

CISCO *Live!*



#CiscoLive



The bridge to possible

NodeJS Middleware for Cisco CVP and Google DialogFlow

Leveraging conversational experiences for next-generation IVRs

Alfonso Sandoval Rosas – Software Consulting Engineer

 @ponchotitlan

DEVNET-3030



#CiscoLive

Cisco Webex App

Questions?

Use Cisco Webex App to chat with the speaker after the session

How

- 1 Find this session in the Cisco Live Mobile App
- 2 Click “Join the Discussion”
- 3 Install the Webex App or go directly to the Webex space
- 4 Enter messages/questions in the Webex space

Webex spaces will be moderated by the speaker until June 17, 2022.



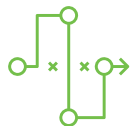
<https://ciscolive.ciscoevents.com/ciscolivebot/#DEVNET-3030>



Agenda

- Conversational Experiences (and why DTMF is a thing of the past!)
- Fulfillment challenges
- NodeJS to the rescue
- Use Case example: Customer ID through a voice questionnaire
- Demo & References

What to expect



Quick recap on DialogFlow ES technology and Cisco CVP



DevNet Code and tooling walkthrough



Use Case Design



Exciting DevNet project demo

What not to expect



Deep-dive into DialogFlow ES Agent design*



Cisco CVP/CVA integration setup with DialogFlow*

*There are references of these at the end of the presentation

Conversational Experiences (and why DTMF is a thing of the past!)



Slido

Have you ever experienced
any of the following when
calling Customer Service?

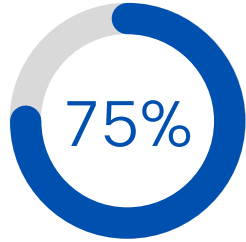
slido



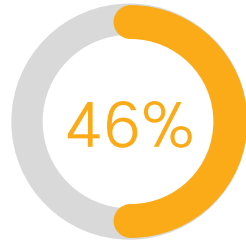
Have you ever experienced any of the following when calling Customer Service?

① Start presenting to display the poll results on this slide.

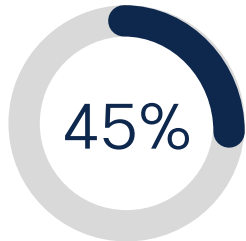
Customer experience with traditional IVRs



of customers feel that the IVR forces them to **listen** to **irrelevant options**

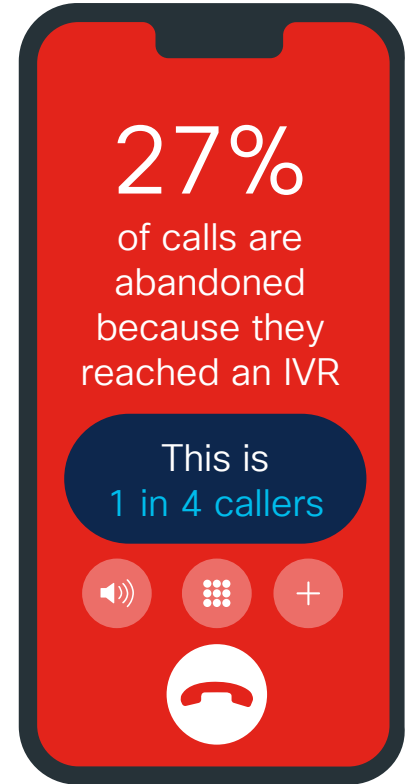


of customers think that the IVR menus are **usually too long**

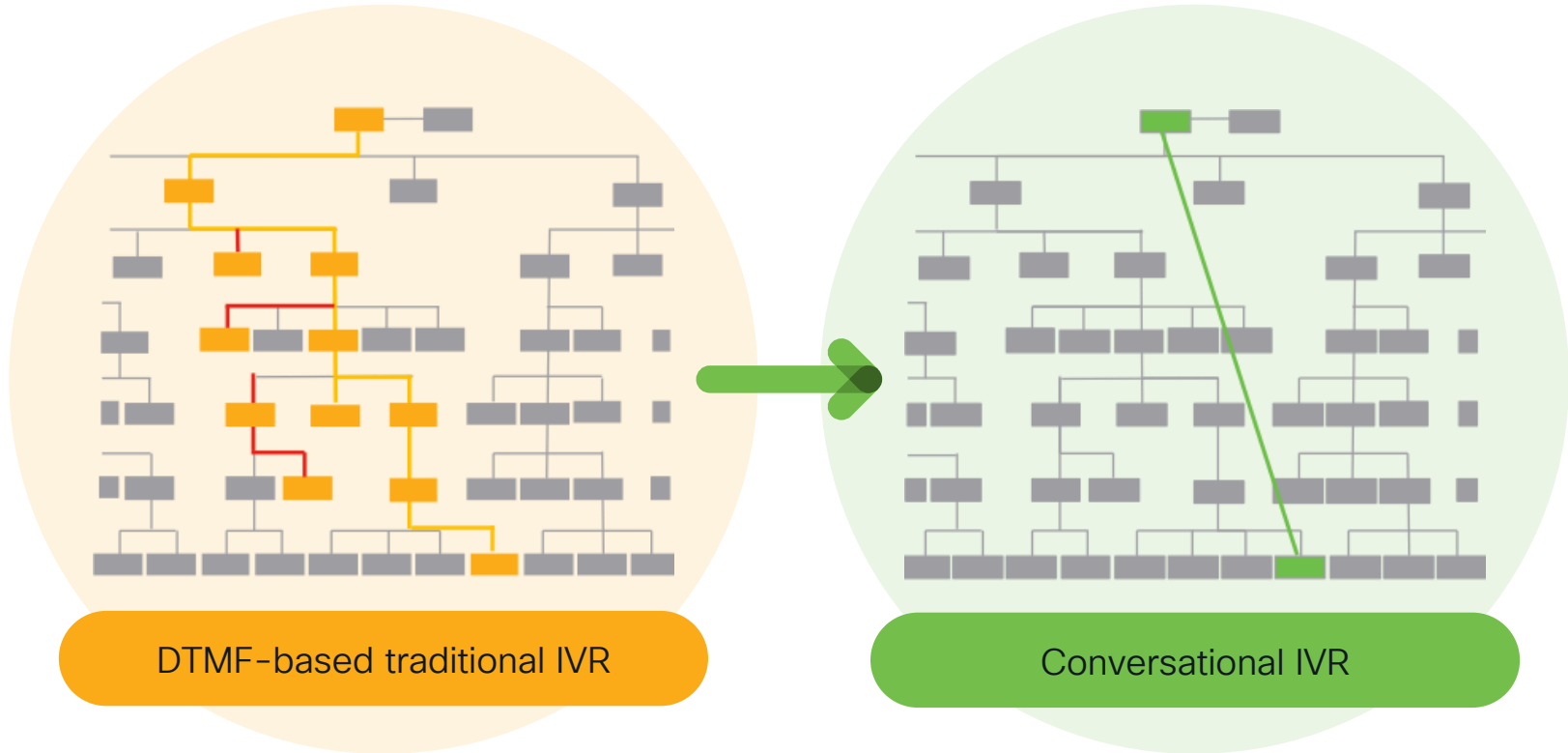


of customers **complain about** having to repeat themselves **very often**

Source: Vonage report, 2019



The Conversational Experience approach





Dialogflow

A natural language understanding platform for designing and integrating conversational user interfaces into different interaction channels



Google Cloud
based platform



NLU
(Natural
Language
Understanding)



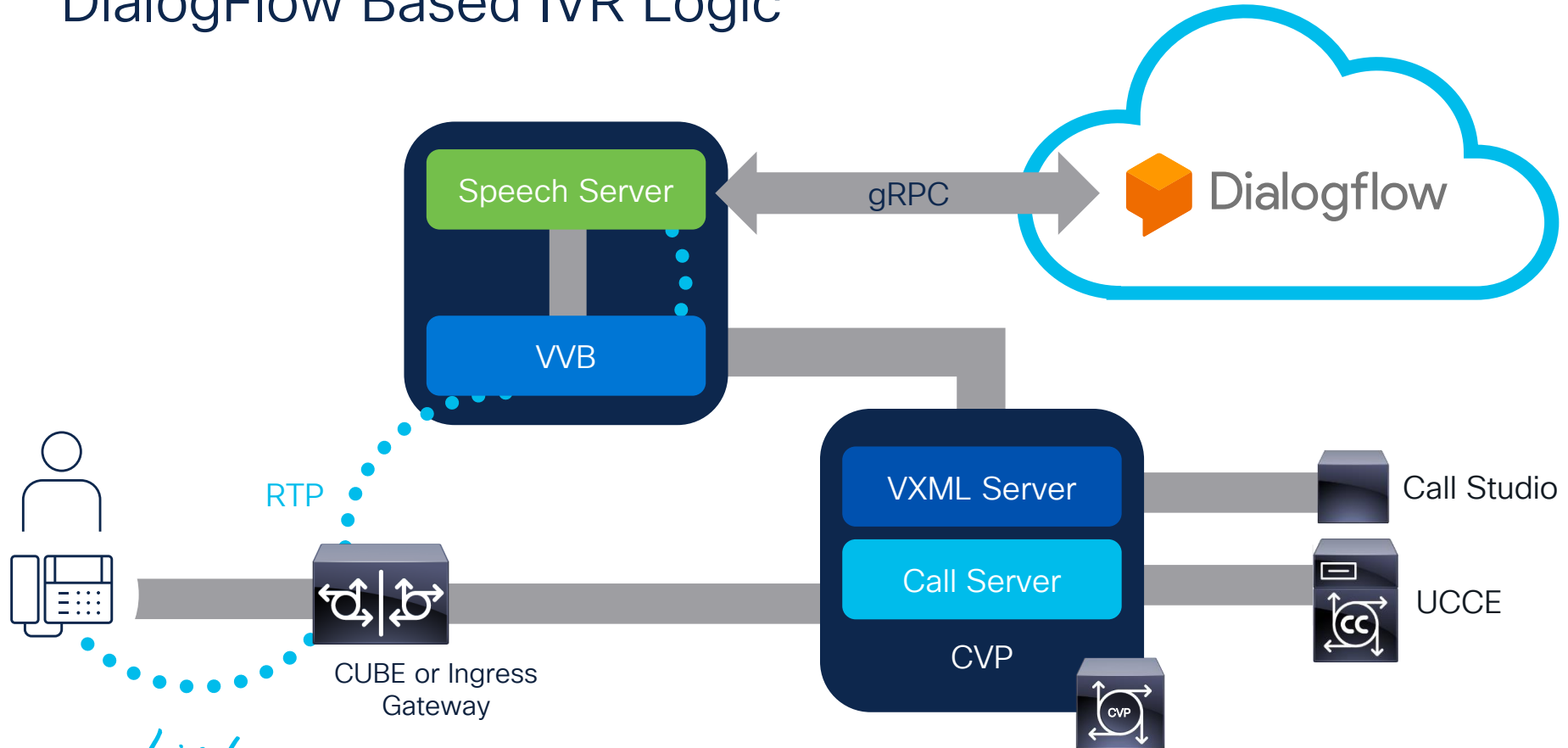
ASR
(Audio Speech
Recognition)



TTS
(Text-to-
Speech)

Cisco CC integration with DialogFlow

DialogFlow Based IVR Logic



An interaction lifecycle

I want to report an
internet issue at
742 Evergreen
Terrace



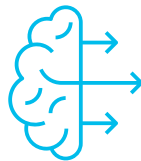
Dialogflow

An interaction lifecycle

I want to report an
internet issue at
742 Evergreen
Terrace



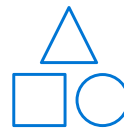
Dialogflow



Match intent



Find
parameters



Map entities

✓ @issuetype

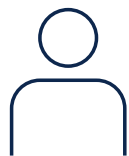
✓ @street

✓ @houseNum

✗ @city

An interaction lifecycle

I want to report an
internet issue at
742 Evergreen
Terrace



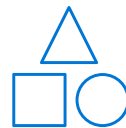
Dialogflow



Match intent



Find
parameters



Map entities

✓ @issuetype

✓ @street

✓ @houseNum

✗ @city



Trigger intent

Do I have all the params
needed for a report?

An interaction lifecycle



Fulfillment challenges

Fulfillment

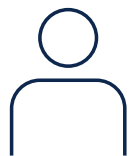
Sure, the city is
Springfield



Dialogflow

Fulfillment

Sure, the city is
Springfield



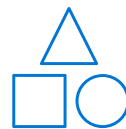
Dialogflow



Match **intent**



Find
parameters



Map **entities**

✓ @issuetype

✓ @street

✓ @houseNum

✓ @city



Trigger **intent**

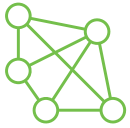
How do I invoke our report creation service?



Reports
API

Fulfillment through Cisco CVP

Pros



Custom Call Studio elements for REST API invocations and Java code snippets

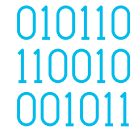


Included out-of-the-box in Call Studio

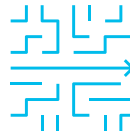
Cons



Very specific usage: Data manipulation is cumbersome

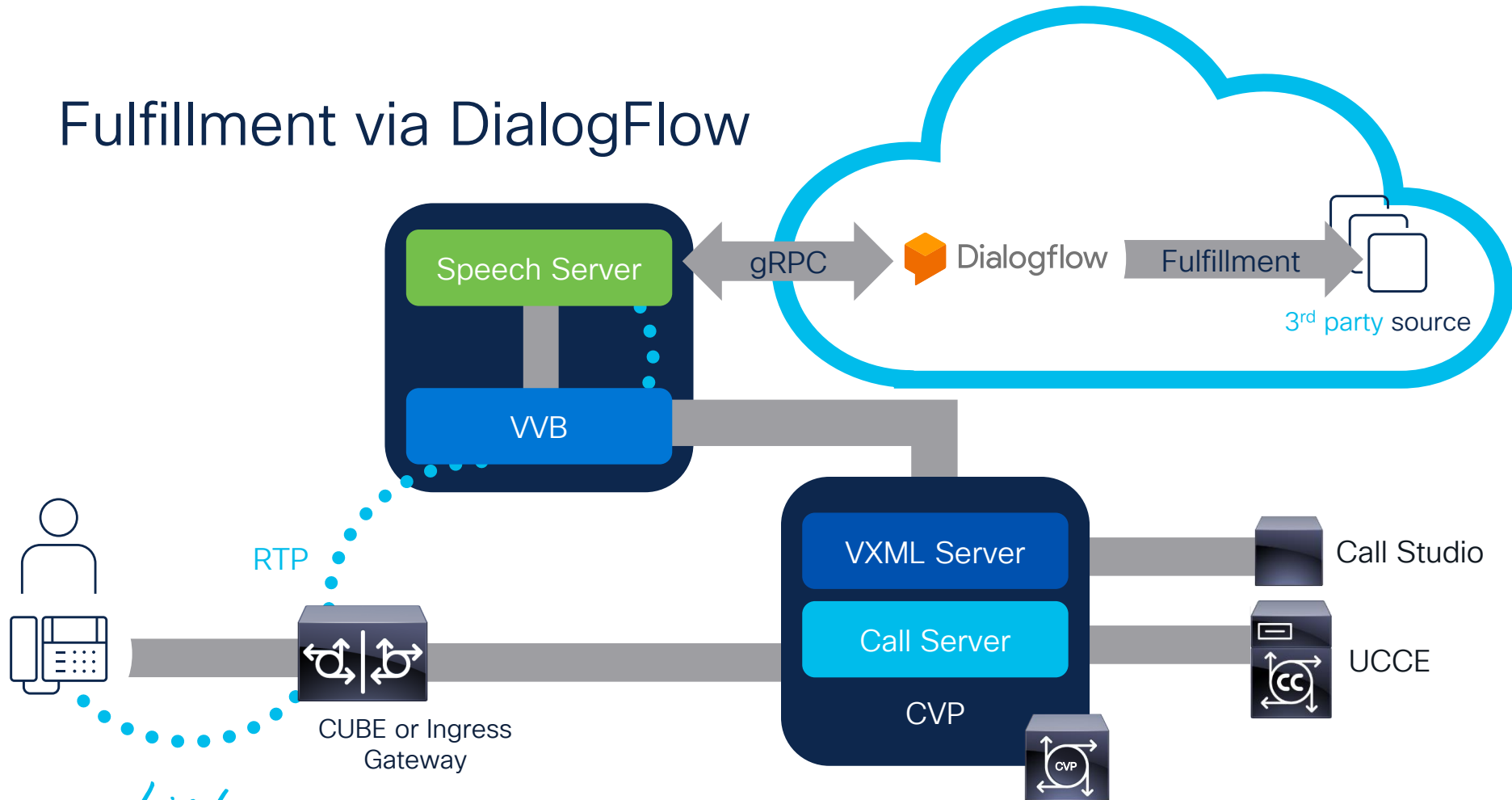


Difficult to adopt on a staged fashion



Steep learning curve – only Contact Center engineers can design and deploy new services

Fulfillment via DialogFlow



es

en



Intents



Entities

Knowledge (beta)

Fulfillment



Integrations



Training



Validation



History



Analytics



Prebuilt Agents

Docs [↗](#)

Trial

Free

[Upgrade](#)Dialogflow CX [new]

Fulfillment

Webhook

DISABLED



Your web service will receive a POST request from Dialogflow in the form of the response to a user query matched by intents with webhook enabled. Be sure that your web service meets all the [webhook requirements](#) specific to the API version enabled in this agent.

Inline Editor (Powered by Google Cloud Functions)

ENABLED



Build and manage fulfillment directly in Dialogflow via Cloud Functions. [Docs](#)



Newly created cloud functions now use Node.js 10 as runtime engine. Check [migration guide](#) for more details.

[index.js](#)[package.json](#)

```
1 'use strict';
2
3 const functions = require('firebase-functions');
4 const { WebhookClient } = require('dialogflow-fulfillment');
5 const axios = require('axios');
6
7
8
9
10
11
12
13
14
15
```

[View execution logs in the Google Cloud Console](#)

Last deployed on 12/01/2021 20:39

[DEPLOY](#)

Fulfillment via DialogFlow (Inline Editor)

Pros



Full programmatic approach



Embedded in web platform



Makes use of Google Cloud Functions (serverless)– no need to deploy any infrastructure

Cons



Monolithic structure



Google Cloud charges a fee for every request made outside of the cloud instance

NodeJS to the rescue

Webhook

ENABLED



Your web service will receive a POST request from Dialogflow in the form of the response to a user query matched by intents with webhook enabled. Be sure that your web service meets all the [webhook requirements](#) specific to the API version enabled in this agent.

URL*

BASIC AUTH

ciscoadmin

HEADERS

Enter key

Enter value

⊕ Add header

SMALL TALK

Disable webhook for Smalltalk

Inline Editor (Powered by Google Cloud Functions)

DISABLED



Build and manage fulfillment directly in Dialogflow via Cloud Functions. [Docs](#)

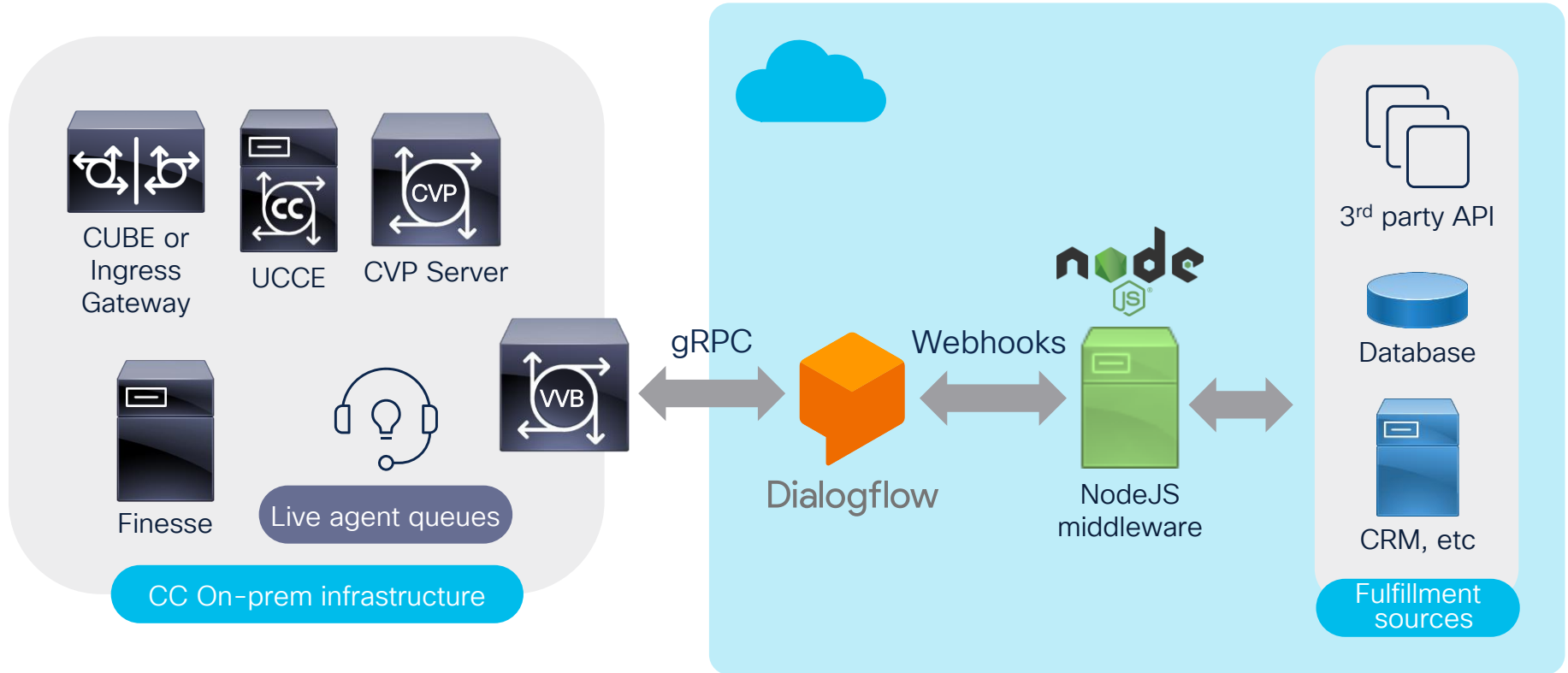


Newly created cloud functions now use Node.js 10 as runtime engine. Check [migration guide](#) for more details.

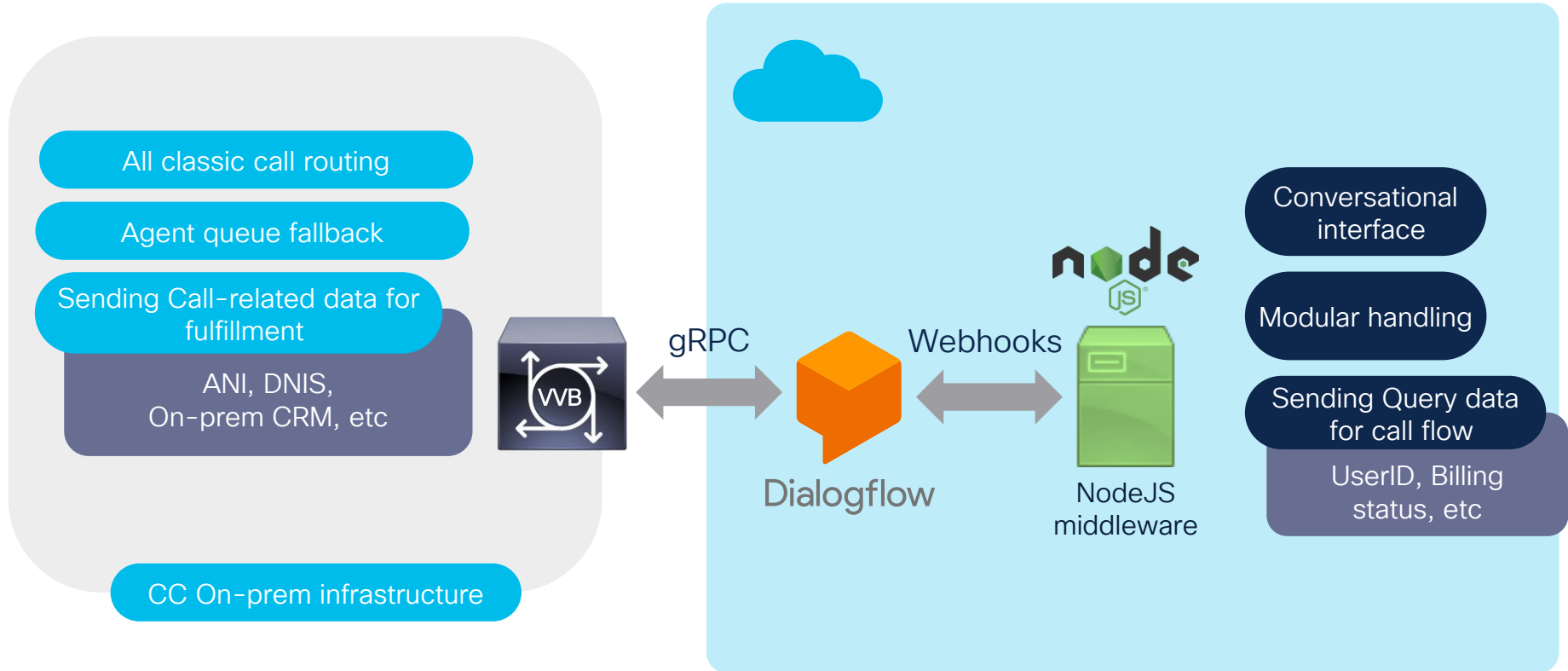
[index.js](#) [package.json](#)

```
1 // See https://github.com/dialogflow/dialogflow-fulfillment-nodejs
2 // for Dialogflow fulfillment library docs, samples, and to report issues
3 'use strict';
```

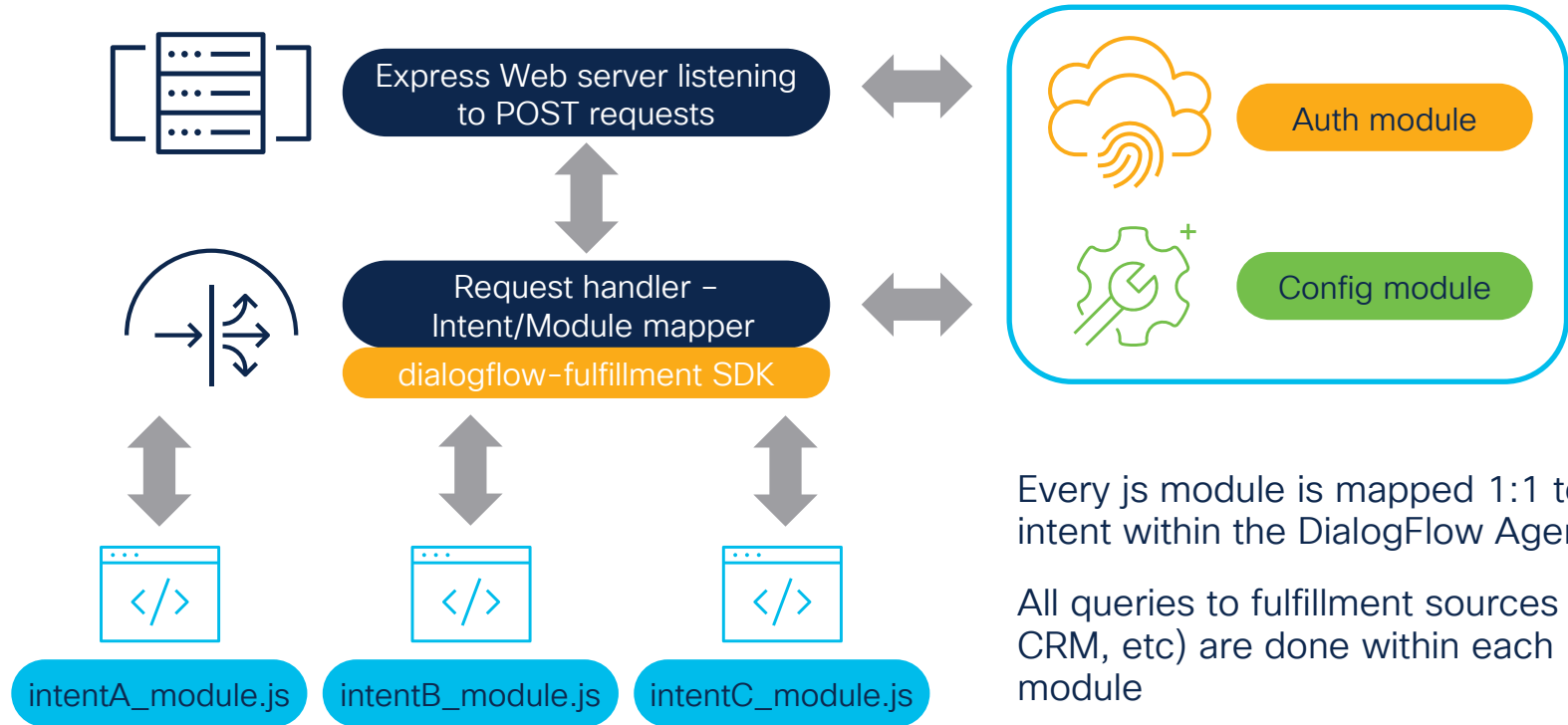
NodeJS middleware via Webhooks



NodeJS middleware via Webhooks



Middleware architecture



Every js module is mapped 1:1 to an intent within the DialogFlow Agent

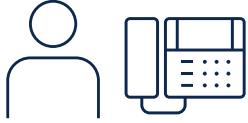
All queries to fulfillment sources (DB, CRM, etc) are done within each module

Use Case example

Customer ID through a voice questionnaire



Use Case example



Customer calls to report an issue with the SP service

Use Case example

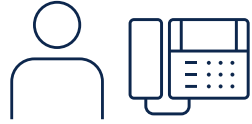


Customer calls to report an issue with the SP service



It is not possible to identify the user with the ANI because it is not associated to the user's account

Use Case example



Customer calls to report an issue with the SP service



Passing the call's ANI



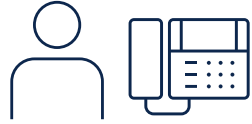
It is not possible to identify the user with the ANI because it is not associated to the user's account



Dialogflow

A voice questionnaire is triggered. The user is asked for the name and city

Use Case example



Customer calls to report an issue with the SP service



Passing the call's ANI



It is not possible to identify the user with the ANI because it is not associated to the user's account



Dialogflow

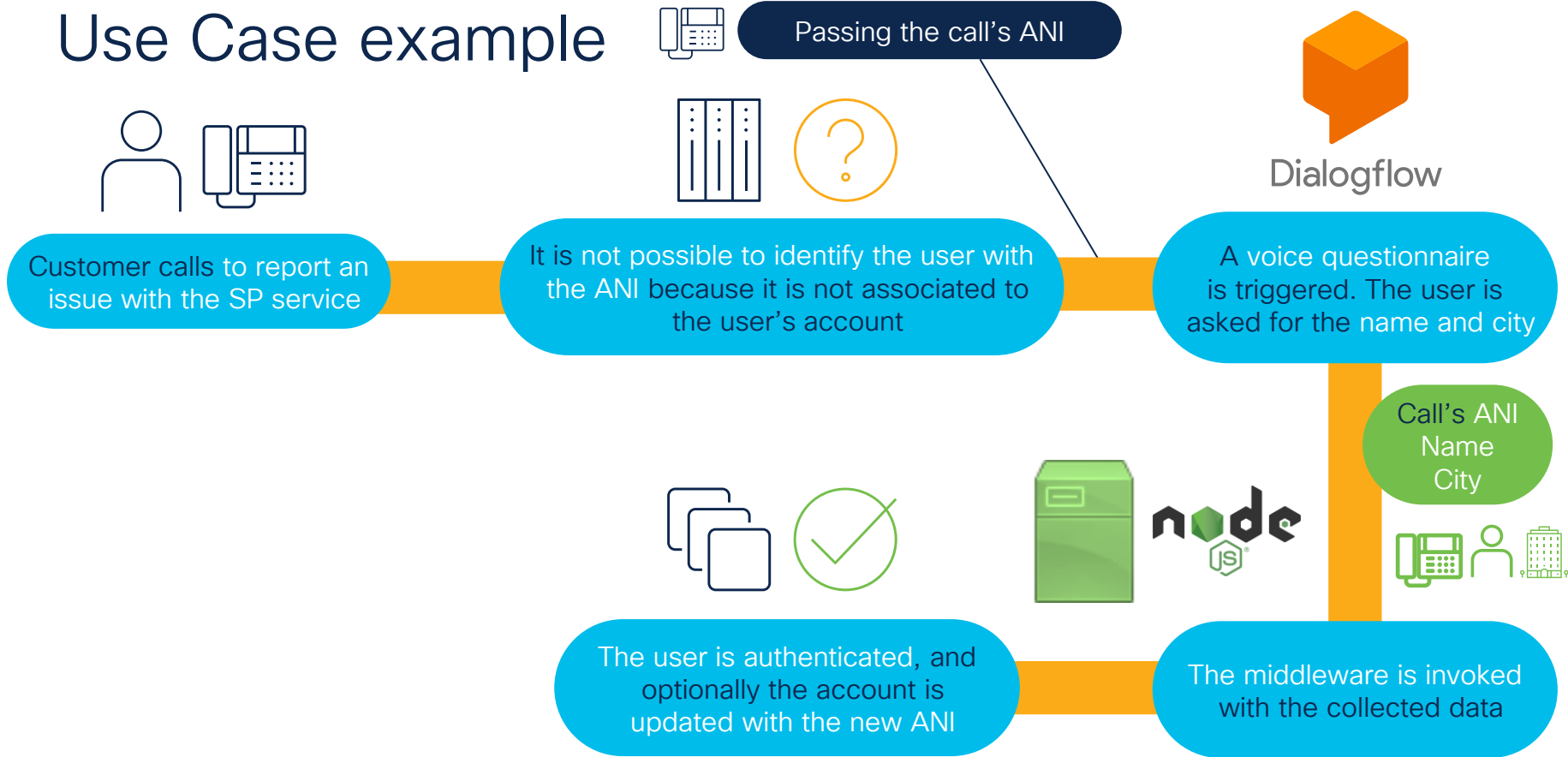
A voice questionnaire is triggered. The user is asked for the name and city

Call's ANI
Name
City

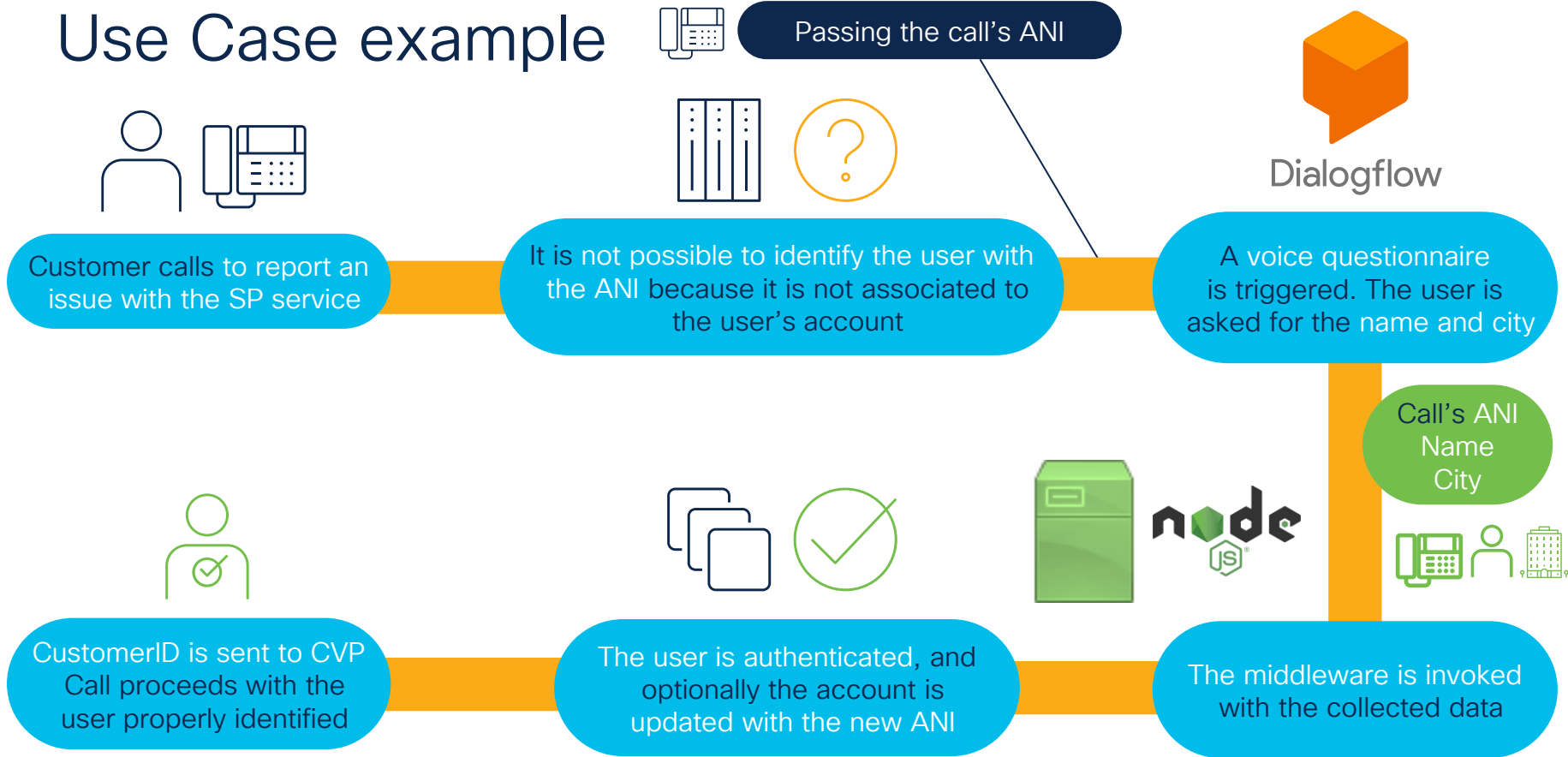


The middleware is invoked with the collected data

Use Case example



Use Case example



Three pillars of our use case



Agent design in
DialogFlow



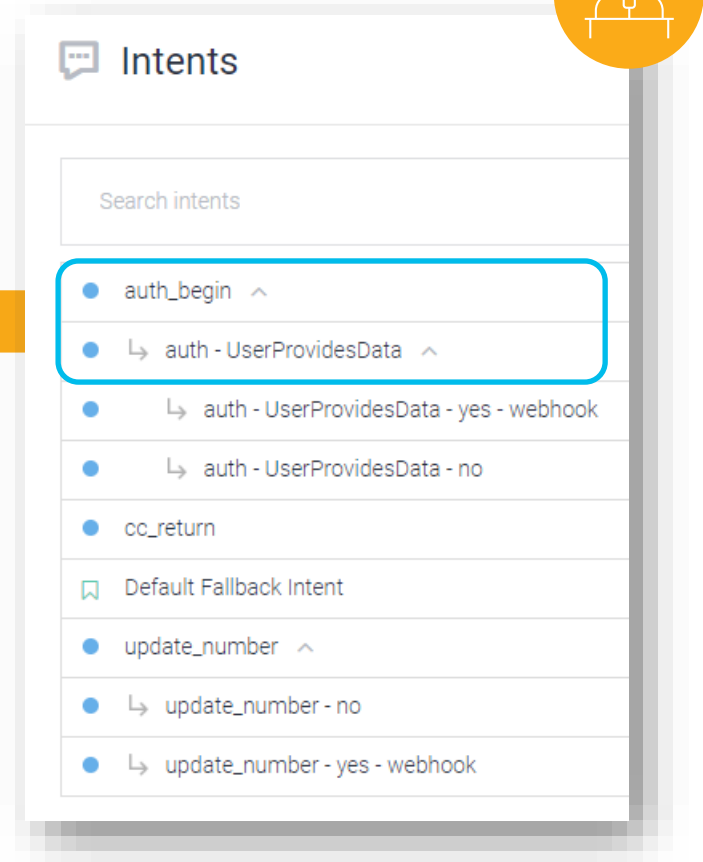
CallStudio generic
app creation



Middleware
module coding

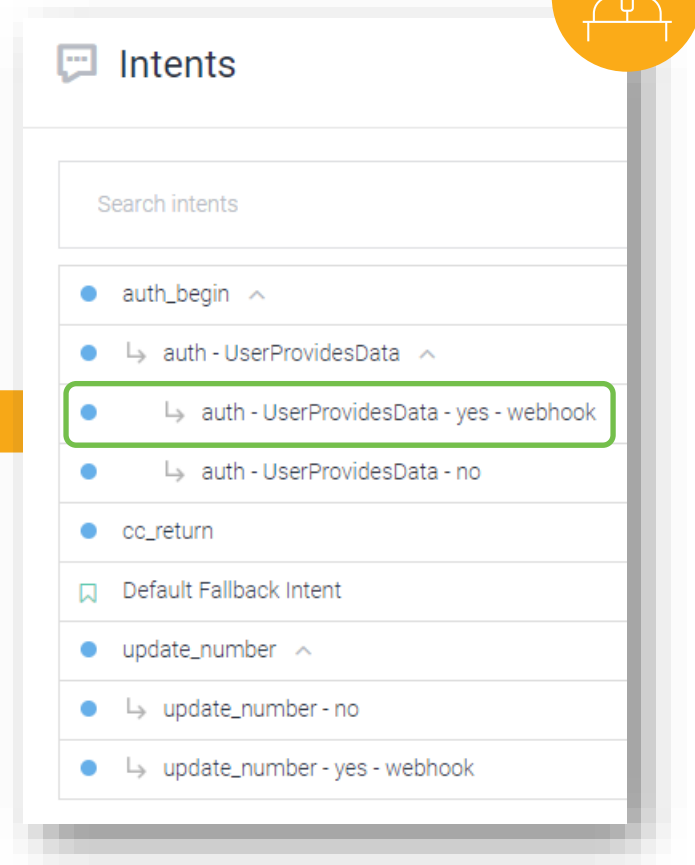
Agent design in DialogFlow

Welcome message
Prompt for user's name and city



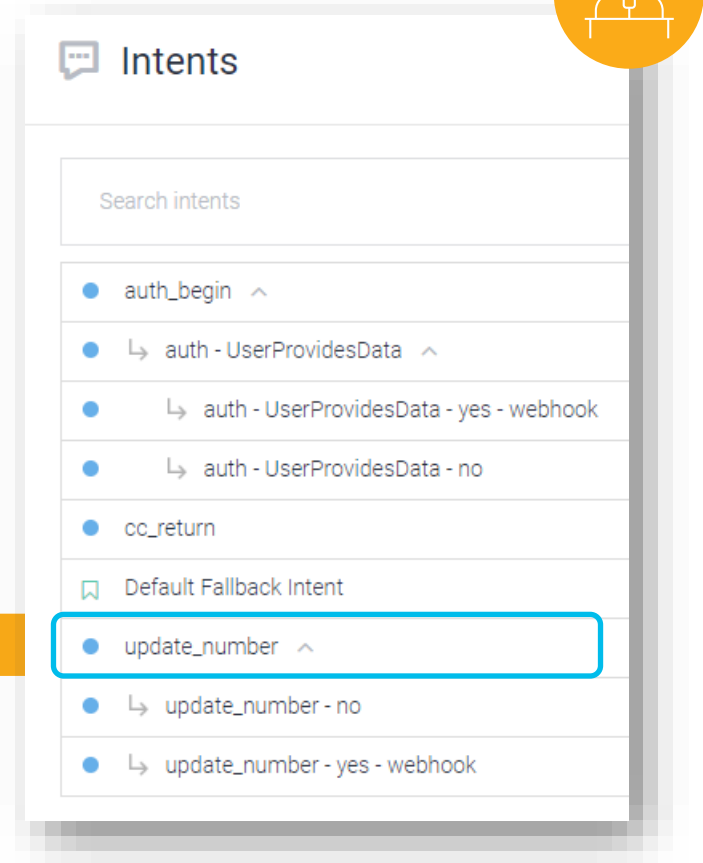
Agent design in DialogFlow

Middleware is invoked with the data from the previous intent



Agent design in DialogFlow

If the user is successfully authenticated, the middleware triggers an event for asking if the user wants to update the ANI in the account



Agent design in DialogFlow



Intents

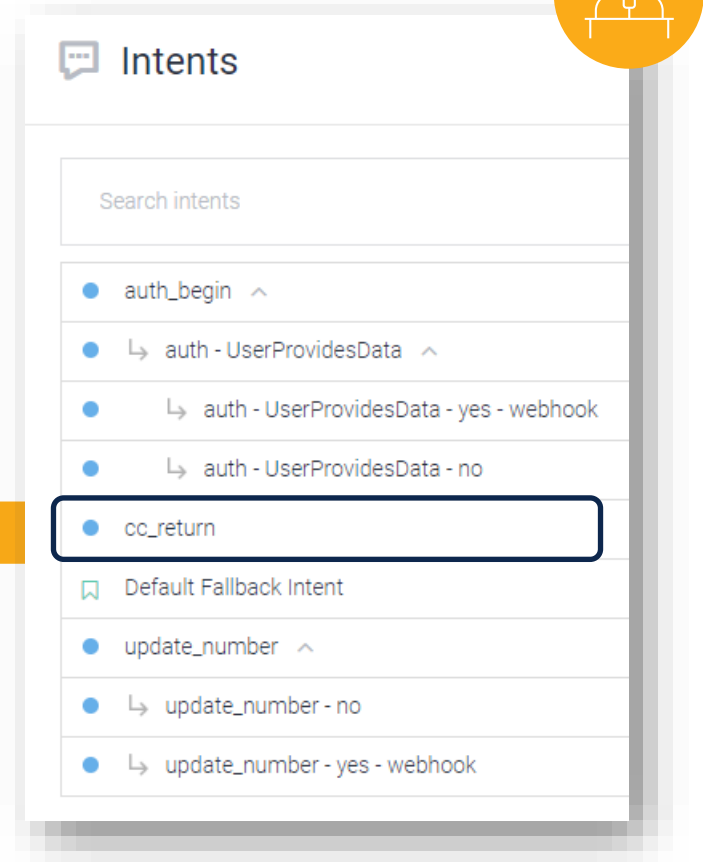
Search intents

- auth_begin ^
- ↳ auth - UserProvidesData ^
- ↳ auth - UserProvidesData - yes - webhook
- ↳ auth - UserProvidesData - no
- cc_return
- 🔖 Default Fallback Intent
- update_number ^
- ↳ update_number - no
- ↳ update_number - yes - webhook

If the user agrees, the middleware is invoked with the ANI collected from CVP and the user ID

Agent design in DialogFlow

Call control goes back to CVP
Payload includes user status and ID





Long-living context for data storage

- auth_begin

Contexts ?

Add input context

10

customer_data



2

auth_begin-followup



Add output context

Custom context for storing the collected data throughout the conversation

Must have enough lifespan for all the rounds

Webhook activation



• auth - UserProvidesData - yes - webhook

Fulfillment ?

☒ Enable webhook call for this intent

⚡ Fulfillment

Webhook

ENABLED ☒

Your web service will receive a POST request from Dialogflow in the form of the response to a user query matched by intents with webhook enabled. Be sure that your web service meets all the [webhook requirements](#) specific to the API version enabled in this agent.

URL*

BASIC AUTH

HEADERS

[+](#) Add header

Enable fulfillment in the intent which will communicate with the NodeJS middleware

Provide all the required connection details in the Fulfillment panel



Return event and middleware prompt

cc_return

Contexts ?

Events ?

cc_return_event ⊗ Add event

Trigger the intent for when the Middleware returns data with a custom Event

Responses ?

DEFAULT +

Text or SSML Response

- 1 \$middlewaremessage
- 2 Enter a text or SSML response variant

ADD RESPONSES

☒ Set this intent as end of conversation ?

Prompt the Middleware's message to the user, and return the call control to CVP

CallStudio generic app creation



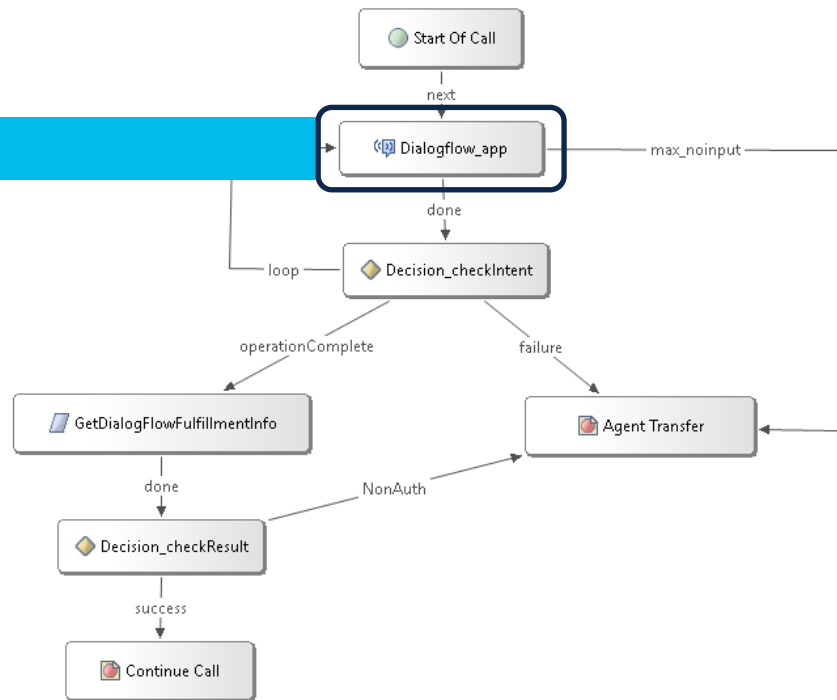
Invocation of the Dialogflow agent
Call control handover

Element Configuration Outline

Voice Element - Dialogflow

General Settings Audio Data Events

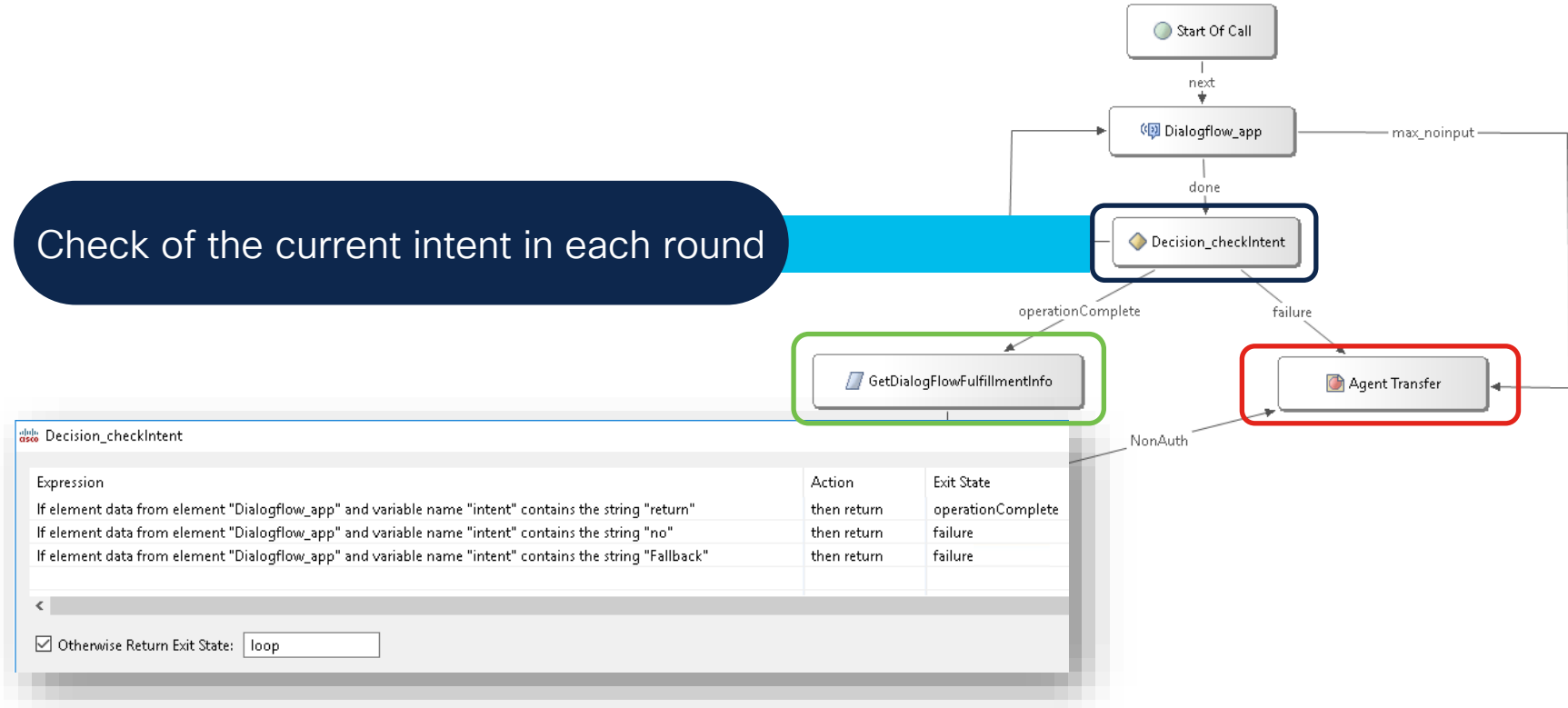
Name	Value
* Service Account ID	acme-chatbot-w9kq
* Audio Output	true
* NoInput Timeout	5s
* Max NoInput Count	3
Termination Chara...	#
Initiation Text	app_begin
* Max Input Time	30s
* Final Silence	2s
* Secure Logging	false





CallStudio generic app creation

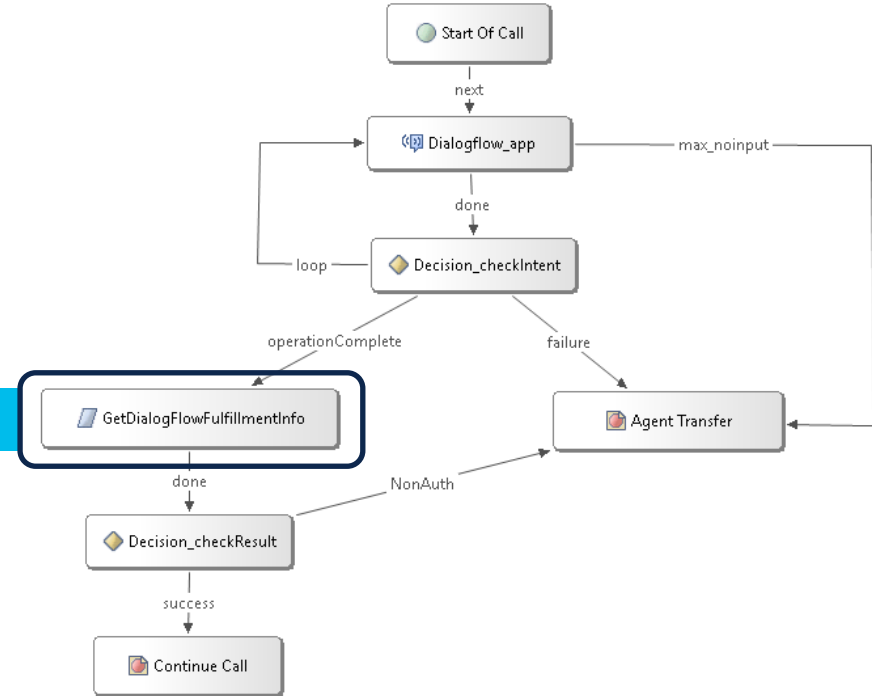
Check of the current intent in each round



CallStudio generic app creation



Parse JSON payload and route the call based on the data





CallStudio generic app creation

Element Configuration

Voice Element - Dialogflow

General Settings Audio Data Events

Name	Value
* Service Account ID	acme-chatbot-w9kq
* Audio Output	true
* NoInput Timeout	5s
* Max NoInput Count	3
Termination Chara...	#
Initiation Text	app_begin
* Max Input Time	30s
* Final Silence	2s
* Secure Logging	false

DialogFlow_auth_user

VoiceXML Property	Value
Dialogflow.queryParams.payload	any_given_param

All call-related parameters are passed to DialogFlow via this VoiceXML Property

“Dialogflow.queryParams.payload”

Middleware module coding



```
module.exports = (agent) => {  
  agent.contexts.forEach(  
    element => {  
      if (element.name == 'customer_data') {  
        CUSTOMER_CITY = element.parameters.customerCity;  
        CUSTOMER_NAME = element.parameters.customerName;  
      }  
    }  
  )  
  ...  
}
```



1. Retrieve the collected data from DialogFlow

Middleware module coding




NodeJS
middleware

```
let CUSTOMER_ANI = agent.originalRequest.payload.payload;
```



2. Retrieve the call data sent from CVP

Middleware module coding



```
let contextSubs = new Object();
contextSubs = {
  name: 'return_context',
  lifespan: 5,
  parameters: {
    userID : response.data.customerID,
    status: response.data.status
  }
}
agent.context.set(contextSubs);
```



3. Query the API of interest and build a new context for returning results to CVP

Middleware module coding



```
agent.setFollowupEvent({
  name: 'cc_return_event',
  parameters: {
    middlewaremessage: For further reference, your ID number is
    <say-as interpret-as="characters" detail="2" >
      ${response.data.customerID}
    </say-as>
  }
});
return agent.add('');
```



4. Put a prompt for the user

Middleware module coding



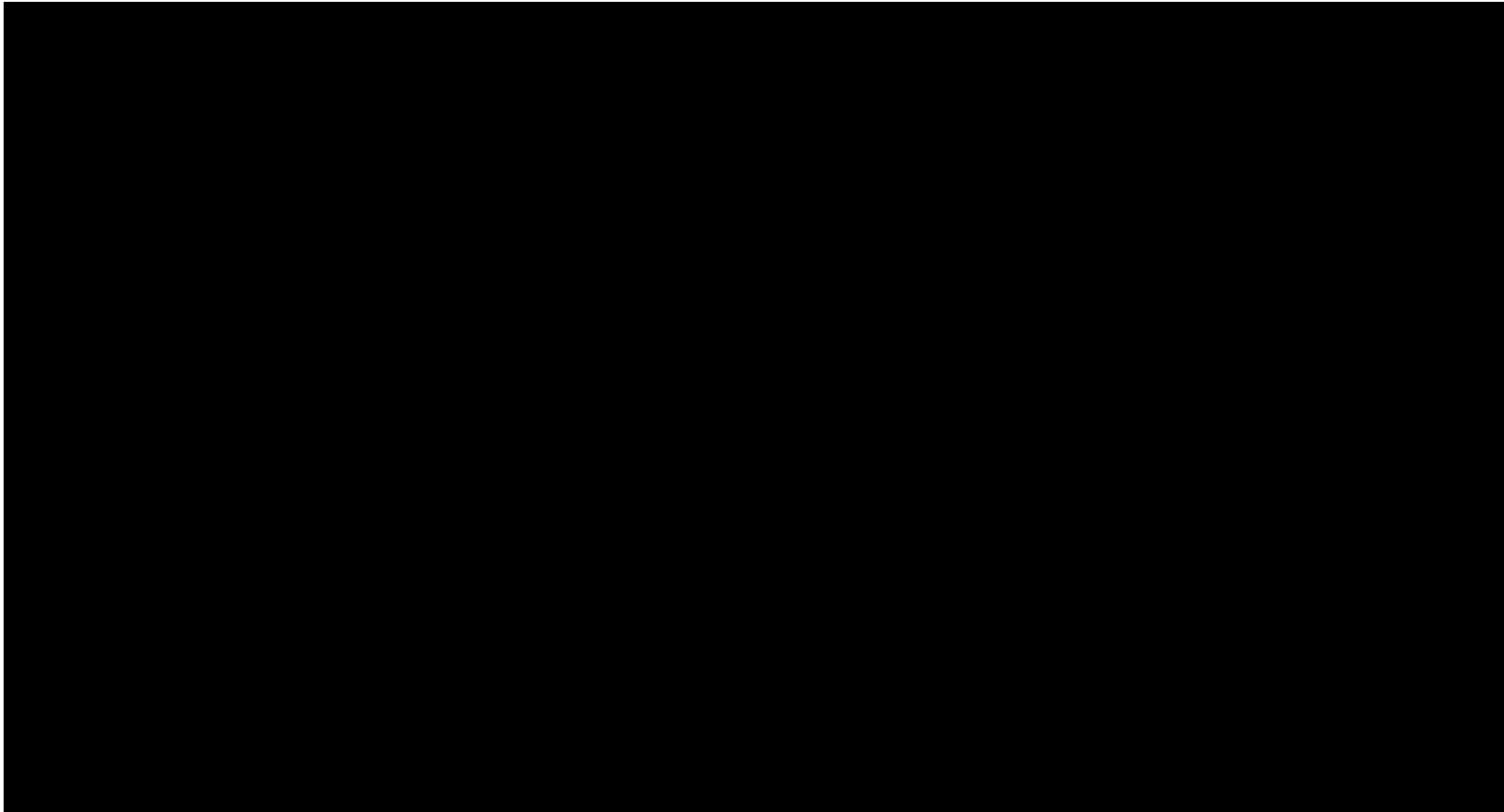
```
const AUTH_MOD = require('./intent-handlers/auth_UserProvidesData')
const UPDATE_MOD = require('./intent-handlers/update_number');
...
let intentMap = new Map();
intentMap.set('auth - UserProvidesData - yes - webhook', AUTH_MOD);
intentMap.set('update_number - yes - webhook', UPDATE_MOD);
agent.handleRequest(intentMap);
...
```

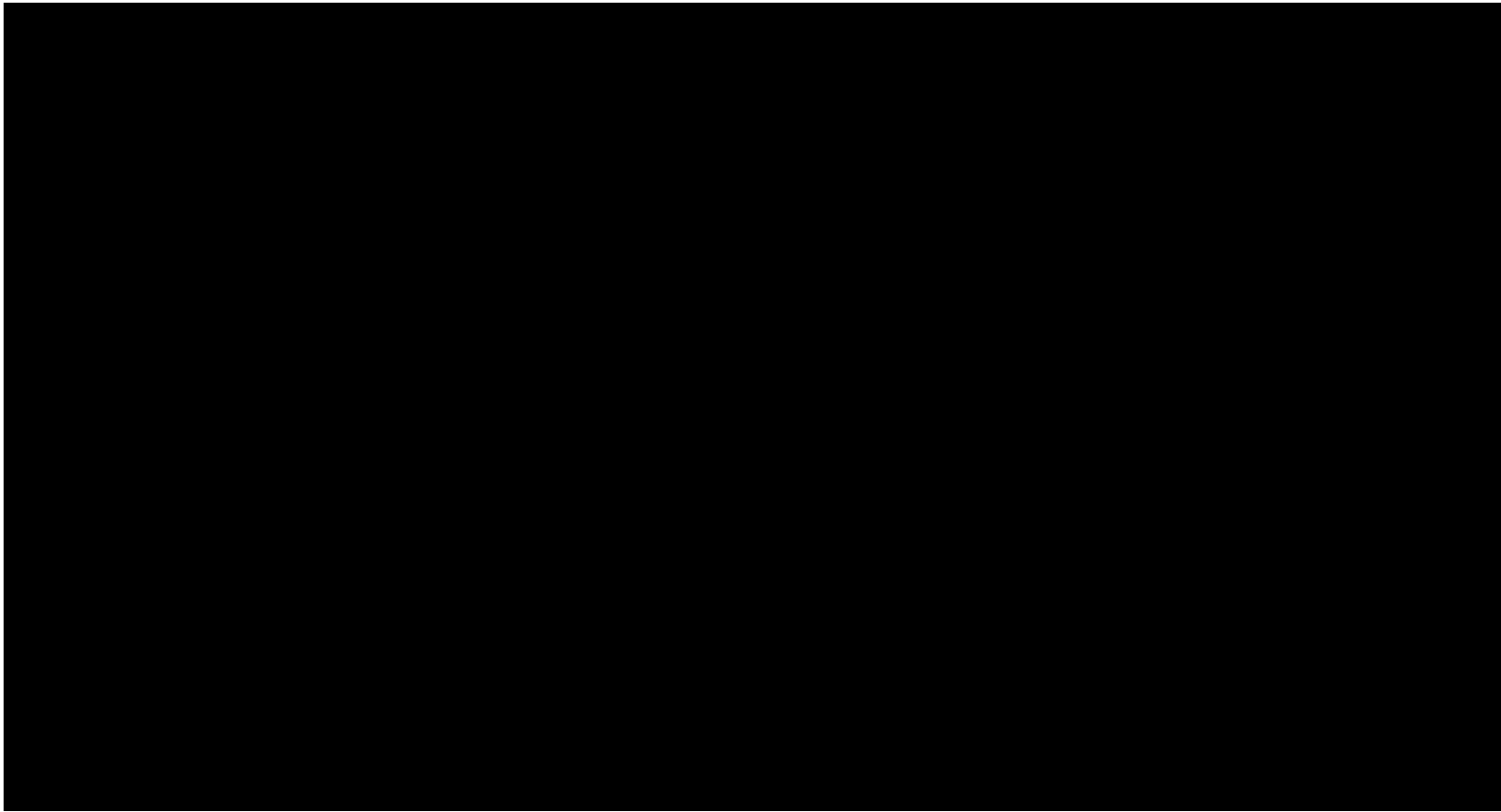


5. Include the new module in the handler

Demo







References

References

Middleware boilerplate on DevNet Code Exchange



<http://cs.co/dfCVPMiddleware>

DialogFlow ES console overview



<https://cloud.google.com/dialogflow/es/docs/console>

Official Cisco guide for DialogFlow integration with CVP/CVA



<http://cs.co/DialogFlowCiscoCVP>



Continue your learning
journey

Cisco Webex Contact Center & Contact
Center Enterprise New Feature Deep Dive

[LTRCCT-2017](#)

Webex Contact Center Flow Designer:
Orchestrating Customer Experiences

[LTRCCT-2012](#)

Webex Contact Center New Digital
Channels Bot Capabilities

[LTRCCT-3001](#)

Technical Session Surveys

- Attendees who fill out a minimum of four session surveys and the overall event survey will get Cisco Live branded socks!
- Attendees will also earn 100 points in the Cisco Live Game for every survey completed.
- These points help you get on the leaderboard and increase your chances of winning daily and grand prizes.



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Certify

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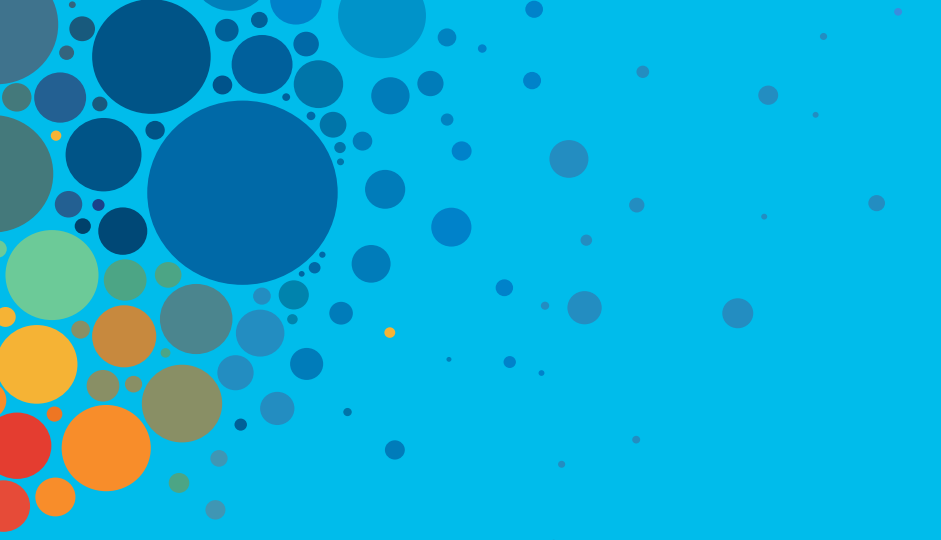
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- Book your one-on-one Meet the Engineer meeting
- Attend the interactive education with DevNet, Capture the Flag, and Walk-in Labs
- Visit the On-Demand Library for more sessions at www.CiscoLive.com/on-demand



The bridge to possible

Thank you

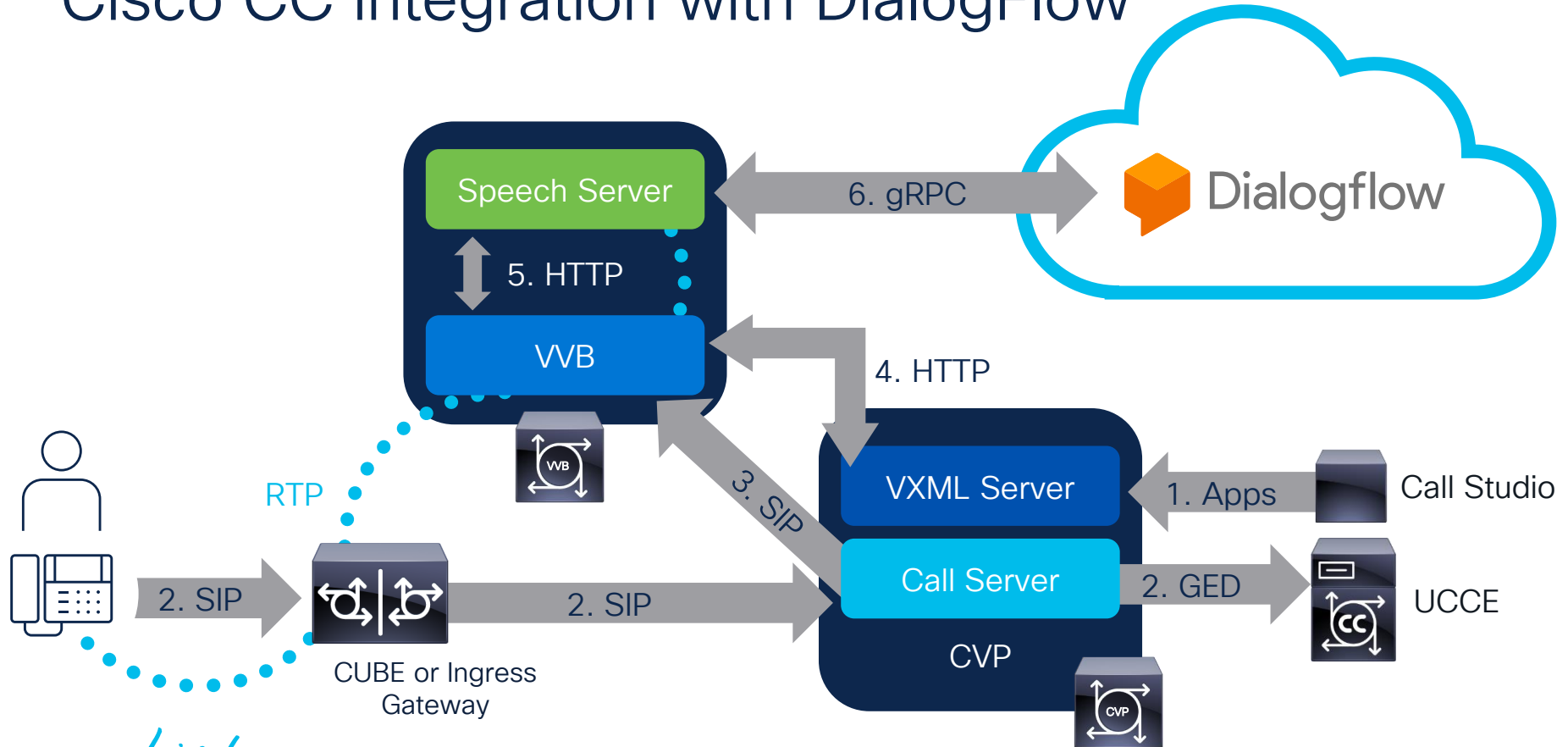
CISCO *Live!*



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Appendix

Cisco CC integration with DialogFlow



Google DialogFlow ES terminology



Agent: Virtual agent which handles conversations with users



Intent: Entity matched by user's input for triggering a workflow



Parameter: Information placeholders within the user input



Entity: A parameter data type (System-defined, Custom)



Context: Rule to match for linking intents together (Input/Output)



Fulfillment: Calling of a 3rd party service via API requests