



CLOUD CONTACT CENTER

Todd Brissette, Charles Evans, Mohiuddin Faruq, Cecilia Butler

ISMT E-599 Capstone

Spring 2020

May 7th, 2020



Executive Summary	3
Company Overview	3
Implementation Team	3
Project Description	3
Vendor Selection	4
Project Technology	4
Part 1: Business Requirements	5
Contact Center Functional Requirements	5
Contact Center Non-Functional Requirements	10
Business Context	12
Current State (As-Is)	12
Future State (To-Be)	13
Business Benefit Justification	13
Financial Metrics	14
Contact Center Metrics	14
Part 2: Technical Specification and Prototype	16
Software Solution	16
Amazon Connect	16
Amazon Lex	16
AWS Lambda Functions	16
Contact Flow	17
Solution Demonstration	17
GLOCO Contact Center Portal Integration Prototype	18
Architectural Approach	19
Proposed Architecture	20
Integration Architecture	21
Current Architecture	21
Future Architecture	23
Data Design and Management	24
Data Entities and Flow	24
Database Migration and Integration Matrix	24
Data Flow	25
Context Diagram	25
Data Flow Diagram (DFD)	26
Data Storage	26

Database Migration	27
Data Backup	27
Data Security and Compliance	28
Part 3: Implementation Plan	28
Solution Delivery Roadmap	28
The Pilot – feature release timeline	28
Scrum Team	29
Primary Responsibility of the Product Owner	29
Development Team’s Primary Tasks and Responsibilities	29
On-premise Database and Application Migration	30
Operationalization	31
Service Level Agreement	31
AWS Enterprise Support (Tier 3)	31
Steady State Contacts and References	31
Business Operations (OCIO)	31
Incident Management	32
Change Management	32
Enablement	32
Contact Center Rep & Manager Enablement	33
Business Analysts Enablement	33
Developer/DevOps/Security Professionals Enablement	33
Enablement Schedule	34
Success Metrics	34
Contact Center Metrics	35
References	35
Appendix	36
Appendix A: Project Scope	36
Appendix B: Cloud Contact Center Comparison Chart	38
Appendix C: Historical Metrics	38
Appendix D: AWS Personal Health Dashboard	39
Appendix E: AWS Trusted Advisor	39
Appendix F: PROSCI’s ADKAR Change Management Methodology	40
Appendix G: GLOCO Contact Center Portal Prototype -- Manager Perspective	40

Executive Summary

Company Overview

GLOCO, Inc. is a large multi-national medical equipment manufacturer and sales company that is headquartered in Cambridge, Massachusetts. It has sales channels that are in both business-to-business (hospital, insurance companies, medical providers) and business-to-customer (domestic and international) markets. It distributes medical equipment, supplies, and technology services across global regions in Asia-Pacific, Latin America, Europe, Middle East, and North America. In order to be the global leader in high quality medical equipment, GLOCO has implemented a business strategy of continuous expansion through mergers and acquisitions which has resulted in them acquiring twelve companies over the last four years.

Implementation Team

Fab 4 Solutions is the chosen vendor for GLOCO's cloud contact center project. They were chosen due to their extensive knowledge in developing cloud-based solutions for healthcare organizations. Fab 4 Solutions delivery team will consist of a project manager, business resources, architect, developers, and testers. The project will be managed through the GLOCO Program Management Office (PMO) and the Fab 4 Solutions project team will work with GLOCO's resources to fine tune requirements, architecture, design and other deliverables required throughout the project lifecycle to ensure that the solution delivered meets an agreed upon set of standards between GLOCO and Fab 4 Solutions.

Project Description

GLOCO has several call centers worldwide and wants to standardize their contact center technology. This is a large undertaking and GLOCO has decided to use a phased approach starting with the North America call center located in Indianapolis, Indiana.

The project will migrate the North America on-premise contact center software and hardware to a cloud solution, AWS Connect. The new contact center software and infrastructure, hosted by AWS will integrate with GLOCO's existing contact center portal, currently running on AWS. This contact center portal serves as the centralized "hub" that enables customer service reps and call center managers to integrate with the necessary applications and data sources to serve customers and manage the call center resources and systems. Most of which have already been migrated to AWS. Given this, this project will

also cover integration to the call center portal and billing, product, order entry, returns management, customer relationship (CRM) application for customer profile information, enterprise workforce management application, enterprise analytics, and incident management. Each of these applications have already been migrated to AWS.

Lastly, this project will include the re-platform of the current North America call center hardware. This includes moving from on-premise hardware to AWS Connect infrastructure that provides the telecommunications equipment, integrated voice response, call distribution, and softphone technology. GLOCO will keep their existing headsets and desktop hardware.

For more details, see Appendix A: Project Scope.

Vendor Selection

With GLOCO's strategic initiative to move to the cloud and its desire to improve the customer experience, we created a weighted table (Appendix B) to validate three possible solutions for GLOCO's Indianapolis Contact Center: migrating Five9 (the current on-prem software) to the cloud, using Five9's SaaS solution, and using Amazon Connect to leverage GLOCO's current AWS infrastructure. Amazon Connect was chosen due to its superior security, scalability and reliability.

Project Technology

Amazon Connect is a cloud contact center technology that can scale globally. The cost structure allows GLOCO to pay based upon usage instead of monthly leasing and the purchase of expensive telephony and network equipment.

GLOCO's technology strategy includes leveraging emerging technology when beneficial and migrating to the cloud and has already migrated several applications. The use of AWS Connect includes Amazon Lex and many additional machine learning features that will provide the voice interaction and text-to-speech requirements for the contact center. In addition, AWS Connect has existing Lambda templates to provide automated assistance to GLOCO customers. Lambda functions can also be customized to support the integration with several key applications and the GLOCO contact center portal.

Also, AWS has contact, route flows and recorded messaging that allow for easy setup by the contact center employees and managers without the need of deep programming skills. Additionally, a Lambda

query gives permission for Amazon Connect to use the query within its Contact Flow, which is a simple graphical interface that is used to design a conversational dialogue map of possible interactions that a customer could have with the contact center from the beginning of the process to the very end.

Part 1: Business Requirements

Contact Center Functional Requirements

The business requirements (initial product backlog) for GLOCO’s Cloud Contact Center will focus on the first phase which impacts the North America call center ecosystem for GLOCO or one of the acquisitions. This list may be revised to include additional requirements needed to support the North America call center business operations and any business requirements required to support scaling for GLOCO’s global call center initiatives.

Theme: Customer Communications	
Epic: Contact GLOCO using Phones	
User Story	Acceptance Criteria
As a customer, I must be able to call GLOCO from my cell or internet phone.	<ul style="list-style-type: none"> The system must be able to receive calls from landline & VOIP phones. The system must present options and announce what each keypress does.
As a customer, I want the call rep to already know my previous case history without having to repeat myself.	<ul style="list-style-type: none"> The system must send to the customer rep the customer’s profile including any case history.
As a CSR, I want to receive inbound customer communication requests	<ul style="list-style-type: none"> The system should be able to route a call to the right department or person
As a CSR, I want to be able to transfer the call to another CSR or department.	<ul style="list-style-type: none"> The system must be able to give the transfer option to another CSR within the same department or a different department. While transferring the call, the system should give the ability to also transfer the relevant information.
As a CSR, I want to be able to put a received call back on waiting.	<ul style="list-style-type: none"> The system must be able to give the option to put a call on waiting.
As a CSR, I want to be able to initiate communication with my supervisor when I need assistance.	<ul style="list-style-type: none"> The system should provide an option to allow a CSR to initiate a call to a supervisor.

As a CSR, I want to initiate a request for an onsite service call if I think it's needed to resolve the customer's issue.	<ul style="list-style-type: none"> The system shall provide the ability for a CSR to send a service call request to a Contact Center manager.
As a CSR, I want to see an existing customer's basic information automatically pulled by matching an incoming call number where available	<ul style="list-style-type: none"> The system should be able to query the database to pull a customer basic information by matching an incoming call number, where available, and display it to the CSR
As a call center manager, I want to be able to receive a call from my CSR for assistance or escalated calls.	<ul style="list-style-type: none"> The system must be able to support and flag escalated contacts and transfer to a manager or designated escalation agent.
As a contact center manager, I want to service customers across North America in their primary language	<ul style="list-style-type: none"> The system should address primary languages for countries in North America.
Epic: Contact GLOCO using Social Media	
User Story	Acceptance Criteria
As a customer, I must be able to contact GLOCO using Twitter.	<ul style="list-style-type: none"> The system must have the option to contact GLOCO using twitter. The system must be able to use a specific twitter handle for a specific contact purpose.
As a CSR, I must be able to see and respond to a customer's Tweet.	<ul style="list-style-type: none"> The system must give the option to display all Twitter feeds based on specific handles and a date range. The system must give the option to select and respond to a Tweet. The system must display if another CSR is currently responding to a tweet.
As a contact center manager, I want to be able to assign resources to monitor the twitter queue	<ul style="list-style-type: none"> The system must display all Twitter feeds from the Twitter handle, specific hashtags and mentions on a daily basis.
As a contact center manager, I want to be able to update the knowledge base with new information on how to manage and respond to certain types of Twitter comments	<ul style="list-style-type: none"> The system must allow direct access to the knowledge base for updates on how to manage newer contact types.
Epic: Contact GLOCO using Live Chat and Chatbots	
User Story	Acceptance Criteria
As a customer, I want to have online	<ul style="list-style-type: none"> The system must offer a live chat offer when I am visiting a GLOCO site.

support via live-chat.	<ul style="list-style-type: none"> The system must give the chat option in GLOCO's mobile app as well as in their website.
As a CSR, I must be able to see and respond to a customers' live chat query.	<ul style="list-style-type: none"> The system must pop up a live chat initiated by a customer. The system must be able to determine which CSR is currently available and route the chat.
As a contact center manager, I would like the chatbot to support self-service customer profile, current billing information.	<ul style="list-style-type: none"> The chatbot should provide similar functionality as the current agentless IVR system: provide basic profile and billing information. The chatbot should be available during agent off-hours.
As a contact center employee, I would like the chatbot to "transfer" to a live agent during call center hours	<ul style="list-style-type: none"> The system shall send chatbot requests to the agent's queue during contact center hours. The system shall handle requests for an agent during off-hours.
Epic: Make Outbound Calls	
User Story	Acceptance Criteria
As a CSR, I want to be able to make outbound calls.	<ul style="list-style-type: none"> The system shall allow the CSR to make outbound calls to customers. The system should allow a CSR to search a customer number and double click on it to make an outbound call.
As a CSR, I want to be able to transfer the call to another CSR or department.	<ul style="list-style-type: none"> The system must be able to give transfer option to another CSR within the same department or a different department
As a CSR, I want to be able to put a received call back on waiting.	<ul style="list-style-type: none"> The system must be able to give the option to put a call on waiting.
Theme: CRM	
Epic: Querying customer records	
User Story	Acceptance Criteria
As a CSR, I want access to customer profiles and records.	<ul style="list-style-type: none"> The system provides access to customer records. The system should be able to pop up relevant customer records by automatically matching incoming phone numbers or using customer login info in case of chat. The system should provide manual search options using a customer's first name, last name, phone no and/or email.
As a CSR, I want to update customer records.	<ul style="list-style-type: none"> The system should give access to update a customer records to record any changes in address or phone no.

Theme: Unified Cloud-based Contact Center Database (CCaaS DB)

Epic: Querying a Knowledge-base Database

User Story	Acceptance Criteria
As a CSR, I want to be able to query knowledge base databases.	<ul style="list-style-type: none"> The system should give access to a knowledge base. The system should give options to search knowledge base using keywords.
As a CSR, I want to be able to update the knowledge base with contact details.	<ul style="list-style-type: none"> The system should give the option to update a knowledge base database to record a resolution and related keywords.
As a manager, I want to update the knowledge base with new information about call center features and methods via the portal.	<ul style="list-style-type: none"> The system should allow updates to support new features or procedures.
As a manager, I want to grant privileges to certain employees to add/change/delete contact center procedures for certain contact center processes.	<ul style="list-style-type: none"> The system should give the option for security to grant privileges to certain contact center personnel to add/update procedures in the knowledge base. (Note: This is not customer/contact details)

Epic: Monitor and Manage Calls & Call Center Environment

User Story	Acceptance Criteria
As a Contact Center Manager, I need to be able to monitor calls in progress.	<ul style="list-style-type: none"> The system shall present the visual of each agent on an active call, call start time and call duration in minutes.
As a Contact Center Manager, I can create a special group of callers by picking callers from multiple region(s)/location(s).	<ul style="list-style-type: none"> The system shall give options to create a team based on a group of callers from multiple region(s) to handle a special group of customers based on pre-set criteria
As a call center manager, I need to be able to monitor calls in process and in waiting.	<ul style="list-style-type: none"> The system shall present a screen with a list of all the calls in waiting, call start time and duration of waiting.
As a call center manager, I need to be able to assign a call to a particular caller	<ul style="list-style-type: none"> The system shall present a screen with a list of all the calls in waiting and the free agents, allow me to route a call to a particular agent
As a call center manager, I need to be able to chat with a particular caller or leave a comment.	<ul style="list-style-type: none"> The system shall give a chat option with a particular call center rep; option to leave a comment for a rep or leave a comment based on particular call status.

As a call center manager, I want to continue to access certain applications from my call center portal.	<ul style="list-style-type: none"> • The system should allow a manager and CSRs access to call center knowledge base, enterprise and contact center reporting and analytics, workforce management (WFM), billing, orders, returns, incident reporting, and CRM application from the portal. • This system should allow access to these systems based upon roles.
As a call center manager, I need to be able to listen in and manage the recording of calls for me and select call center employees	<ul style="list-style-type: none"> • The system shall give the manager the ability to screen, listen in, and manage recording of calls. • The system shall give security the option of managing access based upon roles.
As a call center manager, I want to be able to adjust call routes, agent/non-agent call flows, and greetings	<ul style="list-style-type: none"> • The system shall give the option to manage access to add/delete/update call route and contact flow features. • The system shall give security the option of managing access to select employees.
Epic: Reporting	
User Story	Acceptance Criteria
As a Contact Center Manager, I need to be able to see the call statistics by region(s)/location(s).	<p>The system must be able to generate a report with the following filtering options:</p> <ul style="list-style-type: none"> • Call date range (mandatory) • One or multiple selected regions (mandatory) • Call duration range in minutes (optional, if none provided - should be default to any duration) • Selected callers (optional, default is all)
As a Contact Center Manager, I need to be able to see the call details of each caller	<ul style="list-style-type: none"> • The system shall present a report displaying a list of all callers, call list of each caller, duration of each call, whether the call is resolved or not (a flag), caller's comment. • The system shall present the following filtering criteria - caller, call start & end date, and call duration.
As a CSR I need to be able to generate a report to see my own call statistics	<p>The system must be able to generate a report with the following filtering options:</p> <ul style="list-style-type: none"> • Call date range (mandatory) • Call duration range in minutes (optional, if none provided - should be default to any duration)
As a call center manager, I need to be able to see the call summary of each caller	<ul style="list-style-type: none"> • The system shall present a report for displaying a list of all callers, each caller total number of calls, the average duration of each call, min and max call duration, number of successful resolutions, number of open cases. • The system shall present the following minimum filtering criteria - caller, call start & end date, and call duration
As a call center manager, I need to be	<ul style="list-style-type: none"> • The system shall be able to present a report with the details of a

able to see the text of particular interaction	particular interaction (voice to text) based on the caller, customer - email and/or phone number.
As a call center manager, I need to be able to manage CSR access	<ul style="list-style-type: none"> The system shall give the option for security to allow for management of CSR access to system and application data.
As a call center manager, I want to be able to access reports about the contact center application	<ul style="list-style-type: none"> The system shall provide access to monitor the AWS Connect environment for management.
Theme: Customer Bill Payment	
Epic: Manage bill	
User Story	Acceptance Criteria
As a customer, I must be able to check my bill by phone.	<ul style="list-style-type: none"> The system must be able to allow customers to check their bills and any upcoming due dates.
As a customer, I must be able to pay my bill by phone.	<ul style="list-style-type: none"> The system must be able to allow customers to pay their bills over the phone by using major credit cards – Visa, Master and American Express.
As a CSR, I should be able to access bill information and process a bill for a customer	<ul style="list-style-type: none"> The system must provide an interface to accept customer payment using major credit cards - Visa, Master and American Express, or third-party hosted payments.
Theme: Product Purchase and Inventory Check	
Epic: Product Purchase and Inventory Check	
User Story	Acceptance Criteria
As a CSR, I should be able to put order for a customer	<ul style="list-style-type: none"> The system must allow and provide an interface to purchase products for the customer.
As a CSR I should be able to check inventory for the customer	<ul style="list-style-type: none"> The system must provide an option to search for a particular product and check product inventory.

Contact Center Non-Functional Requirements

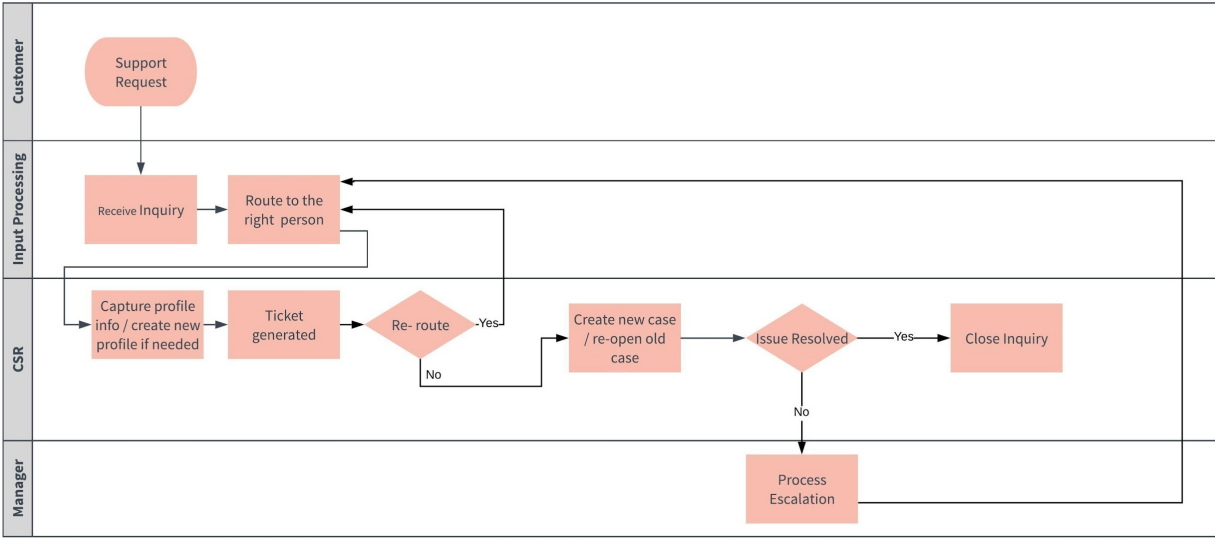
The non-functional requirements will cover the network, telecommunications, applications, integration and security requirements necessary to support a highly available, secure, cloud-based solution that can support North America and scale to support GLOCO’s global call center initiative. The non-functional requirements will also address scalability, performance, security, monitoring, data and application integrity, and service levels.

Non-functional Requirements		
User Story	Acceptance Criteria Operational	Acceptance Criteria System
As a customer, I want the contact center to be open seven days a week, so that I can get necessary support, check and pay my bill when I need to.	<ul style="list-style-type: none"> As a customer, I want to be able to connect to a CSR over the phone without waiting more than 5 minutes I want acceptable response times from designated social media accounts I want to be able to get information anytime. 	<ul style="list-style-type: none"> The system shall be able to support a large, regional contact center and handle call queues and routing to help in managing acceptable call response times. The system shall update social media (Twitter) queues and allow access to appropriate personnel managing queues. The system shall provide unassisted features: IVR and chatbot, during off-hours.
As a customer, I want to get a response in less than 2 minutes when I am contacting through live chat.	As a contact center resource, I want the system to provide contact wait time information	<ul style="list-style-type: none"> The system shall manage contact wait times The system shall allow the manager to monitor wait times.
As a manager, I want a system that will enable remote contact center management in the near future.	As a manager, I want to be able to adjust WFM, knowledge base procedures, call/contact monitoring, routing and contact flows to support remote location operations.	<ul style="list-style-type: none"> The system shall provide integration to the appropriate applications for updates both on-prem and remote. The system shall allow for remote connectivity and monitoring. The system shall provide role-based access to contact center application and system monitoring from on-prem and remote locations. The system shall be available and support performance KPIs for remote work. Note: Performance KPIs TBD.

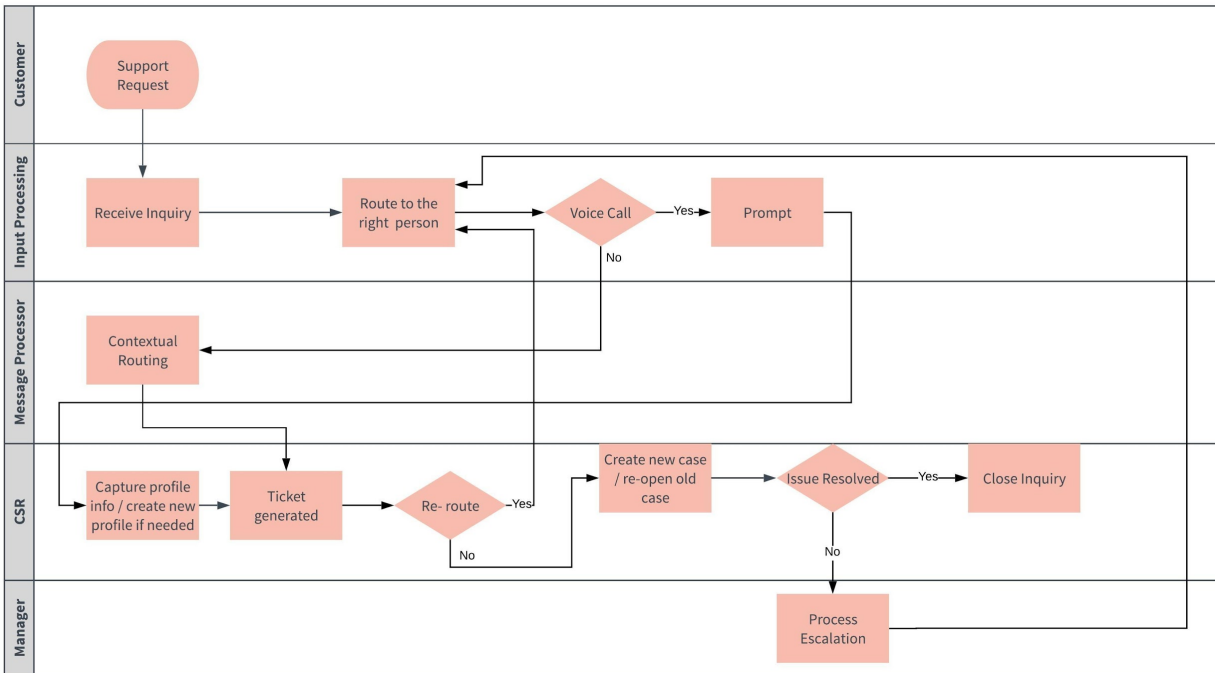
<p>As a call center manager, I want the call details to be displayed in less than 10 seconds when using the call monitoring application.</p>	<p>As a contact center manager, I need to be able to access the call center monitoring and managing system from anywhere using any device. The system shall have multiple channels - desktop app, web and mobile app - to monitor the system.</p>	<p>The system shall give options to print a report, save the report as PDF, Word Doc or Excel; email the report directly from the interface, schedule the report to run automatically at a certain interval and email the report.</p>
<p>As a call center manager, I want to continue to perform management duties from the call center portal</p>	<ul style="list-style-type: none"> As a contact center manager, I need to adjust schedules, monitor costs, assist with call queues, check and enter incidents, and perform contact monitoring tasks from my portal. As a contact center manager, I need to be able to grant access to designate employees to perform certain supervisory tasks using the same applications. 	<ul style="list-style-type: none"> The systems shall integrate with the CRM, WFM, product information, order entry, returns management, incident management, analytics, knowledge base applications. The system shall provide the option for select personnel to provide system access based upon roles.

Business Context

Current State (As-Is)



Future State (To-Be)



Migrating to Cloud Contact Center moves several on-premise resources to the cloud.

Call/Contact Center Technology	Current Environment	Future Environment
SIP Trunk	On-Premise	AWS
PSTN Trunk	On-Premise	AWS
Voice Handsets	On-Premise	AWS (software-based softphone)
Session Border Controller	On-Premise	AWS
SIP Client Software	On-Premise	On-premise (individual laptops/devices)
PBX	On-Premise	AWS
IVR	On-Premise	AWS
ACD	On-Premise	AWS
CRM	AWS	AWS
Call Center Application incl. CC Knowledgebase & Reports	On-Premise	AWS
Products & Order Entry (ERP Applications and Databases)	AWS	AWS
Customer Billing	AWS	AWS
Incident Management	AWS	AWS
Workforce Management	AWS	AWS
Enterprise Analytics	AWS	AWS

Business Benefit Justification

This financial forecast is an outlook for the initial five years of CapEx (implementation) and OpEx (recurring cost) after the project's completion. The primary benefit of this project is that it aligns with GLOCO's company vision of engaging customers via new digital channels and at the same time strengthening its internal systems and processes. Another valuable benefit of moving GLOCO's contact

center’s infrastructure to the cloud is that it moves a portion of its expenses from CapEx to OpEx which are fully tax-deductible in the year they are made. Additionally, migrating the contact center to the cloud makes it possible for remote work for Customer Service Reps which will deliver a business advantage through the use of AWS’s industry leading technologies. The five-year cost of the Cloud Contact Center solution is \$4.05M, but it is more than offset by the \$8.43M in expense reduction from cost savings, the result of which is \$4.38M in savings. The cost reduction primarily comes from an \$6.5M expense decrease, after the first year, in GLOCO’s tech support staff that is currently needed to manage the on-prem infrastructure of the GLOCO’s contact centers. Additionally, the costs will be lowered by a reduction of the Contact Center’s communication infrastructure equipment and leased telecom lines.

Financial Metrics

Cloud Contact Center	Implementation	Recurring Costs				Total
	FY21	FY22	FY23	FY24	FY25	
Cloud-based Solution System Integration	\$.50M	--	--	--	--	\$.50M
Cloud-based Solution Licensing	\$.25M	\$.25M	\$.25M	\$.25M	\$.25M	\$1.25M
Legacy Licensing	\$.05M	--	--	--	--	\$.05M
Staff Augmentation	\$.35M	--	--	--	--	\$.35M
Training	\$.20M	\$.05M	\$.05M	\$.05M	\$.05M	\$.40M
Communication Infrastructure Reduction (e.g. PBX, SBC, VOIP Trunks)	--	(\$.02M)	(\$.05M)	(\$.05M)	(\$.05M)	(\$.12M)
Phone Device Reduction	--	(\$.01M)	(\$.04M)	(\$.04M)	(\$.04M)	(\$.08M)
Contact Center Tech Support FTE Reduction	--	(\$.50M)	(\$2.0M)	(\$2.0M)	(\$2.0M)	(\$8.0M)
Contact Center Tech Facility Reduction	--	(\$.13M)	(\$.50M)	(\$.50M)	(\$.50M)	(\$2.0M)
Fab 4 Solutions Development Contract	\$1.50M	--	--	--	--	\$1.50M
Total	\$2.85M	(\$.36M)	(\$2.29M)	(\$2.29M)	(\$2.29M)	(\$4.38M)

Contact Center Metrics

Amazon Connect will provide GLOCO the ability to report on a wide array of historical and real-time statistics that will be very useful to not only technical management of the service but in its financial cost implications. In Amazon Connect there are two types of metrics (real-time and historical) that are collected and can be reported. These metrics are built from Contact

Contact Summary

Contact Id:	3a8a796a-4ffe-401c-af51-6cd83e
Next Contact Id:	5b073cc0-90cf-42f8-b172-9de69f
Channel:	Voice
Initiation Method:	Inbound
Initiation Timestamp:	11/1/19 2:46 PM
Disconnected Timestamp:	11/1/19 2:48 PM
Agent Connection Attempts:	0
Last Updated:	11/1/19 2:49 PM

Exhibit 1: Contact Trace Record

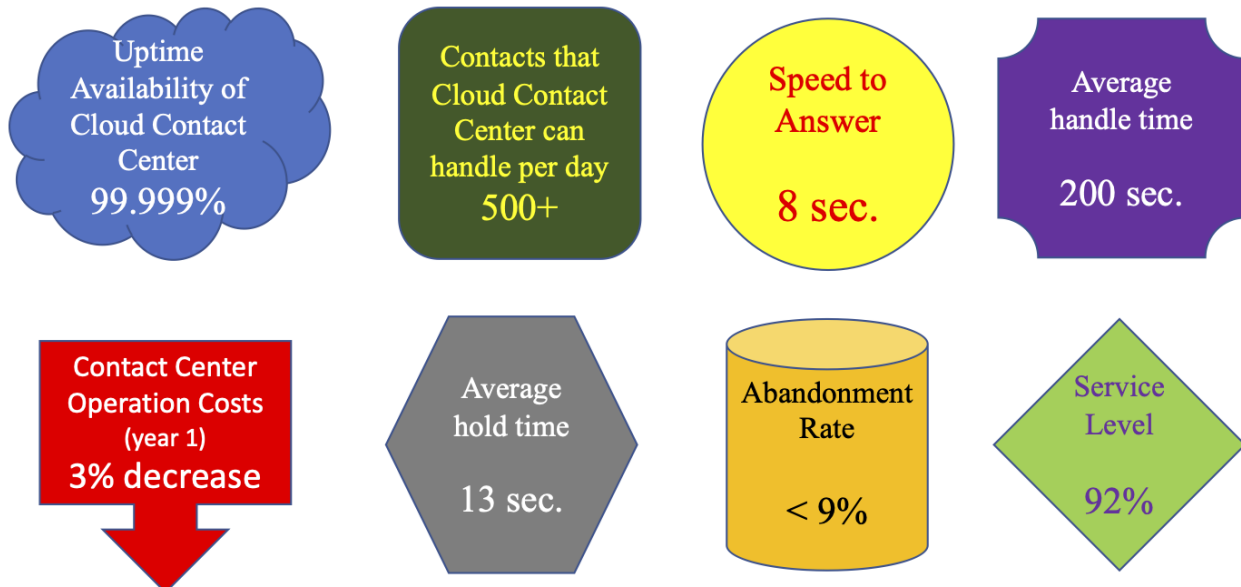
Trace Records (Exhibit 1) that captures metrics each time a customer is connected to an agent. All the Contact Trace Records that are collected by Connect are published to CloudWatch (real-time monitoring),

which allows for building of robust dashboards. Depending on the real-time metric (Figure 2) the refresh rate can either be instantaneous (e.g., number of agents available) or can be updated on a regular interval of every 15 seconds (e.g., calls abandoned). Historical metrics reports allow the ability of the user to create custom reports based on what is important to your needs. The two types of metrics available to historical metric reports are the Contact Trace Record and an agent activity-driven metrics that are based on the agent activities such as agent status changes (Appendix C).



Figure 2: Real-time Metric Dashboard

The following success metrics are based on Fab 4’s previous experience working on similar implementations. Additionally, these success metric metrics are only measured during normal operating hours of the contact center which is 7am to 7pm CST, seven days a week, excluding any scheduled downtime.



Part 2: Technical Specification and Prototype Software Solution

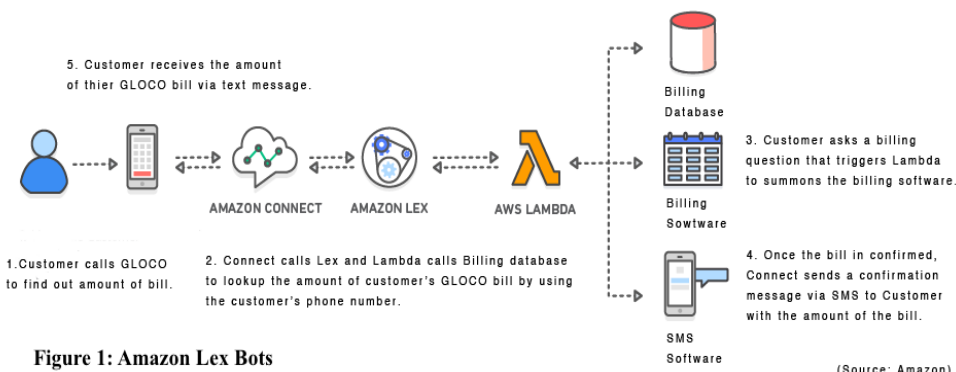
Amazon Connect

AWS Connect will support the following tech specs:

- 1) Provide telecommunications including phone numbers/lines, IVR, and ACD.
- 2) Ability to create voice and call routes and setup greetings, notices, inbound and outbound calling.
- 3) Integrate with monitoring and reporting to capture information needed for KPIs and metrics like call length, drop rate, time it takes for CSR to respond and more.
- 4) Voice to text and chatbot using Lex
- 5) Integration with backend applications using Lambda with AWS API Gateways.
- 6) Realtime and historical reporting with Lex, Lambda using AWS Kinesis data and video analytics.
- 7) System reporting and monitoring via AWS management consoles.
- 8) Integration with applications like billing, CRM, product and more that are running on AWS.

Amazon Lex

Fab 4 Solutions will use Amazon Lex to install Lex bots for chat and will also enable GLOCO Contact Center resources to collect and analyze data collected during usage. This information will also provide insight to how the contact center resources meet defined KPIs. Also, Fab 4 Solutions will use bots for unassisted experience like: account information and billing query (Figure 3).



AWS Lambda Functions

Using Lambda Functions allows Connect to communicate with GLOCO's databases (e.g., DynamoDB) to lookup information (e.g., account balance) contained within the database. Having this ability to enable agentless access to customer profile and billing inquiries is not currently available when using GLOCO's

current on-prem solution. Additionally, Lambda will give Fab 4 Solutions the ability to develop features for agent assisted lookups, access, and reporting analytics request processing.

Contact Flow

The contact flows and call routes (Figure 4) will be used to define the agent contacts for each of the call routes needed to provide customer experience for billing inquiries, product information, profile changes and orders support.

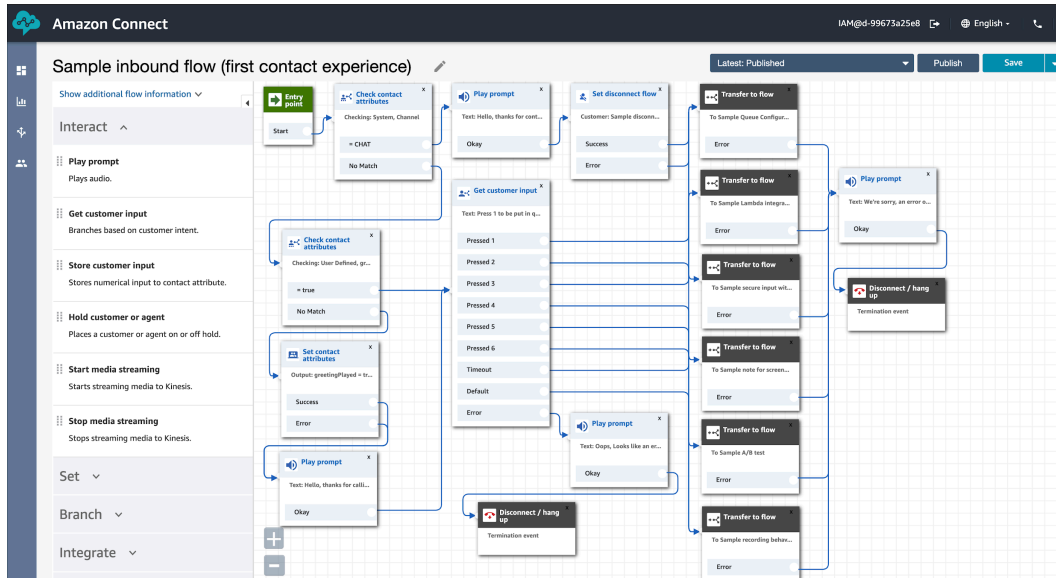
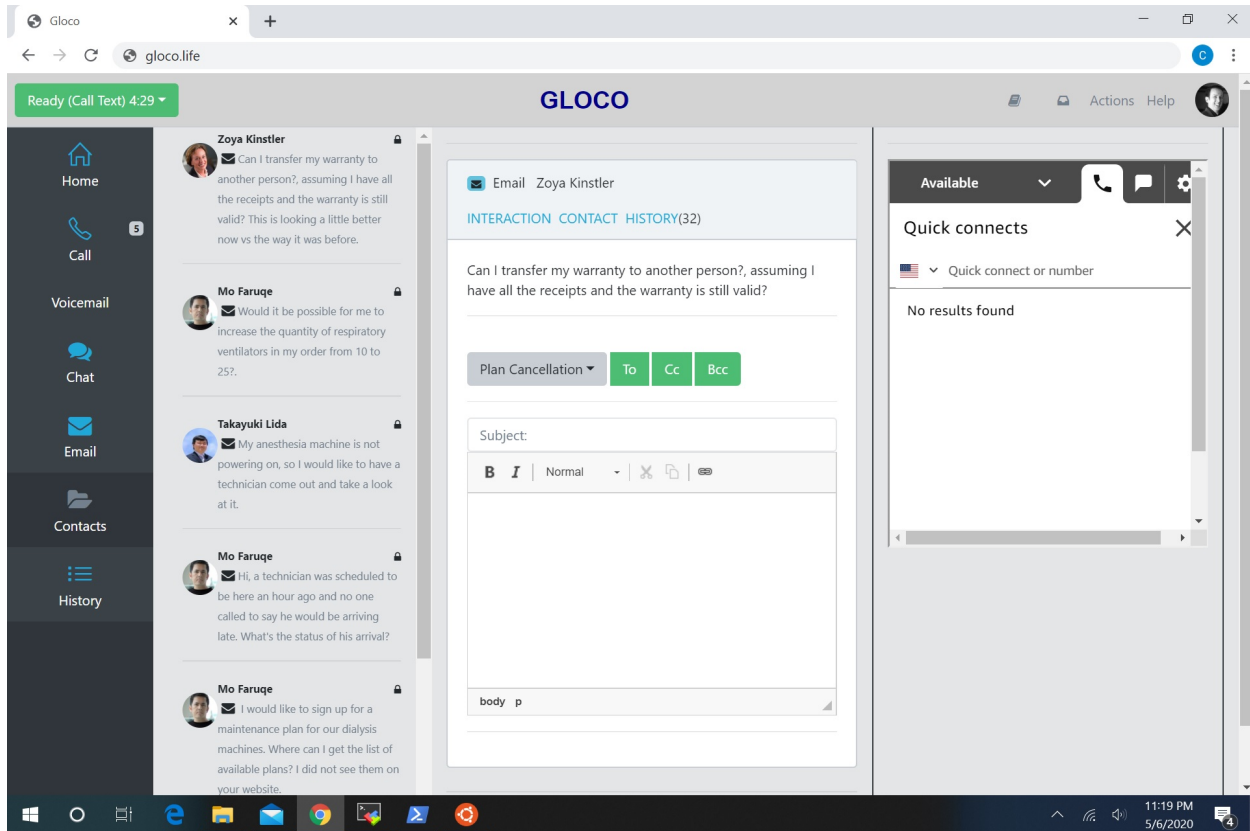


Figure 4: Contact Flow

Solution Demonstration

Below is a mockup of GLOCO’s Contact Center application that will be used by the CSR agents. The left side of the interface provides quick links to all the different interaction types that the agents will have. Just to the right of the interaction types will show the recent history of the agents’ interactions. The center of the screen will be devoted to the message center, which the agents will use to chronicle their interactions with customers.

This is a link https://drive.google.com/file/d/1hXKcfr7Usflg2eF_sYDI7S6T7vekNv5c to an example of an incoming call and how Connect can respond to the customer with query info from a database and here is a link <https://drive.google.com/file/d/1kBp3OcVNXDyYOZghfuWN75EhYpyYPZgU> to show how Connect’ Contact Flow is able to respond to the caller. You can see how when the customer calls, how the bot is set up with their answer. Then in the next connected box you can see how it uses Lambda to query the customer database to see that the last time they called was in 2017.



GLOCO Contact Center Portal Integration Prototype

This is a prototype of the [GLOCO contact center portal](#) using a manager's login to display the homepage and menu that can navigate to three main pages. The purpose of this prototype is to provide a visual of the integration points required for the AWS Connect contact center to the current GLOCO contact center portal. The three main pages show applications, a dashboard, and additional functionality the floor managers need to manage contact center resources. They are:

- **Manager's Hub:** This page is accessible via the main menu and provides a simulated look into the integration to several of the applications addressed in this paper like workforce management, reporting and analytics.
- **Dashboard:** This page is a simulation of a dashboard from the manager's perspective and what information they may want to have available to them on a single viewing pane.
- **Administration:** This page provides access to additional features to manage the portal, incident information for the systems that impact the contact center.

Please note that this is a working prototype and not a functioning website for details of the prototype functions, please see Appendix G GLOCO Contact Center Portal Prototype -- Manager Perspective for details.

Architectural Approach

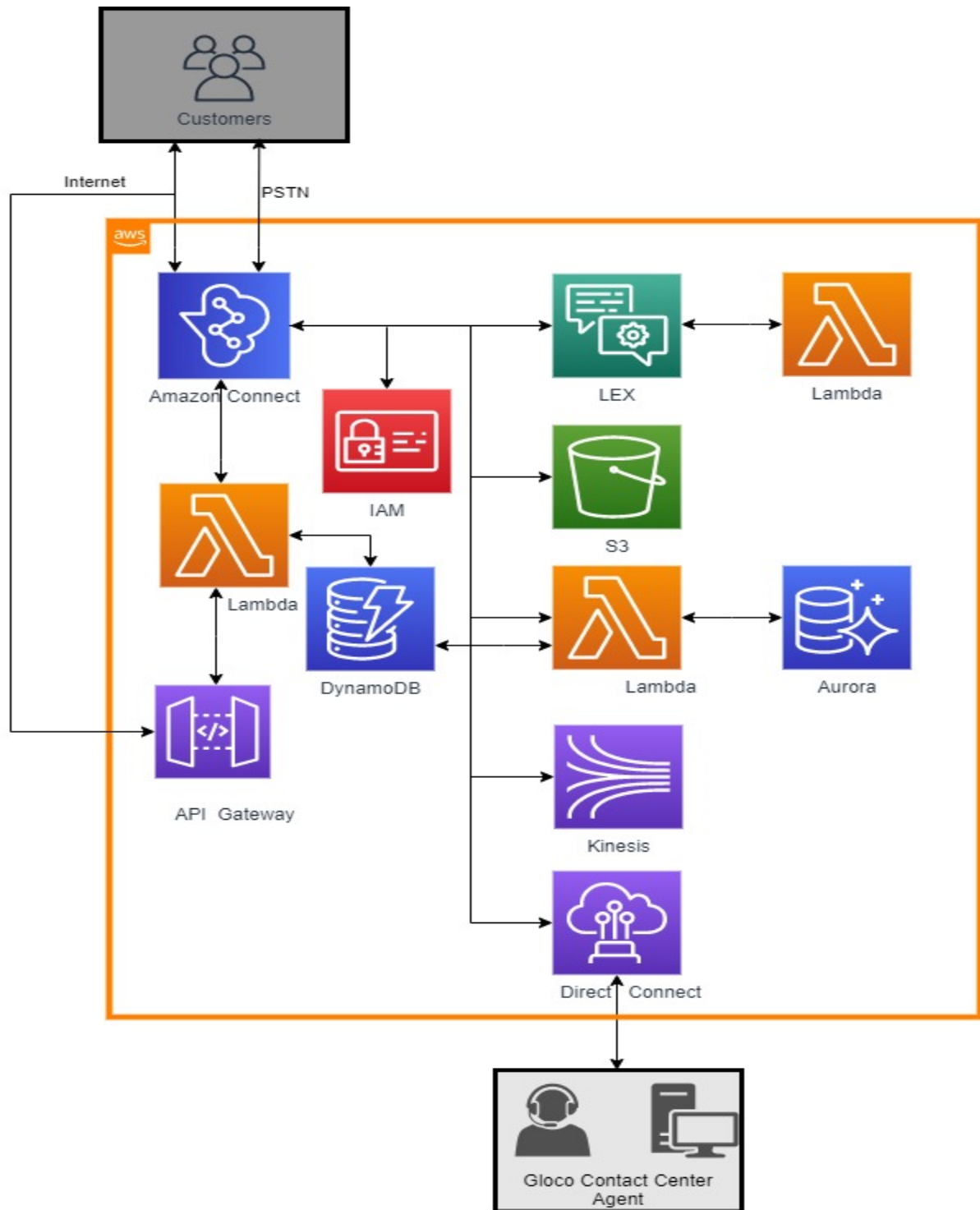
GLOCO's contact center architecture will migrate from an on-premise architecture composed of numerous discrete components to a cloud-based system with Amazon Connect as the core service. Amazon Connect is an omnichannel cloud contact center. It is an open platform that allows integration with other enterprise applications.

The cloud-based architecture will eliminate the need for most of GLOCO's specialized on-premise hardware and software components. Amazon Connect's communications infrastructure will handle inbound and outbound client support requests. Connect's telecom infrastructure will terminate incoming SIP and PSTN voice calls, and its Contact Flow based routing engine will send calls to contact center agents and managers. The Internet Protocol (IP) communication interface between Amazon Connect and call center personnel will enable contact center agents and managers to access the system from anywhere that has an internet connection and supported browser. Voice calls between Amazon Connect and GLOCO premises will use WebRTC technology, and message-based communications will use IP data streams.

Amazon Connect will interface with several AWS services to support chat Bots, chat messaging, and web applications.

- AWS Lambda will be used to integrate contact flows and contact center operations with other systems and services.
- AWS Lex will provide the Automatic Speech Recognition (ASR) and Natural Language Understanding capabilities for conversational user interfaces (e.g., Bots).
- AWS S3 will be used to store call recordings.
- AWS API Gateway will be used by applications to trigger AWS Lambda functions that provide integrations with Amazon connect.
- AWS Aurora will provide data storage for customer records, billing, orders, product inventory, and workforce management.
- AWS Redshift will provide analytics based on contact trace records.
- AWS Direct Connect is a dedicated connection between GLOCO premises and an AWS direct line service provider. Provides a private connection AWS connect and GLOCO.

Proposed Architecture



GLOCO's contact center will include the security, reliability, and high availability that are common to AWS cloud services. Data in transit will use SSL/TLS for security, and data at rest will be encrypted S3

buckets and RDS database instances. Contact center personnel will use Amazon Connect's role-based access control for defining permission levels for Amazon Connect functions.

Integration Architecture

The current architecture must integrate with the on-premise call center environment and GLOCO applications that have been migrated to AWS. The North America call center project will require the following integrations:

Applications currently on AWS include:

- Customer relationship (CRM) application for agent assisted and unassisted support.
- Billing database for automated (agentless) and agent assisted billing inquiry.
- Product, returns management (RMA), and order entry functionality provided by the GLOCO ERP application.
- Enterprise workforce management application (WFM).
- Incident Management.
- Enterprise reporting and analytics.
- GLOCO Call Center Portal which currently serves as the “central application” or hub and currently integrates with the applications mentioned above and call center technology.

Applications currently on-premise or associated with the current call center technology:

- Five9 (current contact center solution) knowledge base.
- Current contact/call center records
- Voice, call flows, call greetings
- Call routing hardware (Integrated Voice Response and Automated Call Distribution) data
- PBX data
- Monitoring and KPI configurations

Current Architecture

Due to the complexity of the integration, two diagrams will illustrate the integrations. Figure 5 will illustrate the current call center call routing and management, or telephony, equipment and the network protocols used to integrate. This diagram shows the use of HTTPS, SIP, RTP, Java Telephony API or JTAPI, and VoiceXML that can leverage HTTPS, REST and most TCP based protocols to integrate the

contact center hardware and databases when a contact is initiated via phone or web-enabled device. Here are key integration points:

- The customer-initiated phone call integrates with the IVR via a gateway located in the DMZ.
- The customer can integrate with a web portal for self-service via HTTPs and web-based protocols that allow a customer to initiate a web-enabled live chat and email contacts.
- The IVR manages integration from a GLOCO web portal session to an agent.
- The agent via uses HTTPs to interact with the customer database for initial custom identification.
- An agent may forward to other agents by placing the customer back into the queue using the ACD for caller hold if the agent is not available or directly using the ACD/PBX switching.

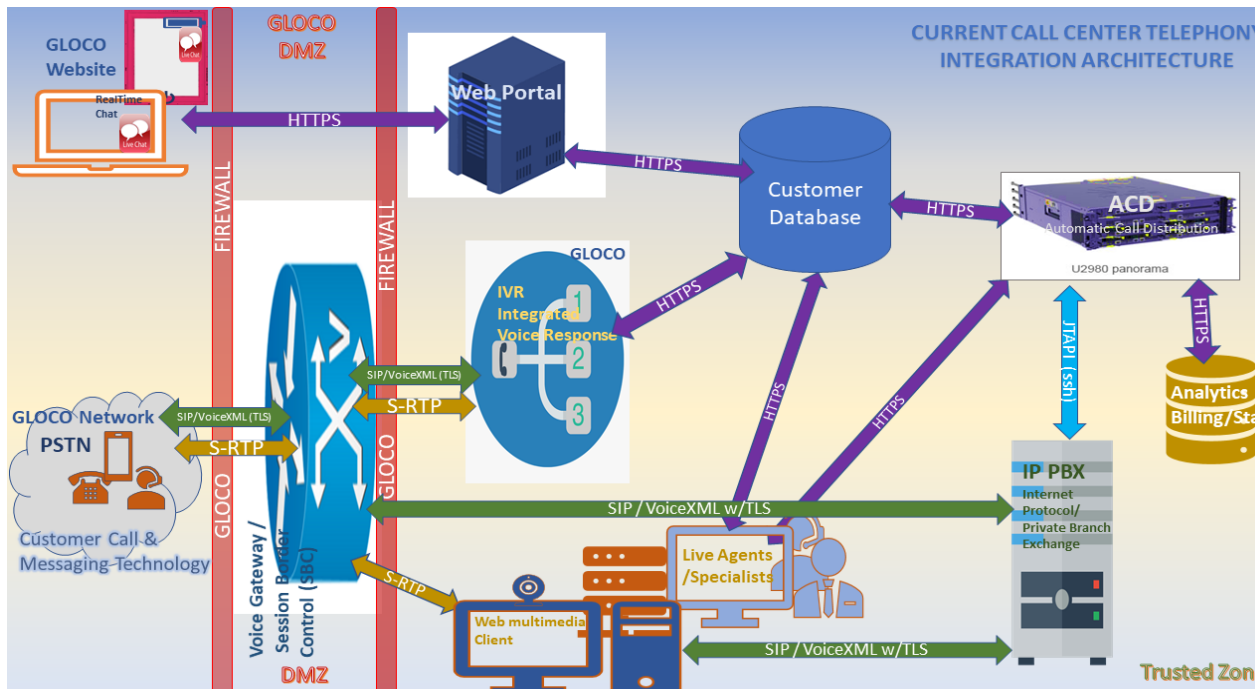


Figure 5: Current Telephony Integration

The following diagram, Figure 6, depicts the integration from the telephony equipment to the on-premise contact center application as well as the integration from the on-premise application to the applications that have already been migrated to AWS as part of the GLOCO cloud migration strategy. Those applications were listed above. A voice gateway is used to manage integration between the telephony and the contact center software. An API Gateway is used to manage integration between the contact center software to live agents or integration into cloud-based applications.

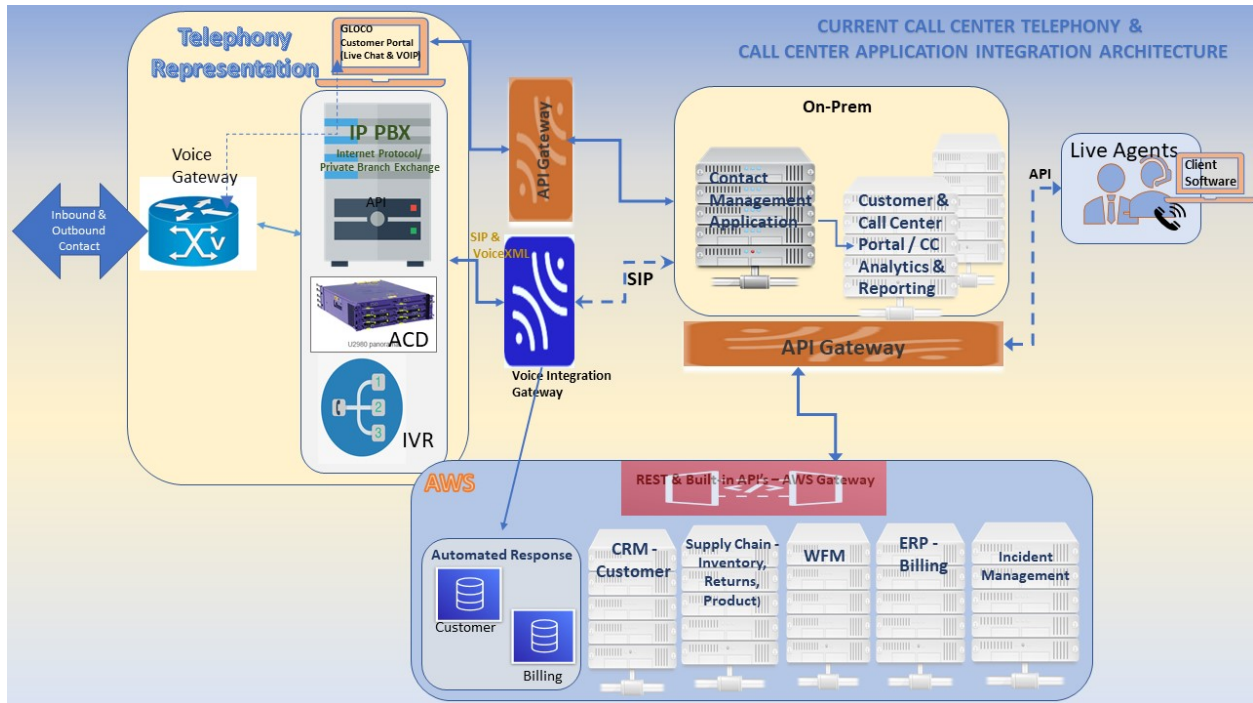
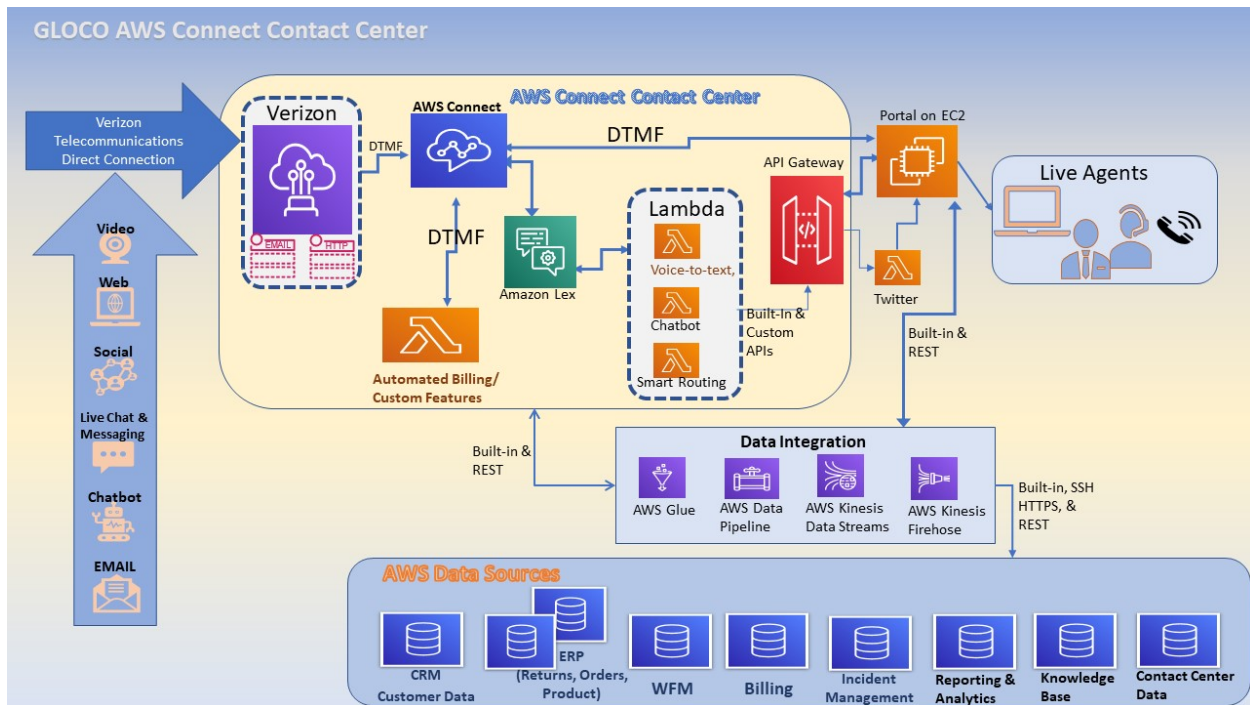


Figure 6: Current Integration Between Current Telephony, Contact Center Applications and AWS-Based Applications

Future Architecture

The future integration architecture is simplified as there is no need for the telephony equipment. The network topology is replaced by AWS Direct Connect that will provide telephone connection to from a service provider to Amazon Connect. Amazon Connect the network integration from a phone-based contact to Amazon Connect. Amazon Connect uses APIs to integrate with GLOCO applications. The call routing is defined using the Amazon Connect routing configuration tool alleviating the need for contact center software. To manage browser-based or web-initiated contact, Amazon Connect will integrate with the GLOCO portal using the API Gateway.



Data Design and Management

Data Entities and Flow

GLOCO has few AWS based applications that need to be integrated with the new cloud-based contact center system. In addition, data from existing call center related applications needs to be migrated to the cloud and integrate with the new system. The database migration and integration matrix for the proposed solution is shown below.

Database Migration and Integration Matrix

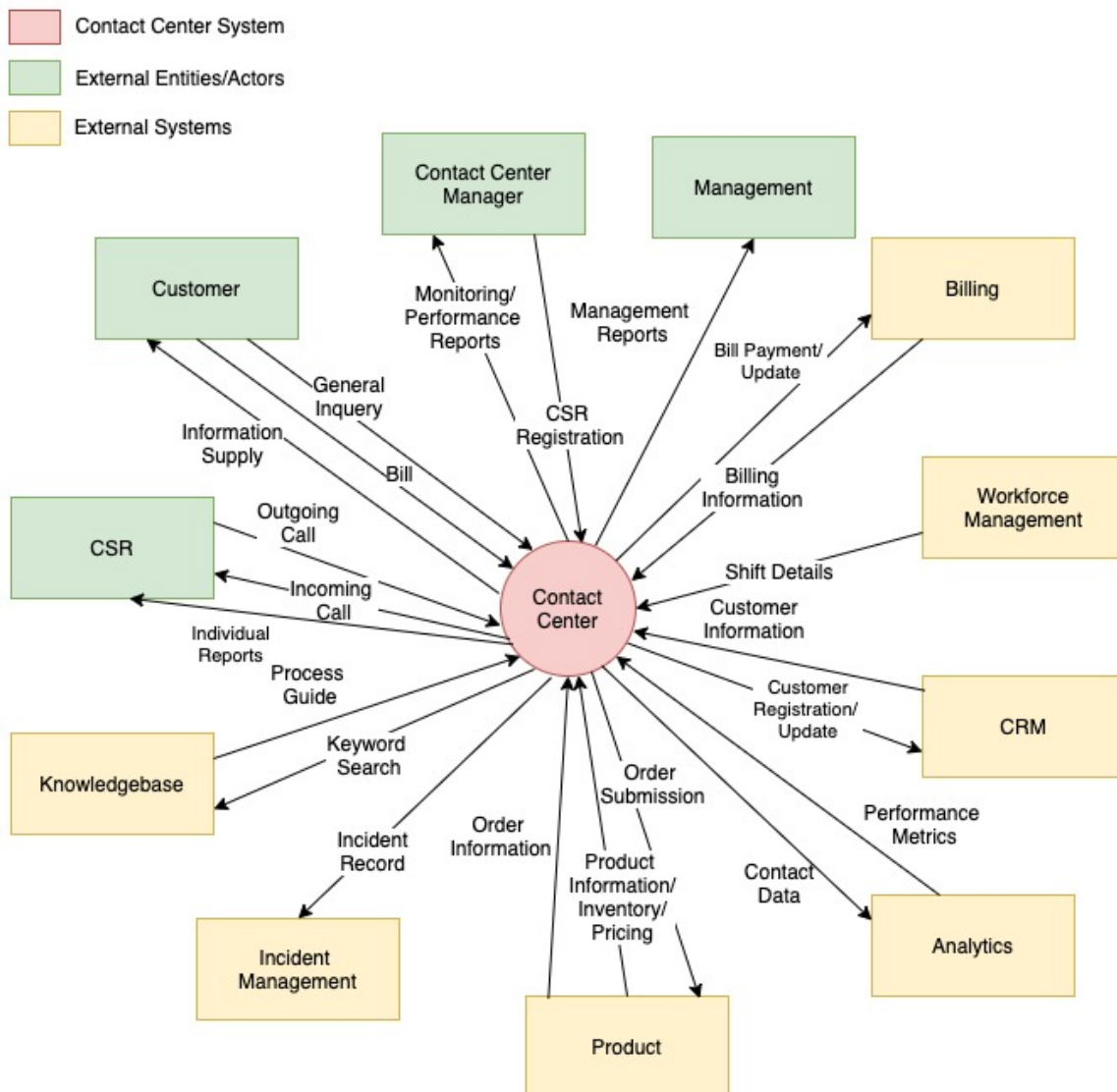
Databases	Related Entities	Current Location (and Current DB Engine)	Require DB Migration	Require App Migration	Require Integration with the New System
CRM	Customer details	AWS (Amazon Aurora PostgreSQL)	No	No	Yes
Billing	Billing info	AWS AWS (Amazon Aurora PostgreSQL)	No	No	Yes
Product	Inventory	AWS (Amazon Aurora PostgreSQL)	No	No	Yes
WFM	Workforce history	AWS (Amazon Aurora PostgreSQL)	No	No	Yes
Analytics	historical data	AWS (Amazon Redshift)	No	No	Yes
Call Center	Call Records/ Logs	On-premise (Oracle)	Yes	Yes	Yes
Incident Mgmt.	Incidents/ Issue records	On-premise (Oracle)	Yes	Yes	Yes
Knowledge-base	Knowledge- base records	On-premise (Oracle)	Yes	Yes	Yes

Data Flow

A context diagram and a Data Flow Diagram (DFD) are attached below to show important data flow between various entities and actors from a high level. Actors include important stake-holder groups like CSR, Contact Center Manager, Management and Customers; and systems and database entities include CRM, Billing, Product, WFM, Knowledge-base, Incident Management, and Analytics.

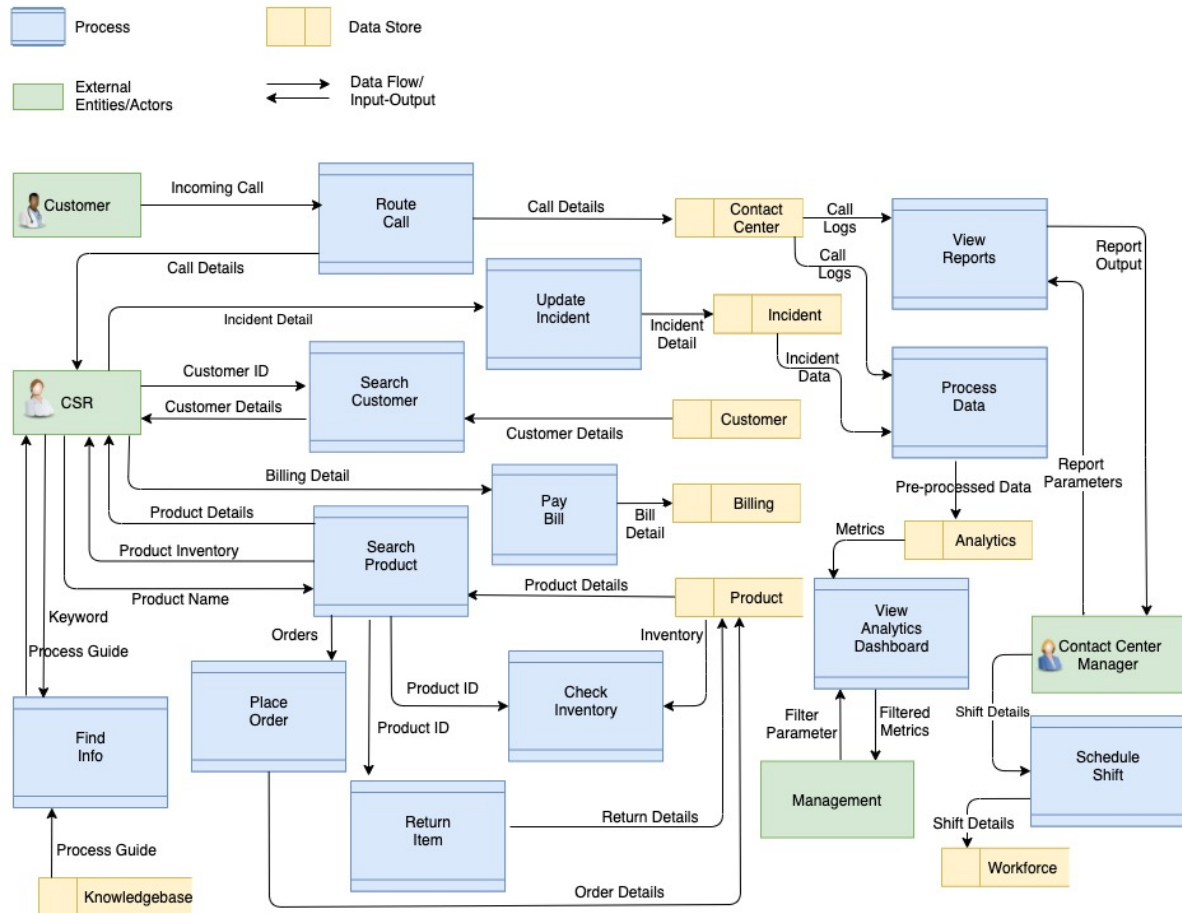
Context Diagram

Contact Center Context Diagram (System Boundaries)



Data Flow Diagram (DFD)

Contact Center Data Flow Diagram



Once on-premise database migrations are completed, to integrate the existing cloud based as well as newly migrated on-premise applications with the new cloud-based Contact Center solution, we will be using Amazon built-in DB APIs, AWS Lambda and Amazon API Gateway Service to create microservices for each business function area. These microservices will expose HTTP endpoints to be consumed by different clients to create seamless user experience.

Data Storage

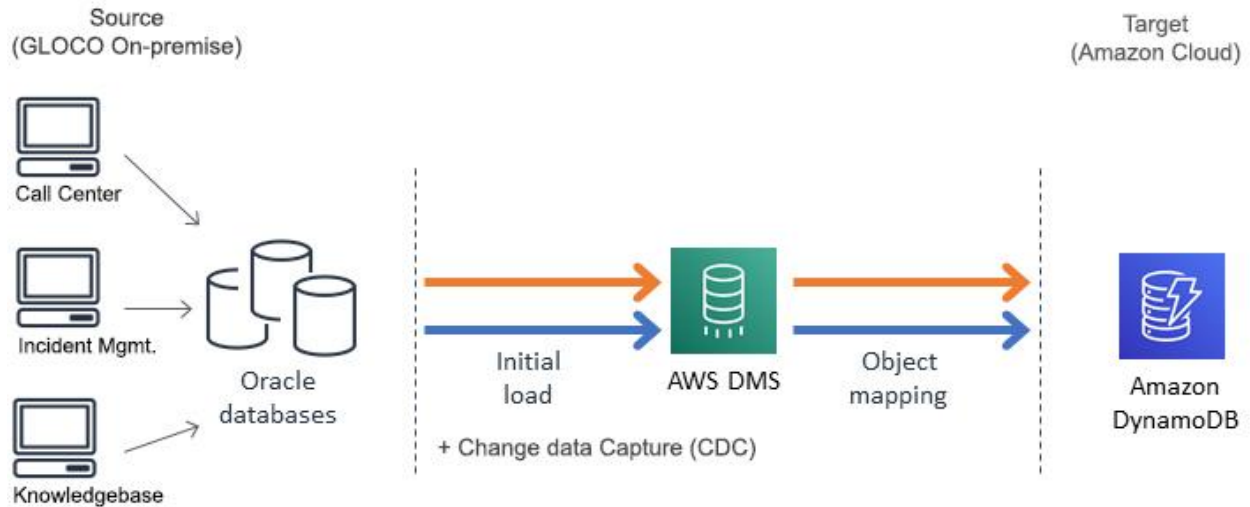
GLOCO's current call center related databases are in Oracle, a SQL based RDBMS. The plan is to move them to cloud based Amazon DynamoDB, a document as well as a Key-Value store NoSQL database, for high throughput and high availability. GLOCO's other business applications that are already moved to AWS are using Amazon Aurora PostgreSQL RDBMS. Amazon Redshift is used for Analytics.

Database Migration

As per the “Database Migration and Integration” matrix, the following three databases need to be migrated to AWS:

Databases	Related Entities	Current Location	Target Location	Current DB Engine	Post Migration DB Engine in AWS
Call Center	Call Records/Logs	On-premise	AWS	Oracle	Amazon DynamoDB
Incident Mgmt.	Incidents/Issue records	On-premise	AWS	Oracle	Amazon DynamoDB
Knowledge-base	Knowledgebase records	On-premise	Yes	Oracle	Amazon DynamoDB

We will migrate the databases from on-premise SQL based RDBMS Oracle to Amazon NoSQL based DynamoDB for higher throughput and availability. These databases don’t require strong transactional consistency, so moving to a NoSQL based database is beneficial from a performance perspective. This will also make schema conversion relatively easier during migration. The databases will be migrated using Amazon Database Migration Service (DMS). DMS supports both one-time migration and continuous replication. In this case it will be a one-time migration. The migration steps are shown in the following diagram:

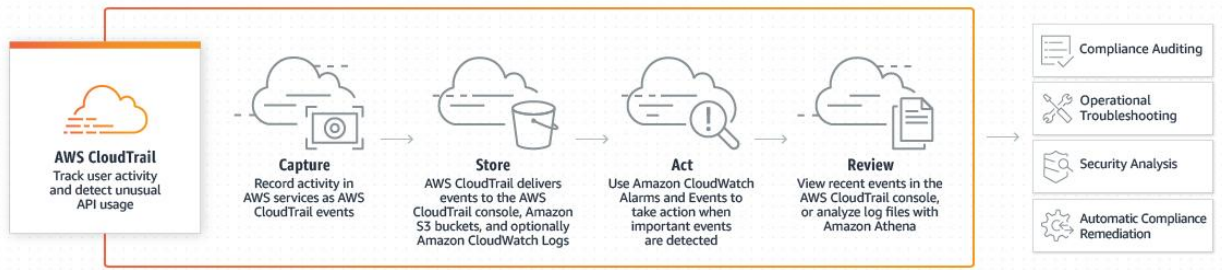


Data Backup

For short-term backup, where backed-up data may require immediate retrieval time of 1 to 5 minutes, we will use Amazon S3 Glacier, and for long-term backup we will use Amazon S3 Glacier Deep Archive, retrieval time 12 to 48 hours. This archived data is automatically distributed across a minimum of three physical Availability Zones that are geographically separated within an AWS Region.

Data Security and Compliance

Data in transmission will be secured by Transport Layer Security (TLS) encryption protocol. The Amazon S3 Glacier and S3 Glacier Deep Archive storage classes offer integration with AWS CloudTrail to log, monitor and retain storage API call activities for auditing, and supports different forms of encryption.



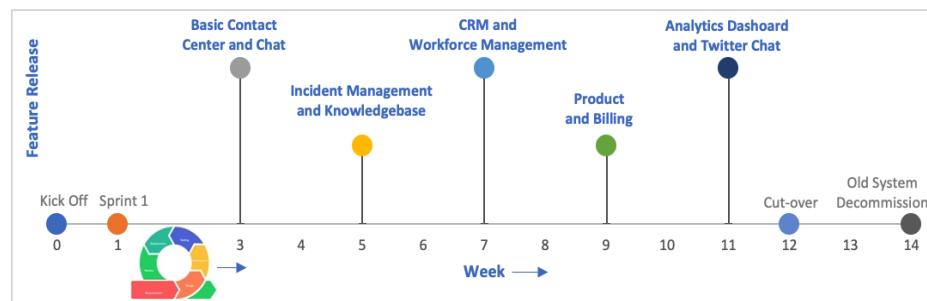
These storage classes also support security standards and compliance certifications like PCI-DSS, HIPAA, EU GDPR, etc. which is important for customer call logs.

Part 3: Implementation Plan Solution Delivery Roadmap

The Pilot – feature release timeline

We will start with the Indianapolis call center in the Indiana, North America region as a pilot project. We estimated it will take approximately twelve weeks from kick-off to go live. Agile Scrum will be used as the project methodology using a two-week sprint size with the first week (Sprint 0) for the preparation.

The overall feature release timeline of the Indiana, the pilot, is shown below:



Other Events



*Change Data Capture (CDC)
- Colors have no special meaning
Note: Sprint 1 starts one week after the kick-off

Iterative Development Cycle (with 2-week Sprint)
(Requirements/Backlog Grooming, Design, Development, Testing, Deployment and Review)

Cutover

Once the Amazon Connect based initial contact center with call routings & chat functionality along with the newly migrated and integrated incident management & knowledge-base apps are in place, a special focus group will start a parallel run with call forwarding to newly acquired Amazon Connect numbers. Other applications that are already on AWS, along with Twitter Chat, will be integrated with the new system in the subsequent weeks. Once all the application and Twitter Chat integrations are completed, estimated at the end of Sprint Five (Week Eleven), the system will be cut over to run fully from Amazon one week after (Week Twelve). At that point current GLOCO contact center numbers will be ported to AWS permanently.

Scrum Team

1. **Scrum Master:** Scrum master will be from the Fab 4 Solutions.
2. **Product Owner:** Fab 4 Solutions may assign one or train someone from GLOCO if GLOCO wishes to have the Product Owner from their side and doesn't have any.
3. **Development Team (from Fab 4):**
 - a. One AWS Cloud Architect
 - b. One System Integrator
 - c. One Business Analyst
 - d. Four Developers – Front-end & Back-end Developers, and DBA/Database Developer
 - e. One QA Team Member

Scrum team structure and size will be adjusted based on the demand and updated requirements as the project moves forward.

Primary Responsibility of the Product Owner

Product Owner will be primarily responsible for, including but not limited to, managing product backlog (refer to the requirements section above for the initial product backlog), set priorities, maintaining primary liaisons between GLOCO stakeholders and Fab 4 development team members and evaluating progress.

Development Team's Primary Tasks and Responsibilities

Development will perform the following tasks to convert the backlog into product features. For the initial product backlog and acceptance criteria, check the requirements section above.

	Task	Performed By
1	Amazon Connect and other Amazon service configuration	AWS Cloud Architect, System Integrator
2	Database setup, configuration and migration	DBA/Database Developer
3	Front-end development	Front-end Developer
4	Backend microservice development using Amazon Lambda	Back-end Developer
5	Application and service integration	AWS Cloud Architect, System Integrator
6	Test, quality assurance and documentation	Business Analyst and QA Team Member

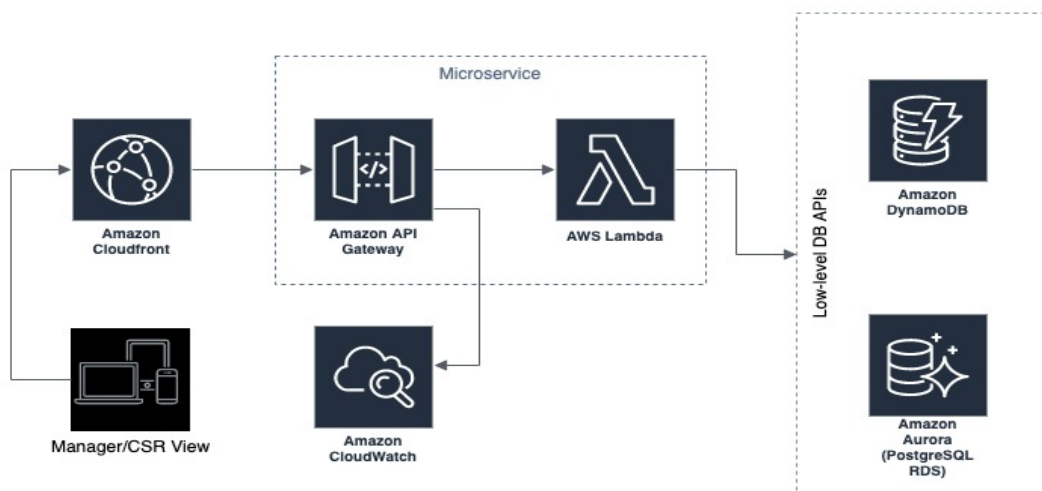
On-premise Database and Application Migration

The following on-premise call center applications will require database migration to AWS Cloud.

	Related Data	Current DB Platform (On-Premise)	New DB Platform (Post Migration in AWS)
Call Center	Call Records/Logs	Oracle	Amazon DynamoDB
Incident Management	Incidents Records	Oracle	Amazon DynamoDB
Knowledgebase	Knowledgebase records	Oracle	Amazon DynamoDB

Database migration will be done using Amazon Data Migration Service (DMS). Migration will start early in the project to sort out any data transfer issue. Once the initial data is migrated, the migration process will continue until the final cutover to capture any changed data during the parallel run. This will be a one-time migration; after the cutover on-premise databases will be decommissioned.

Once the initial database migration is completed, the application migrations will be done by integrating the existing Manager/CSR view with the newly migrated data in the Amazon DynamoDB database, along with the other existing AWS based business application databases, by using different Amazon services including Amazon Lambda and Amazon API Gateway (please, see the diagram below).



Some coding will be necessary to create new microservices using the Amazon Lambda function and Amazon API Gateway.

Operationalization

Service Level Agreement

GLOCO will have an Amazon Connect Service Level Agreement (SLA) policy governing the use of Amazon Connect. It includes service commitments from AWS of a 99.99% monthly uptime percentage.

If AWS is unable to meet that commitment, they will provide GLOCO with service credits that can be used to pay future Amazon Connect charges.

Monthly Uptime Percentage	Service Credit Percentage
99.99% - 99.0%	5%
98.9% - 95.0%	15%
Less than 94.9%	100%

AWS Enterprise Support (Tier 3)

GLOCO is currently using an AWS Enterprise Support Plan, which applies to every linked AWS account including this new Amazon Connect account. Included with the AWS Enterprise Support Plan is unlimited access to 24x7 phone, email, and chat access to Amazon’s Cloud Support Engineers which will be the Tier 3 level of technical support for the Cloud Contact Center. Additionally, GLOCO has access to the AWS Personal Health Dashboard (Appendix D) and the AWS Trusted Advisor (Appendix E).

Steady State Contacts and References

Below is a list of the contacts and references for the Cloud Contact Center’s steady state support.

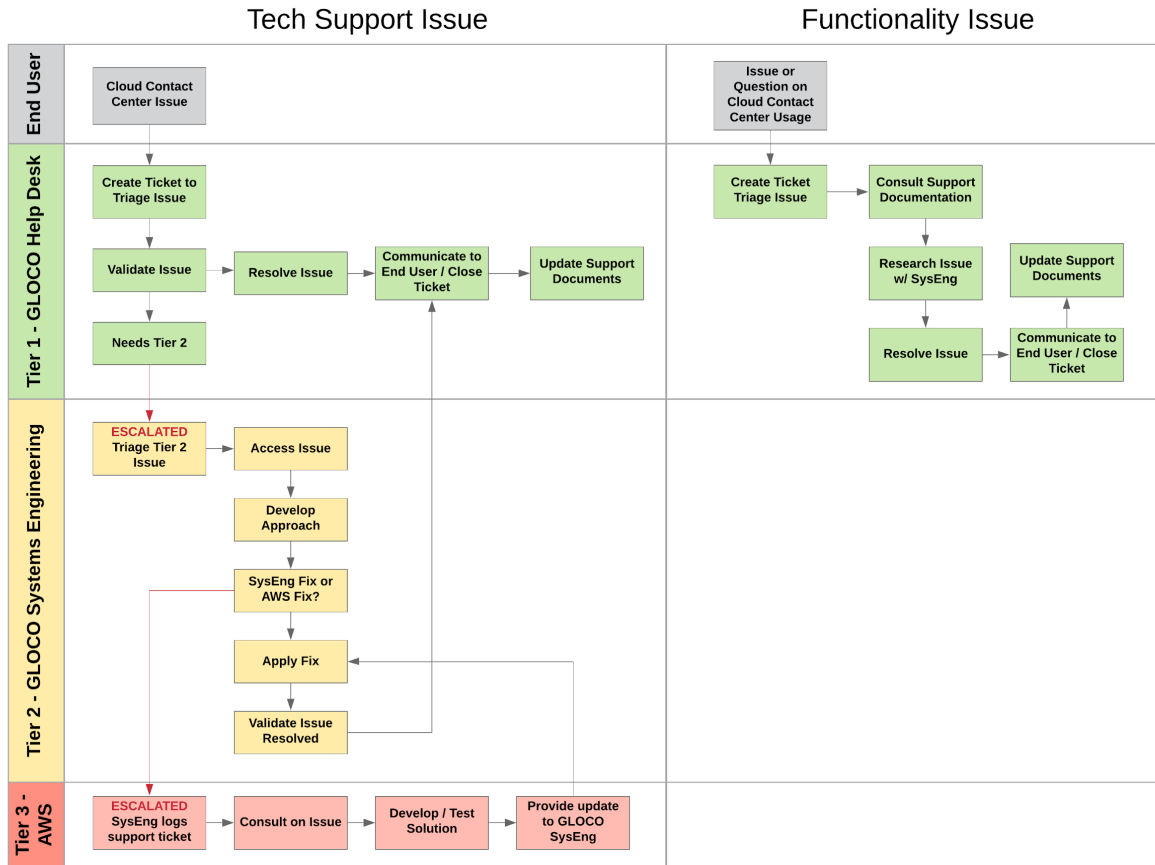
Tier 1 Support	Help Desk
Tier 2 Support	Systems Engineering
Tier 3 Support	Amazon Web Services
Process Documentation	GLOCO Process Exchange
Technical Documentation	GLOCO SharePoint
User Facing Documentation	GLOCO Net

Business Operations (OCIO)

GLOCO’s Business Operations department, located within the Office of the CIO, is responsible for ensuring the overall IT business operates effectively financially. Part of their responsibilities will now include monitoring Connect’s monthly costs to verify that GLOCO’s financial resources are operating effectively. Additionally, Business Operations will need to model Connect’s total cost to enable benchmarking to provide the CIO with budget justification and forecasting.

Incident Management

Below is a flowchart that shows the incident management for Cloud Contact Center issues.



Change Management

GLOCO’s Program Management Office (PMO) will establish a project change management team prior to kickoff and will continue until 90 days post-completion of the project. The PMO will continue its current use of PROSCI’s ADKAR change management methodology (Appendix F). The change management team’s mission will be to ensure each individual GLOCO employee will embrace the change to the new contact center as quickly and effectively as possible with minimal productivity impact.

Enablement

GLOCO contact center reps and managers will be using their existing headsets and the same contact center portal software. The integration between the reps and manager portal UIs exists for several applications like billing, CRM, workforce management, knowledgebase, and enterprise analytics for some of the reports. The new integrations include Twitter/social media and the migrated call center-specific

knowledgebase, reports, and contact center database. Enablement will focus on changes and additions to that user interface (UI) and the tools that enable the reps, managers, analysts and developers to update, maintain, and monitor the performance of the AWS Connect contact center environment. A breakdown of the enablement is addressed in subsequent sections.

Contact Center Rep & Manager Enablement

Reps and managers enablement will address the following areas. The sessions will be developed to address topics based upon roles.

- How to access incoming data and contacts from Twitter and the chatbot queue
- Changes to analytics and reports, including AWS specific data points.
- Knowledgebase and workforce management integration.
- AWS Connect route training which includes route queues, routing profiles and contact flows.
- Call Management system and network health dashboard and monitoring feature.
- Call Center Administration: billing, usage, and key performance indicator management.

Business Analysts Enablement

The analysts create reports and use AWS reporting and machine learning services to provide analysis on clients, call/contact patterns and more. They will need to be aware of new data points and how they are collected. Their enablement will focus on reporting capabilities and data sources.

Developer/DevOps/Security Professionals Enablement

GLOCO has been migrating applications to the cloud and the technical team is proficient in AWS services. The development will receive enablement on the AWS Connect and AWS Direct Connect contact center solution developed by Fab 4 Solutions. DevOps and network teams will receive enablement, as needed, on the AWS network and infrastructure implemented. GLOCO security will be trained to manage roles and application access configurations.

Enablement Schedule

The schedule is provided below. Fab 4 Solutions will lead enablement sessions on the new features integrated into the portal and the end-to-end AWS Connect contact center solution. In addition, a team will be provided for 2 weeks after implementation to assist contact center personnel as needed.

Role or Responsibility	Primary Training Topics	Training Timeframe
Contact Center Rep	<ul style="list-style-type: none"> • Twitter/Social Media/Chat Features • AWS Connect call and contact route development 	Project Weeks: 9-12
Manager	<ul style="list-style-type: none"> • Twitter/Social Media Chat • AWS Connect • AWS Billing & Cost Mgmt • Portal Updates: New Knowledge Base, Call Management & Analytics 	Project Weeks: 8-12
Network, Developers, DevOps, Security	<ul style="list-style-type: none"> • AWS Connect incl Direct Connect • Related AWS Network & Security Functions 	Project weeks 0-2 and 9-12. Note: Training to be provided throughout the project and after as needed to maintain the AWS Connect environment
Analysts	<ul style="list-style-type: none"> • CSR Portal -->AWS Dashboards • AWS Billing Administration • AWS Connect Metrics Report 	Weeks 10-12

Success Metrics

The keys to the success of migrating to the unified cloud-based platform are associated with customer satisfaction, contact center efficiency, and cost reduction. Amazon Connect's ability to provide accurate and robust reporting of statistics is critical to measuring success. Amazon Connect supports a wide array of historical and real-time statistics calculated from Contact Trace Records (CTR). Several of the statistics will be used to determine Key Performance Indicators (KPI).

It's essential to confirm and measure the platform's ability to perform its core functions. Validation tests will be done throughout the project to prove the system is on track to meeting its functional and performance objectives. Before going live, the system will have to pass an acceptance test, which describes the conditions that must be satisfied before going live.

Metric	How Achieved
10% decrease in the number of calls handled by a live support agent.	The use of automation and BOT technology will enable more self-service clients.
5% of interactions handled by newly added omnichannel interfaces.	Allow customers to communicate with Gloco using their preferred media interfaces (Twitter, BOT, web,etc) and devices.
90% reduction of on-premise contact center communications hardware and software	Elimination of communications infrastructure components like IVRs, ACDs, SBCs, PBXs and SIP trunks.
50% reduction in IT personnel needed to manage and maintain the contact center.	Reduction of on-premise communications infrastructure
99.999% availability of contact center	Amazon's high availability framework
Scale up or down contact center resources within minutes.	Amazon's support real-time manual or auto scaling of resources
3% decrease in contact center operation costs	Savings due to increased call center and agent efficiency
Add or modify routing or queueing parameters in real-time (minutes)	Real time configuration of Amazon Connect's resources to support on-demand adjustments to the contact center environment.

Contact Center Metrics

Success will also be measured against targets for several well-known contact center Key Performance Indicators (KPI).

Metric	Description
9% Abandonment Rate	Percentage of contacts disconnected by the customer while in the queue
Average Speed of answer of 8s	Average time it takes to answer a call. Includes time spent waiting in a queue but does not include time used to navigate through the IVR
Average hold time of 13s	Average time, in seconds, that a contact in the queue was on hold
Average handle time of 200s	Average time a contact was connected with an agent. It includes talk time, hold time, and After Contact Work (ACW)
Service Level of 92%	Percentage of contacts removed from the queue within a specified number of seconds after being added to it

References

Amazon Connect Administrator Guide. (2020, January 22). Amazon. <https://docs.aws.amazon.com/connect/latest/adminguide/>

Amazon Connect SLA. (2020). AWS. Retrieved April 5th, 2020 from <https://aws.amazon.com/connect/sla/>

AWS Personal Health Dashboard. (2020). AWS. Retrieved April 5th, 2020 from <https://aws.amazon.com/premiumsupport/technology/personal-health-dashboard/>

AWS Trusted Advisor (2020). AWS Support. Retrieved April 5th, 2020 from <https://aws.amazon.com/premiumsupport/technology/trusted-advisor/>

Figure 5. Current Contact Center Telephony, Wellborn, Robert (2015, March 2) *Avoiding Contact Center IVR Hell with WebRTC via Generic Call Center Architecture*. *WebRTCHacks*. <https://webrtcchacks.com/webrtc-contact-center/>

Lunden, I. (2017, March 28) *AWS Launches Amazon Connect, Productizes Amazon's In-House Contact Center Software*. TechCrunch. <http://social.techcrunch.com/2017/03/28/aws-amazon-connect/>

Appendix

Appendix A: Project Scope

The Fab 4 Solutions Group GLOCO Contact Center project scope will include functionality in the following areas:

1. Development of new AWS Connect contact flows, voice routes currently, and telecommunications configurations managed by the existing Five9 solution and/or network hardware for the North America based contact center as follows:
 - a. Fab 4 Solutions will implement these changes in the new AWS Connect environment.
 - b. Fab 4 Solutions will disable the flow to the on-premise hardware and software and for North America contact center functionality only on the existing software and hardware stack.
2. Fab 4 Solutions will develop and implement integration functionality between AWS Connect environment for the following North America contact center AWS-based applications.

Please note:

- a. Contact center assisted and unassisted CRM-based customer profile information.
 - b. Contact center assisted and unassisted customer billing inquiry and billing information via the billing database.
 - c. Contact center assisted and unassisted bill pay functionality
 - d. Contact center assisted product database/product inquiry.
 - e. Contact center assisted returns management functionality.
 - f. Contact center incident entry.
 - g. Contact center order entry.
 - h. Contact center management workforce management (WFM).
 - i. Contact center portal integration with AWS Connect system and current applications
3. Fab 4 Solutions will develop and migrate data associated with the current call center software knowledge base, contact center database(s), and reporting functionality.
 4. Fab 4 Solutions will develop and/or migrate live chat functionality to the new AWS Connect environment. The live chat will be made available from the public website and integrate with the contact center portal
 5. Fab 4 Solutions will develop a new AWS Connect chatbot which will be accessible from the public GLOCO website and integrate with the GLOCO contact center portal.
 6. Fab 4 Solutions will integrate with Twitter to support a contact center Twitter handle traffic.

7. Fab 4 Solutions will enable the new AWS-base solution and disable the North America related functionality on the existing call center hardware and software platform. Fab 4 Solutions **will not** fully decommission or physically remove or disconnect any hardware or software from service providers.
8. Enablement on the newly developed AWS Connect contact center environment with designated GLOCO North America contact center resources and technology personnel.

The following is not in scope for this phase of the project. Therefore, Fab 4 Solutions is not responsible for technology and processes associated with the following:

1. Returns management (RMA) processes. It integrates with the RMA application and allows the CSR to provide the customer with the necessary information to return products. It also allows the CSR to provide initial product and customer information to initiate the returns process.
2. Inventory and Accounting Management: The call center is not currently responsible for processing returns accounting and inventory specific information.
3. Troubleshooting & Repairs: The CSR transfers calls to the respective device specialist. The specialist will troubleshoot and initiate repairs if necessary.
4. Order Delivery: The CSR is not responsible for delivery tracking. However, the solution will integrate with order entry. Integration with an order tracking feature is to be determined in the technical requirements section of this document. Note: Fab 4 Solutions will need to determine if it is part of the same application. Delivery is often part of a logistics application or a third-party logistics company with the capability to integrate to their tracking system (i.e., UPS tracking).

Appendix B: Cloud Contact Center Comparison Chart

Below is a weighted table to validate three possible solutions: migrating the current contact center Five9 to the cloud, using Five9’s SaaS solution, and using Amazon Connect to leverage GLOCO’s current AWS infrastructure. Based on the weighted scoring of the five categories, Amazon Connect was selected as the vendor.

Product	Amazon Connect	Five9 (SaaS)	Five9 (Migration)
Platform (0.15)	15	30	45
Features (0.25)	25	50	75
Integrations (0.2)	40	20	60
Security (0.3)	30	60	90
Support (0.1)	10	30	30
Score	120	190	300
Rank	1	2	3

Appendix C: Historical Metrics

The metrics included in the custom reports can be grouped, filtered, and scheduled to be created on regular intervals.

The screenshot shows two sources of historical metrics. On the left, a Microsoft Excel spreadsheet displays a table with the following data:

	A	B	C
1	Agent	StartInterval	EndInterval
2	Jane	2020-01-28T00:00:00.000Z	2020-01-29T00:00:00.000Z
3	John	2020-01-28T00:00:00.000Z	2020-01-29T00:00:00.000Z
4	John	2020-01-29T00:00:00.000Z	2020-01-30T00:00:00.000Z
5			
6			

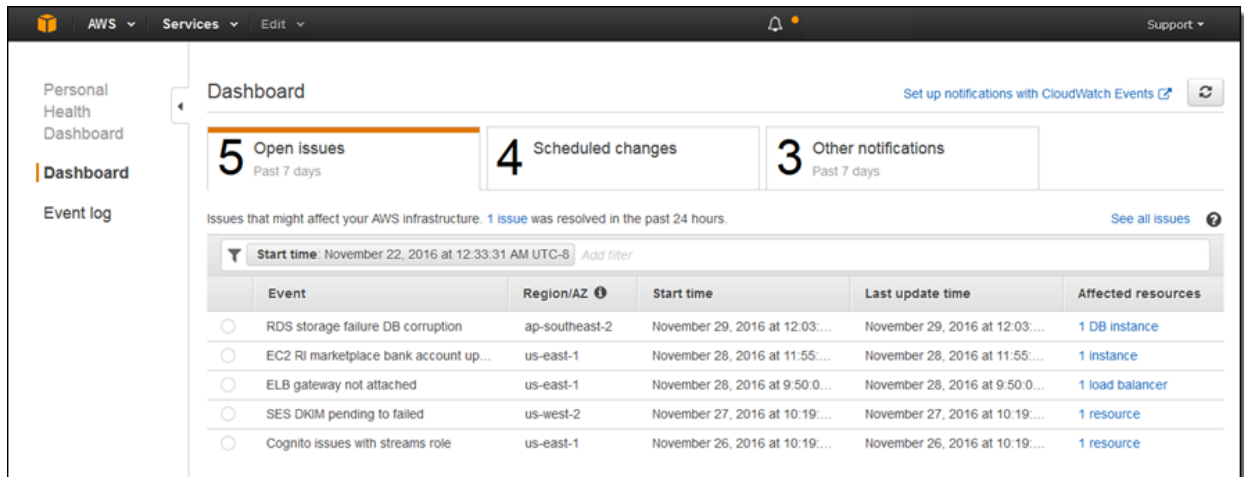
On the right, a Five9 dashboard shows a table with the following data:

Interval	Agent
1/28/20 12:00 AM - 1/29/20 12:00 AM	Jane
1/28/20 12:00 AM - 1/29/20 12:00 AM	John
1/29/20 12:00 AM - 1/30/20 12:00 AM	John

A red box highlights the two sources of historical metrics. The left side is labeled 'Leftside: Historical Metrics downloaded into CSV file opened in Microsoft Excel' and the right side is labeled 'Rightside: Historical Metrics located in Connect's online portal dashboard'.

Appendix D: AWS Personal Health Dashboard

The AWS Personal Health Dashboard, included with the AWS Enterprise Support Plan, gives GLOCO personalized alerts based on the AWS resources that GLOCO uses. When GLOCO receives an alert, the dashboard will provide remediation recommendations based on the AWS resources that GLOCO is currently using (“Amazon Personal”, 2020).



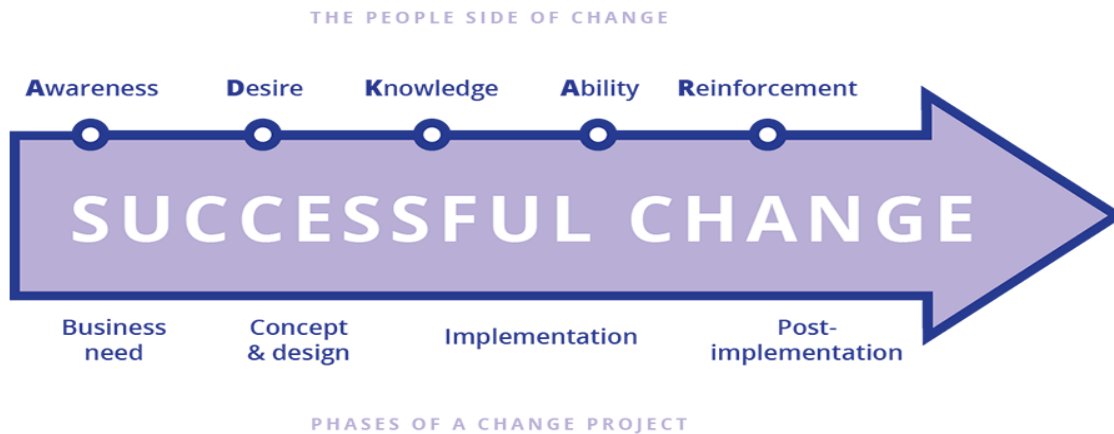
Appendix E: AWS Trusted Advisor

The Enterprise plan includes a premium version of AWS Trusted Advisor, which is an online support tool that will give GLOCO a supercharged version of its real-time guidance of provisioning GLOCO’s AWS resources. It will inspect GLOCO’s environment and give recommendations on how GLOCO can reduce costs by highlighting unused resources, identify needed changes to security settings, redundancy shortfalls, performance improvements, and service usage alerts (“AWS Trusted”, 2020).



Appendix F: PROSCI's ADKAR Change Management Methodology

PROSCI's ADKAR is the GLOCO Program Management Office's current change management methodology.



Appendix G: GLOCO Contact Center Portal Prototype -- Manager Perspective

The [prototype](#) shows integrations to applications from the contact center manager's perspective. The prototype includes the primary webpages that require portal UI integration for this project.

Instructions to navigate the prototype:

- 1) Navigate to <http://gccmgrhub.prodtechhub.me/> in your browser or click on the links. Please note that responsive design was used however, rendering could be challenging on devices with small screens.
- 2) From the home page, click on any of the following menu options to view the pages to view the integration points on each page:
 - a) Manager Hub: There are six tiles labelled for the applications that contact center managers need to manage resources. The links are inactive and when clicked you return to the top of the page.
 - i) Scroll down to the footer and hover over the icons to view the functions the icon provides
 - (1) Headset icon for listening in with a working agent and can allow for transfer as well.
 - (2) Microphone icon used to speak with a working agent.
 - (3) Record icon to initiate live audio recording for this current project phase with the capability to support video in a subsequent phase.
 - (4) Chat icon to initiate a live chat with a working agent.

- (5) Phone icon to receive a transferred priority or escalated call.
- b) Dashboard: This page serves as the main page to get live updates on what is happening on the call center floor. In addition, access WFM for shift management and a side menu to access priority functions. This page uses static and random data from local databases to support refresh features.
 - i) 8 “cards” that simulate a live feed from contact queues that updates upon refresh or when returning to the page.
 - ii) A side navigation that has access to critical manager functions. It is accessible via the “hamburger” menu icon at the top left of the page. It is just below the CONTACT CENTER MANAGER DASHBOARD page title area. It contains non-working links to illustrate integration and access to applications needed to manage contact center resources.
 - iii) Graphs measuring priority KPIs, a map and information of locations with the most traffic using static data.
 - iv) A workforce management section with ability to add to a shift or add a rep
 - v) Status bars highlighting KPI statistics using static data.
 - vi) Footer with same details and the manager hub page.
- 3) Administration: This page allows for incident reporting, security updates and more. It contains 6 tiles that have non-functioning links illustrating integration to the following:
 - a) Security for portal and contact center resource password resets and access management.
 - b) Personalization for portal and contact center personal styling and accessibility.
 - c) Social media trends for reviewing and analyzing social media feeds for patterns.
 - d) Search and analyze audio and video feeds. Video not part of this phase but could be archived from other systems.
 - e) Systems and Network: This tile is for troubleshooting as well as links with access to contact center network and applications monitoring.
 - f) Incident Reporting: For access to the contact center customer incidents as well as GLOCO incident applications.

This prototype is best viewed from a laptop or desktop using Microsoft Edge and IE, Google Chrome, Mozilla Firefox and Opera. Apple Safari has not been fully tested but the prototype can render on an iPad but not optimal for viewing due to the layout of some of the page content.