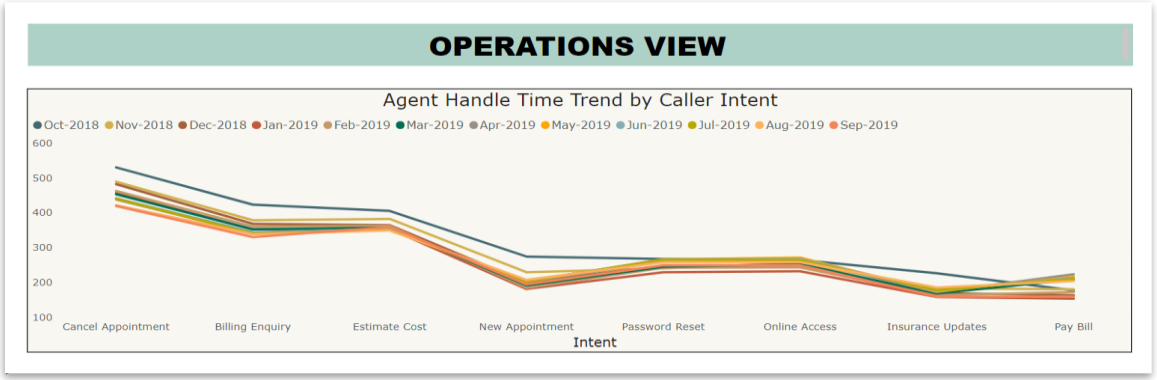
Visualizations

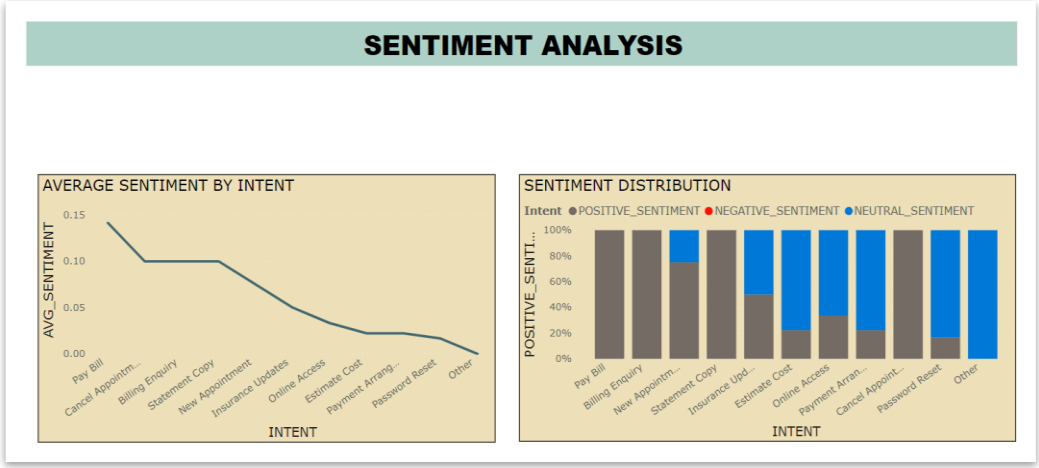
Ingest → Stage → Transform → **Analyze/Visualize** → Archive

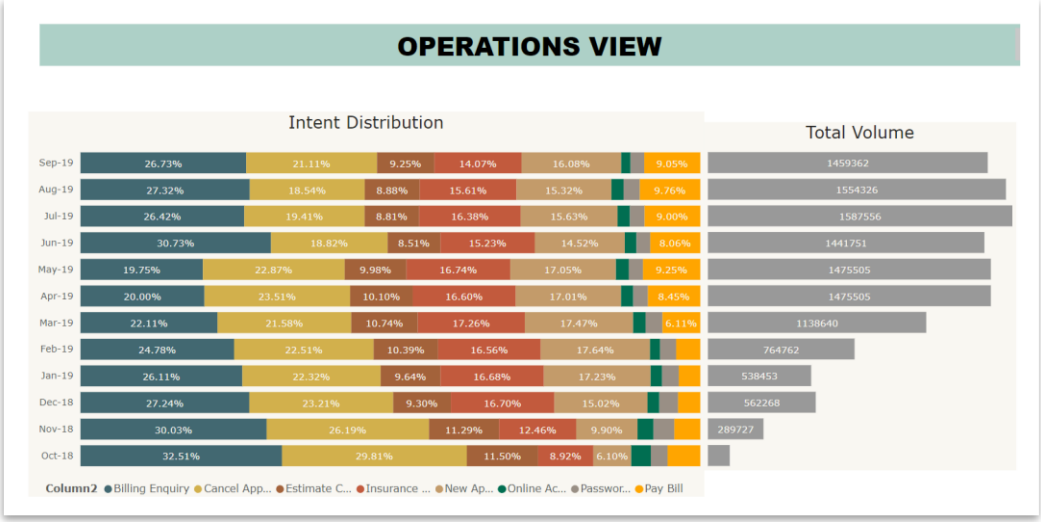
Visualizations provide clear representation of key contact center performance metrices to supervisors and managers. Some common visualizations are bar, line and pie charts, heatmaps, gauges etc. Here are some sample reports...

SAMPLE REPORTS









Dashboards

Ingest → Stage → Transform → Analyze/Visualize → **Archive**

Reporting dashboards consolidates and presents critical performance metrics and key performance indicators (KPIs) in a visually intuitive manner.

Real-time Monitoring

Enables instant access to live data, allowing for proactive issue resolution and performance optimization.

Data-Driven Decision Making

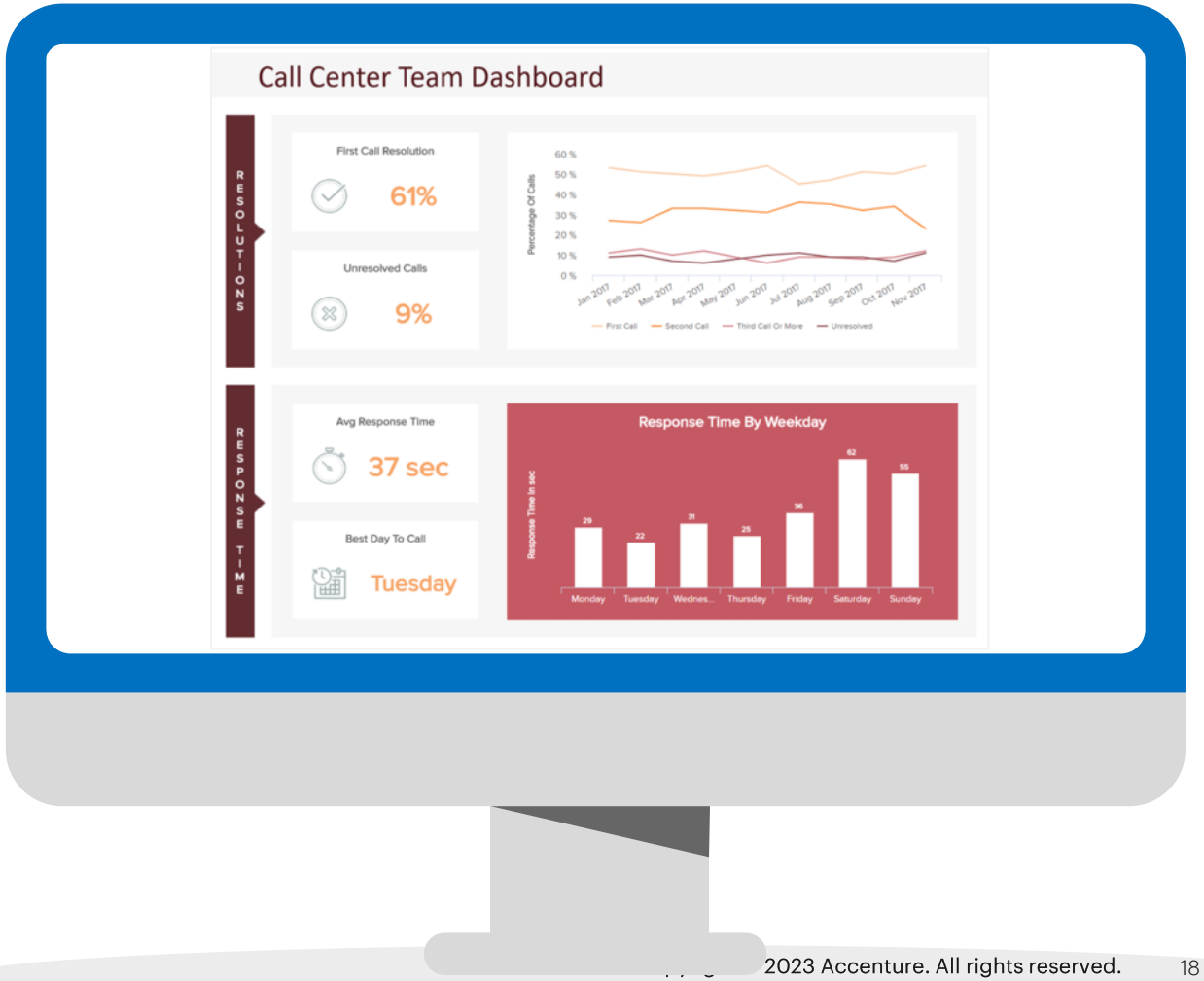
Empowers managers to make informed decisions based on current and historical performance data.

Improved Efficiency

Identifies areas for process improvement, leading to reduced AHT and increased customer satisfaction.

Enhanced Agent Performance

Provides agents with visibility into their performance metrics, fostering accountability and motivation.



Archival of data

Ingest → Stage → Transform → Analyze/Visualize → **Archive**

S3 Intelligent Tiering

If there is data with varying access patterns and we are not sure which storage class to choose, use S3 Intelligent-Tiering. It automatically moves objects between two access tiers based on their usage patterns.

S3 Glacier

It is a great choice for archival data that is rarely accessed but needs to be stored securely. Able to configure data retrieval times ranging from minutes to hours, depending on requirements.

S3 Glacier Deep Archive

Cost-effective but suitable for data that is not expected to be accessed frequently, such as regulatory and compliance data.

Lifecycle Policies

By using lifecycle policies, we can automate the process of archiving data from frequently accessed storage classes like S3 Standard to lower-cost storage classes like Glacier or Glacier Deep Archive as the data becomes less frequently accessed over time.

Versioning & Cross Region Replication

If data durability and availability are critical for the archived data, we can enable versioning in S3 to protect against accidental deletion or modification. Additionally, we can set up cross-region replication to replicate the archived data to another AWS region for disaster recovery purposes.

How is the reporting data secured in AWS?

Security

Components across all layers of the architecture protect data, identities, and processing resources by natively using the capabilities in AWS such as Authentication & Authorization (IAM), Encryption (KMS), Network Protection (VPC) and Monitoring & Logging (CloudWatch)

Data Security

AWS provides an advanced set of access, encryption, and logging features to do this effectively. The proposed architecture leverages AWS Key Management Service (KMS) to manage encryption of data in transit and at rest

Data Access

AWS offers capabilities to define, enforce, and manage user access policies across AWS services. AWS Identity and Access Management (IAM) lets you define individual user accounts with permissions across AWS resources

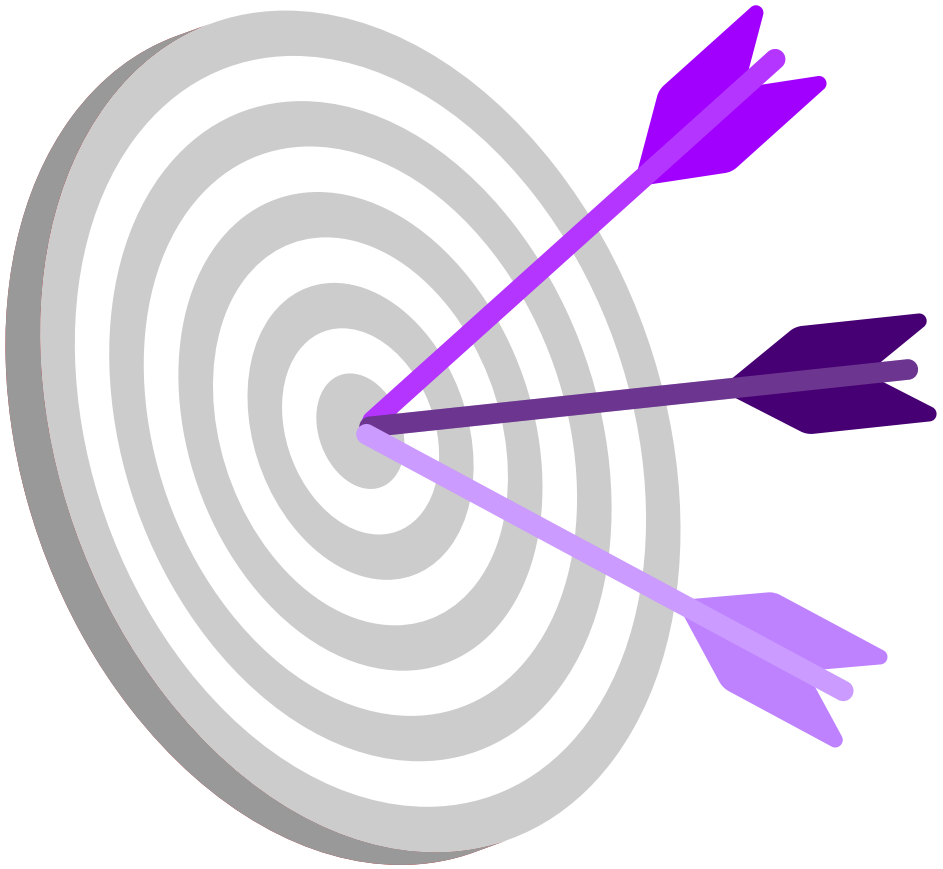
Data Privacy

The AWS infrastructure puts strong safeguards in place to help protect customer privacy. All data is stored in highly secure AWS data centers. AWS supports 143 security standards and compliance certifications

Our point of view

Contact centers manages and operates various applications across multiple platforms. The reporting solution for each of these applications reside with in their respective platforms. The strategy for a unified reporting platform for contact centers will help organizations deliver the omnichannel and organization-wide visibility you need....

The result?



01 A flexible architecture for storing contact center reporting data that scales with organization over time

02 Proven analytics model (CAR/JAR) that delivers all important contact center KPIs

03 A scalable solution that allows you to focus on your organization's needs, rather than on updating and managing reporting tools

Contact us

Dileep Raghav

Management Consulting
Senior Manager

Mahesh Mukundan

Management
Consulting Manager

Naga Rakshith Javaji

Management
Consultant

Maheshbala Ganesh

Management
Consulting Analyst

Arjun Balaraman

Management Consulting
Senior Manager

Santhosh Natarajan

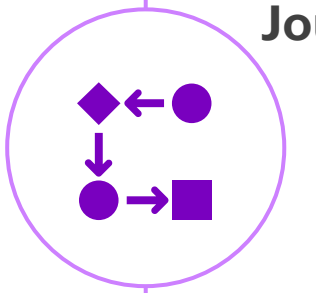
Accenture Leadership

Appendix

CAR/JAR Analytical Model

Customer Analytical Record

A consolidated data view on customers across products and services to build an exhaustive customer profile



Journey Analytical Record

A consolidated view of customer journeys to track and analyze how customers engage with the brand using multiple channels

Timely access	Central repository of all relevant data avoids data accessibility constraints
Quick data building	Reduce analytical data build time significantly
Flexible	Provides flexible, logical and lean data structure
Scalable	Facilitates contraction or extension of variables as requirements change
360-degree view	Designed to provide all-inclusive comprehensive customer observation

Typical CAR/JAR building process

Identify required data → Define data capturing process → Data cleaning → Integration of data → Rolling up to create CAR/JAR Tables