Hands-on Chatbots with Google Dialogflow

Course Outline

Module 1: The Big Picture

Bots, DialogFlow

Voice and free-flowing chat

Module 2: Interaction models in ChatBots

Agents,Intents,Entities,Contexts

The Building Blocks of DialogFlow

Module 3: Dialogs in DialogFlow

Linear & Non-linear Dialogs

Managing conversation flow

Module 4: Fulfillment & Deployment

Webhooks & Integrations

External APIs for fulfillment &Deploying DialogFlow apps

Overview

Machine learning has made possible bots which can conduct intelligent conversations

Technologies underlying bots are complex but platforms make building these bots simple

Google's Dialogflow (formerly api.ai) offers an easy way to build sophisticated chatbots

Where Would You Use Chatbots?

A chatbot is a program that can conduct an intelligent conversation

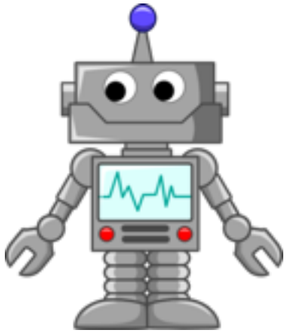
Convincingly simulate human behavior and pass the Turing test

Help Navigating a Site

Can't find what you're looking for?

Chat window pops up - just ask questions!

Help Navigating a Site



Chat is usually powered by a bot

Customer Support for Your Order

Order not received from your favorite e-commerce site?

Call customer support on the phone

Customer Support for Your Order

Order not received from your favorite e-commerce site?

Chat on the site, track your order using an intelligent bot

Chatbots for Business

Weather bot

Grocery bot

News bot

Personal finance bot

Shopping bot

Introducing Dialogflow

Types of Chatbots

Rule Based

Basic, know only about rules that have been pre-programmed

AI Based

Intelligent, learns from conversations using ML techniques

Types of Chatbots

Rule Based

Basic, know only about rules that have been pre-programmed

AI Based

Intelligent, learns from conversations using ML techniques

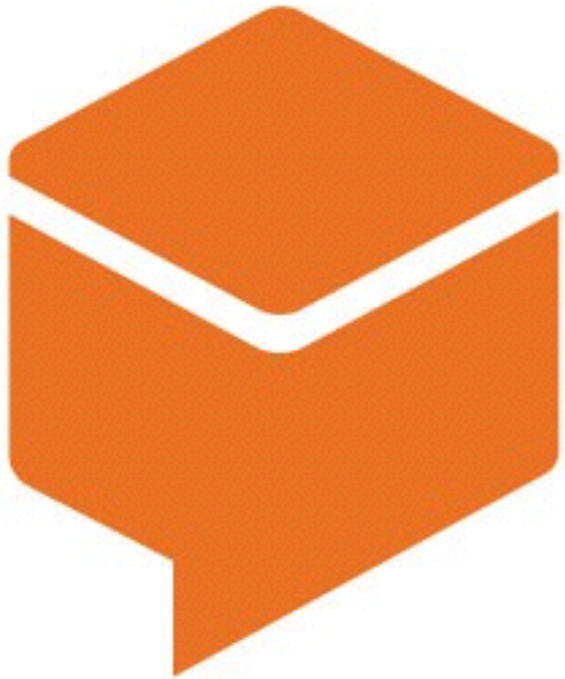
A Little History

2011: Speaktoit developed an intelligent personal assistant for mobile phones

2014: Speaktoit released api.ai to third party developers

2016: Google buys Speaktoit to to power Google Assistant

2017: api.ai is renamed to Dialogflow

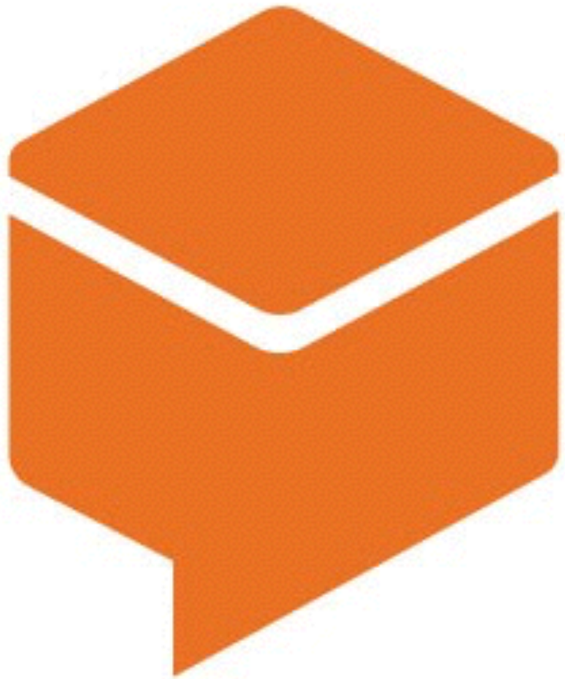


Dialogflow is Sophisticated

Build natural, rich conversations with an intuitive UI

Uses machine learning to understand what users are saying

Each ML model is unique to an individual user's bot



Dialogflow is Cutting Edge

Supports 14+ languages

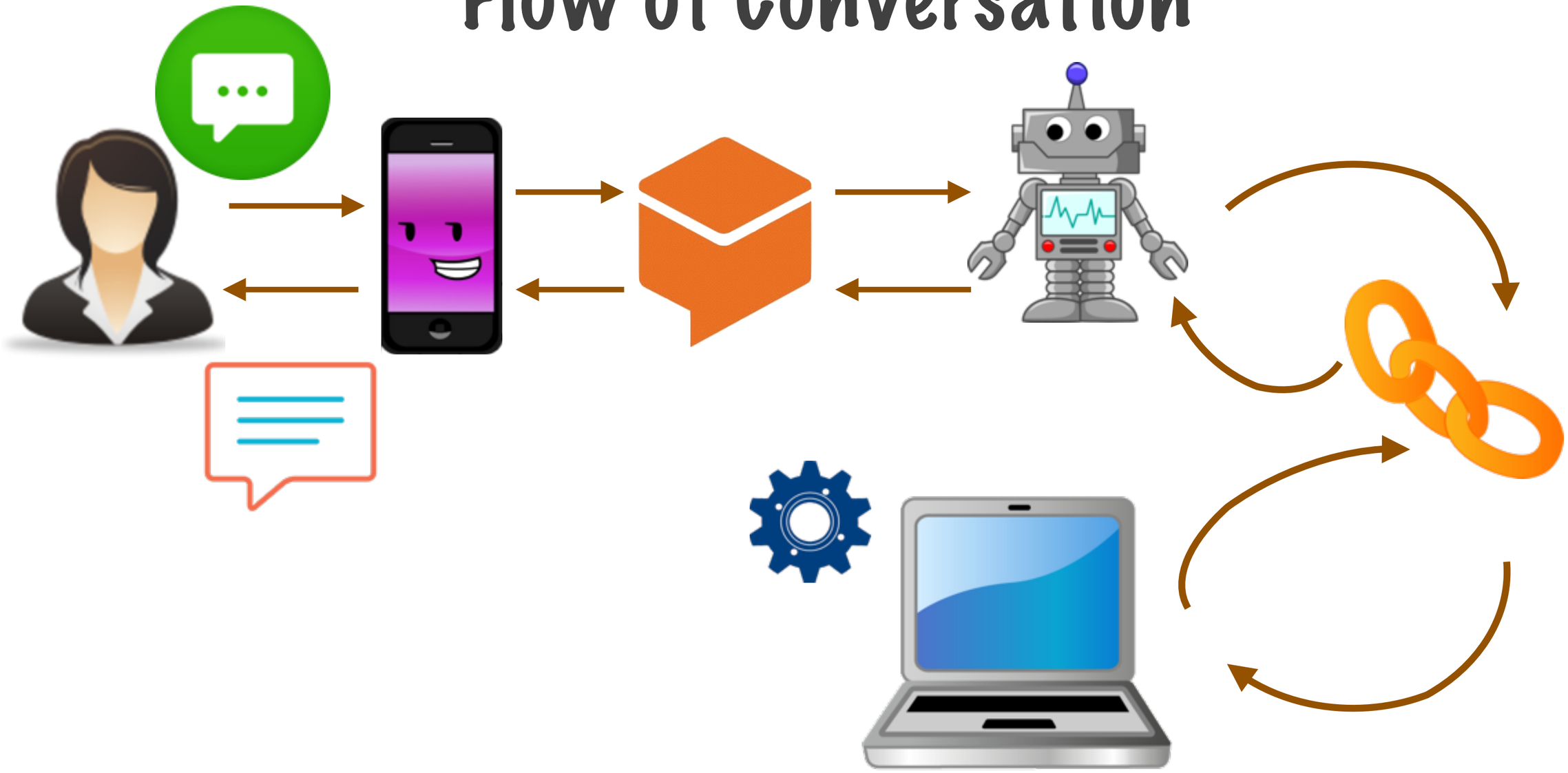
Develop in 16 programming languages

SDKs to work with web apps, mobile apps and wearables

Integrates with 14 major chat platforms such as Slack, Cortana, Alexa, Facebook etc

The Big Picture

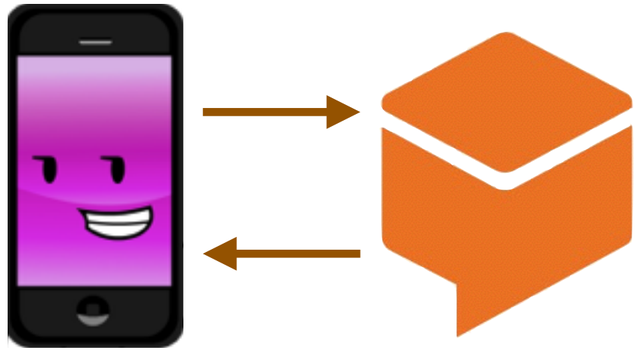
Flow of Conversation



User Expressions

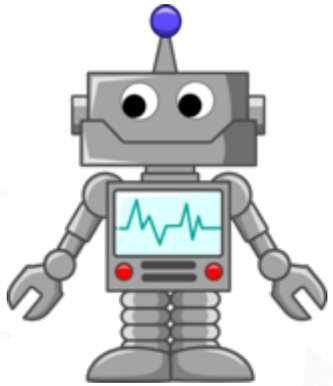
Conversations snippets that a user might use to ask the bot questions

Dialogflow Integrated with Apps



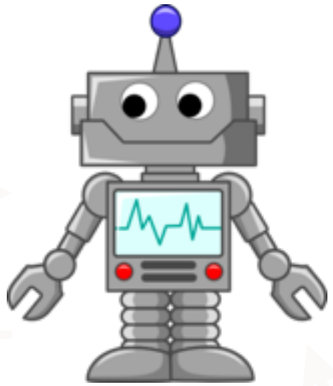
Slack, Kik, Viber, Twilio, Skype,
Google Assistant

Agent



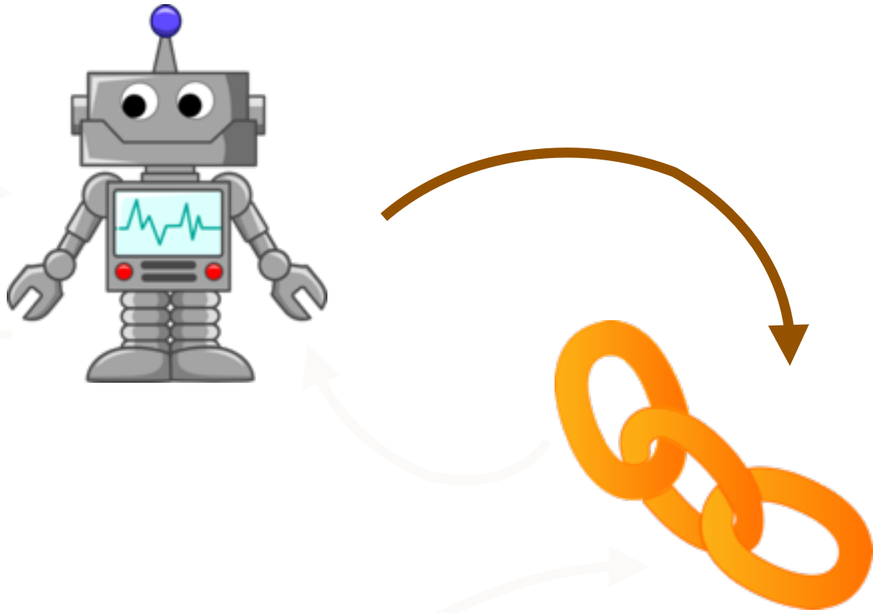
A module which incorporates Natural Language Processing to understand what the user meant

Agent



Transforms user requests to actionable data

Intent



Maps user requests to an intent

Intent

The intent determines action taken by code

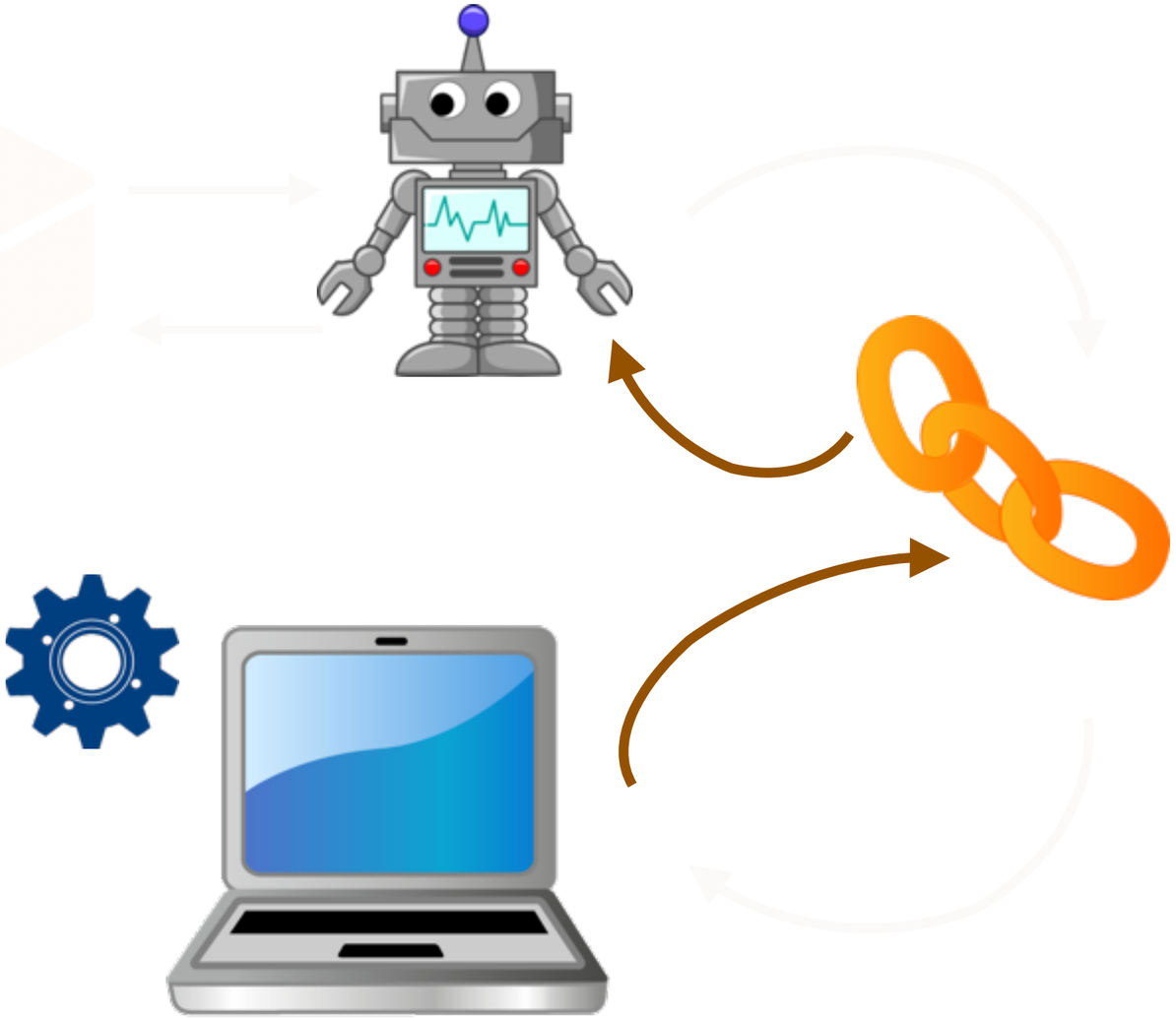
Fulfillment

The code executes to fulfill the intent of the user

Response

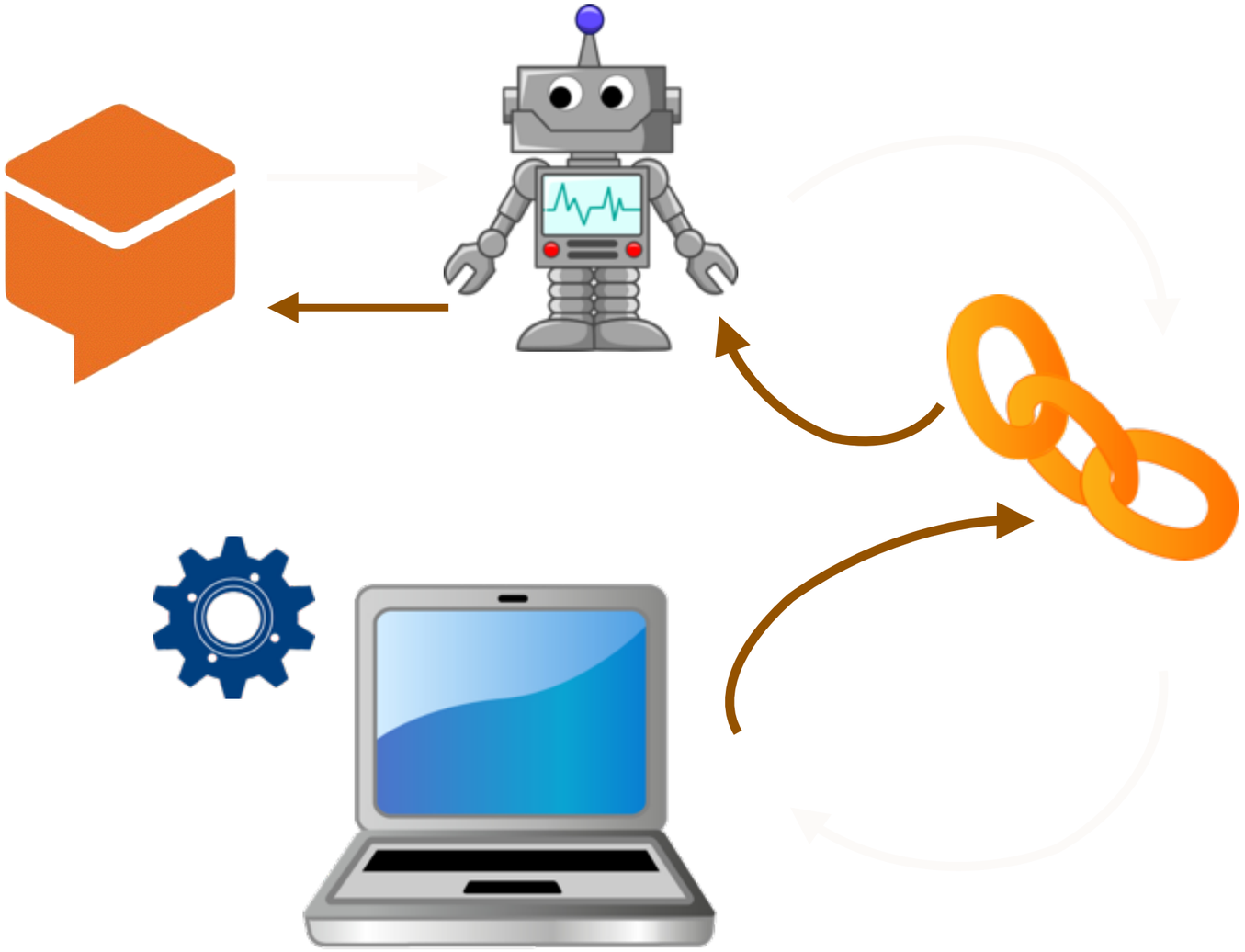
The response in the form of a text message is sent back to the user

Response



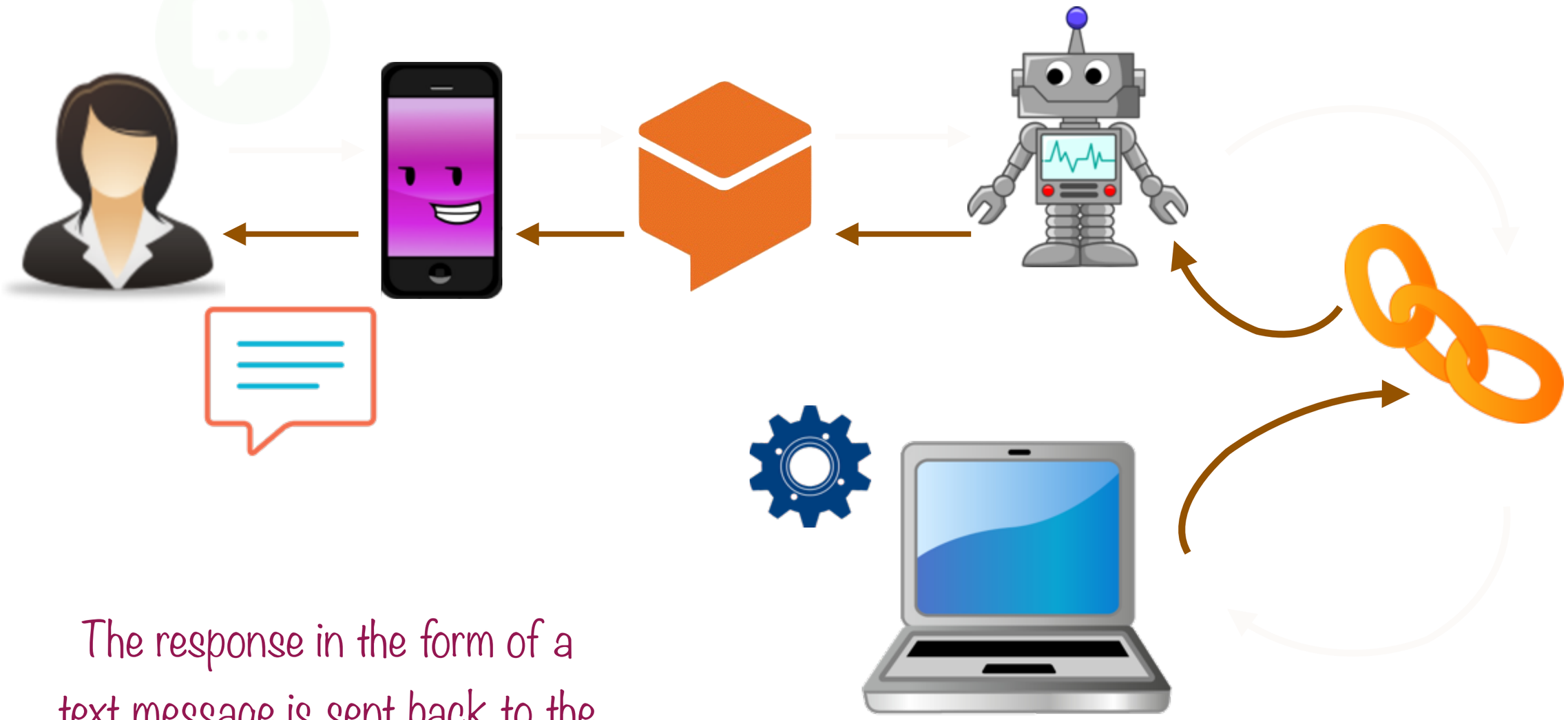
The response in the form of a text message is sent back to the user

Response



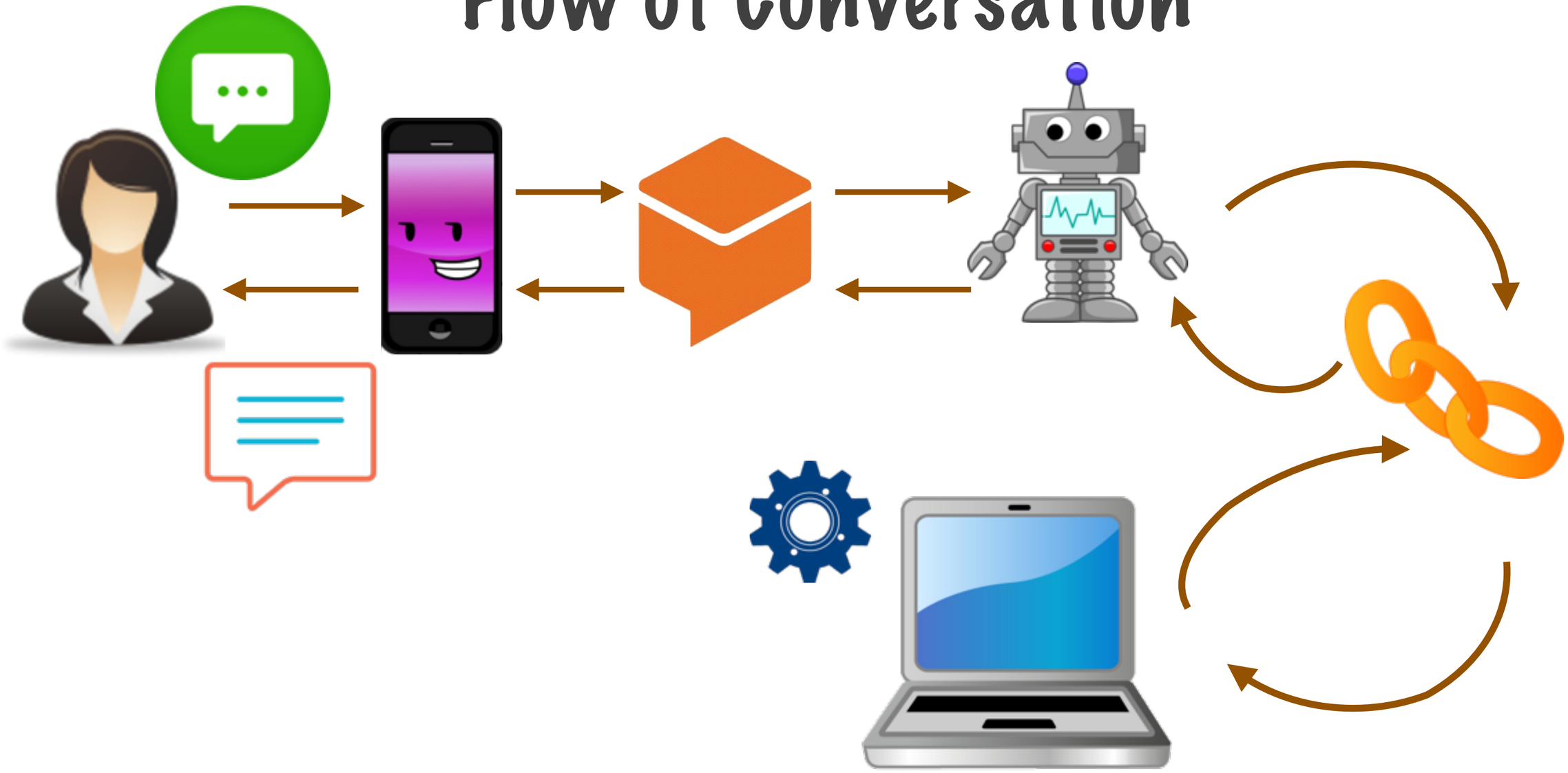
The response in the form of a text message is sent back to the user

Response

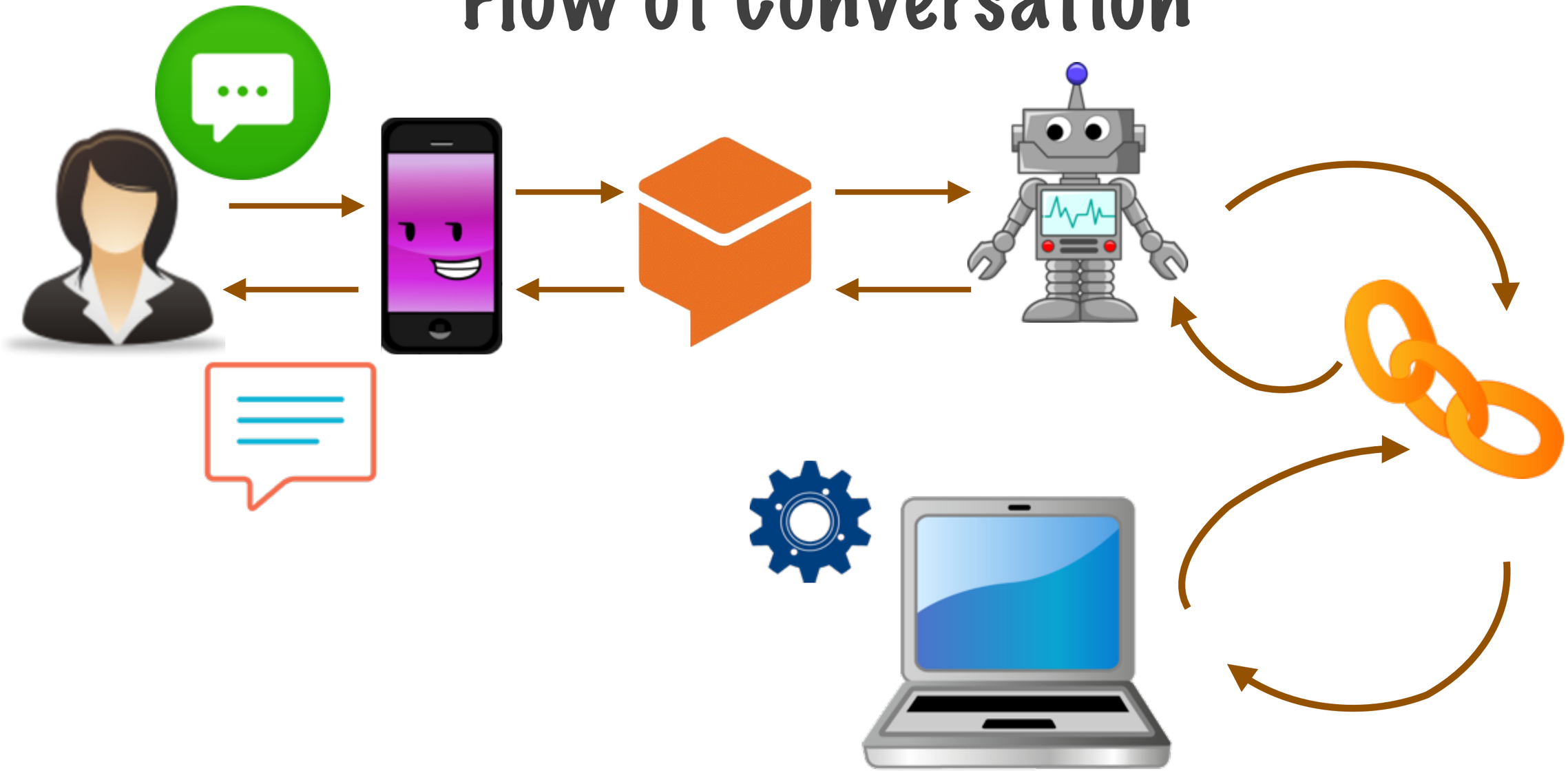


The response in the form of a text message is sent back to the user

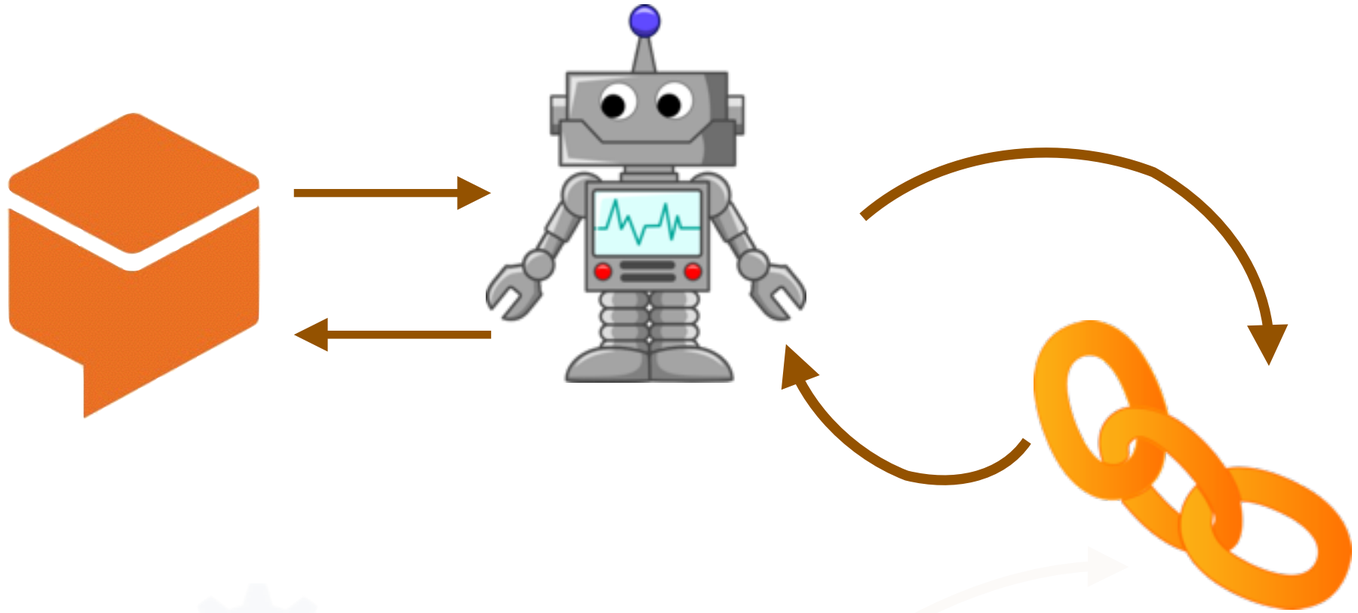
Flow of Conversation



Flow of Conversation

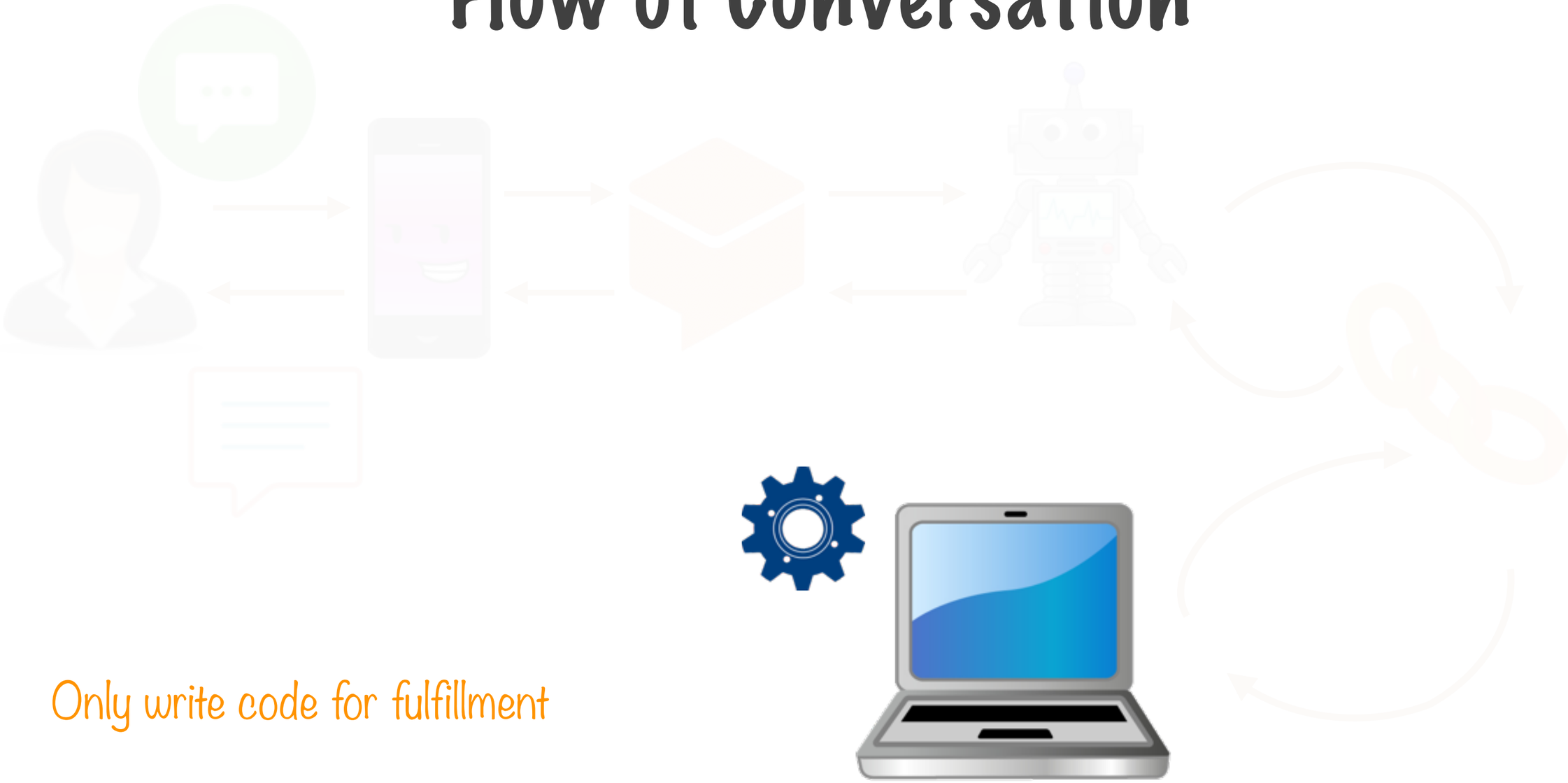


Flow of Conversation



Simple intuitive UI to configure the agents

Flow of Conversation



Only write code for fulfillment

Using the Building Blocks of Chatbots

Building a chatbot using DialogFlow

Create Agent

Custom or pre-existing sample

TripPlanner

Define Entities

Entities are user parameters

sedan or hatchback? suite or single?

Specify Intents

Intents are actions user wishes to accomplish

Welcome, Fallback, BookCars, BookRooms

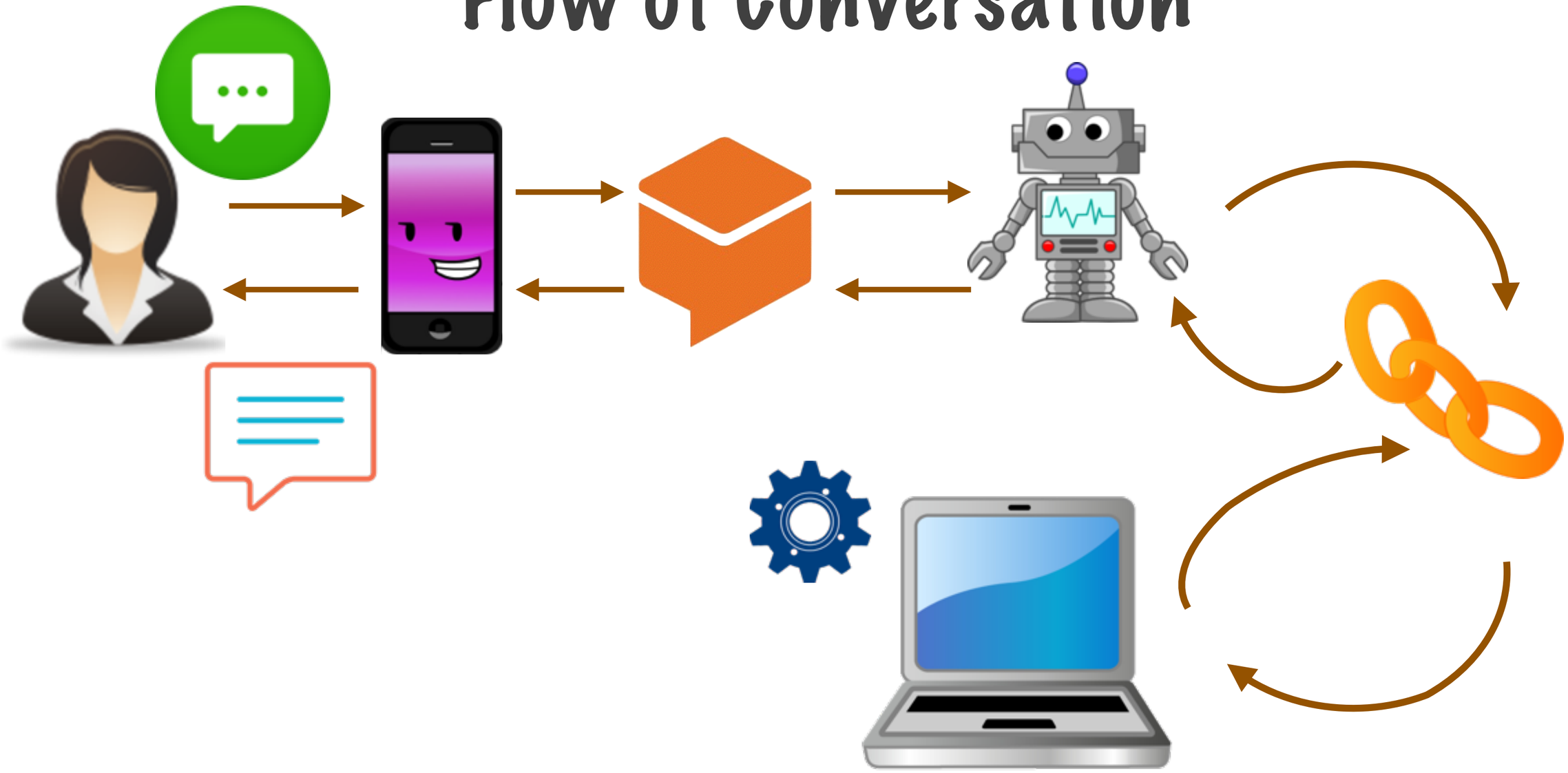
User says

Training data for NLP ML models

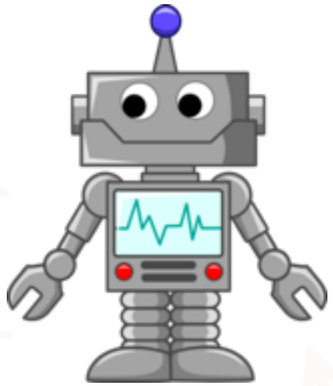
“Hey! Get me a sedan for tomorrow”

Agents

Flow of Conversation

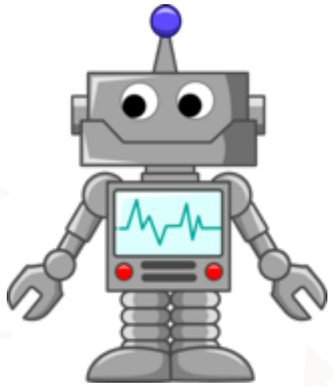


Agent



A module which incorporates Natural Language Processing to understand what the user meant

Agent



Transforms user requests to actionable data

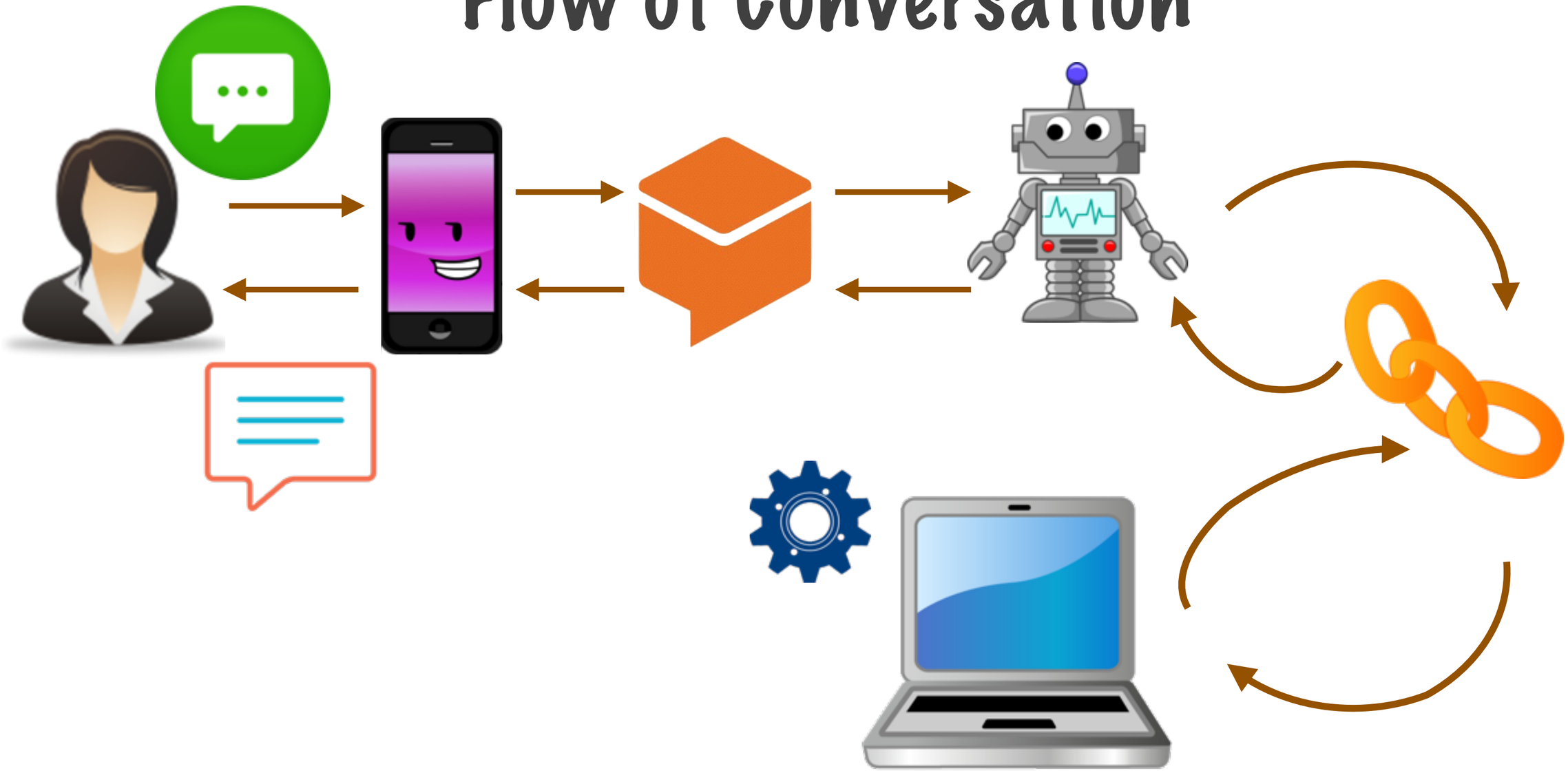
Agents manage conversation flow with the user using intents, entities, contexts and other building blocks

Demo

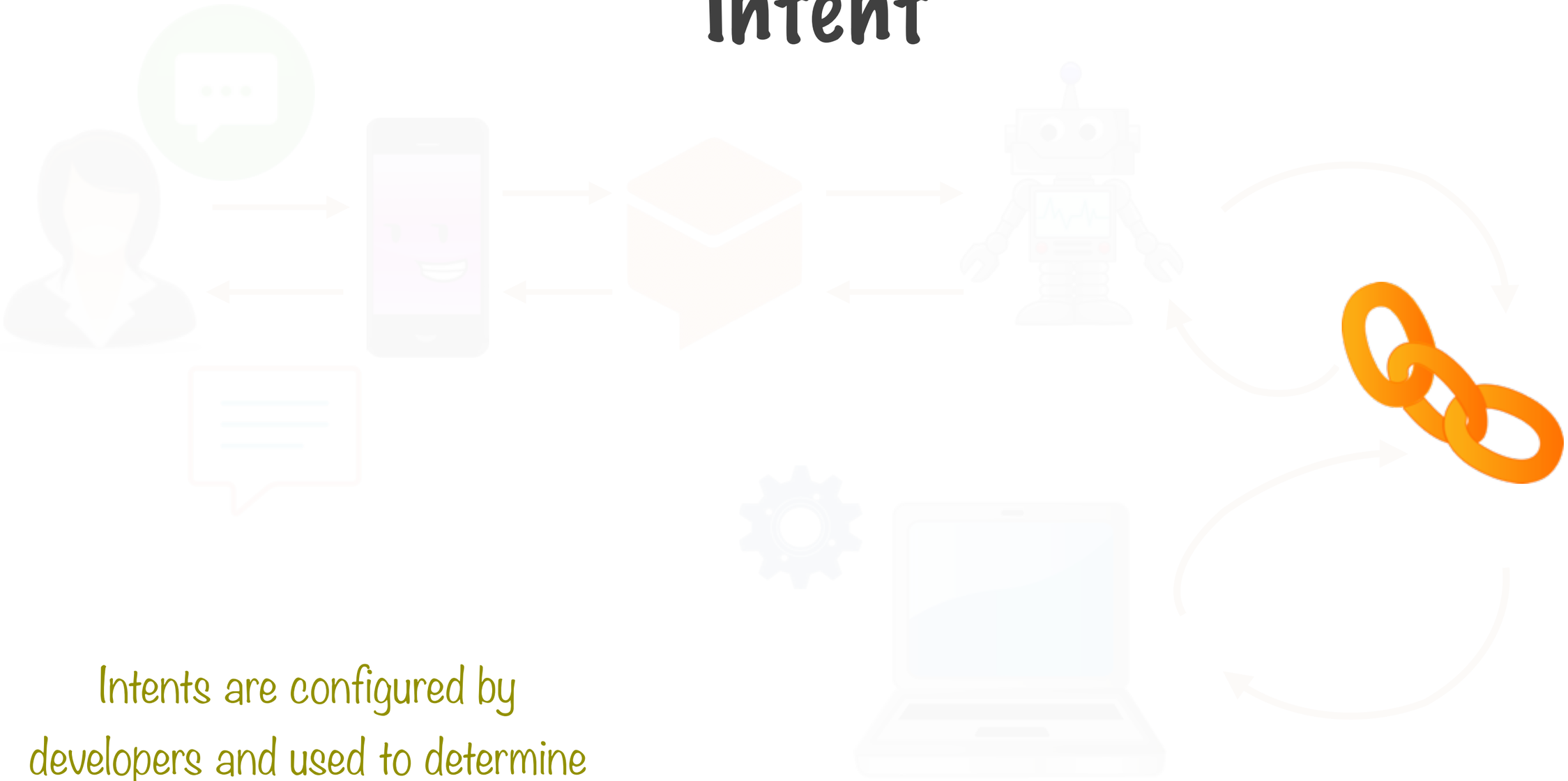
Build an agent which helps plan business trips

Intents

Flow of Conversation



Intent



Intents are configured by developers and used to determine the action taken by code

Intent maps what a user says and what your software should execute

Default Intents

Welcome

Greet the user, exchange pleasantries (partially configured)

Fallback

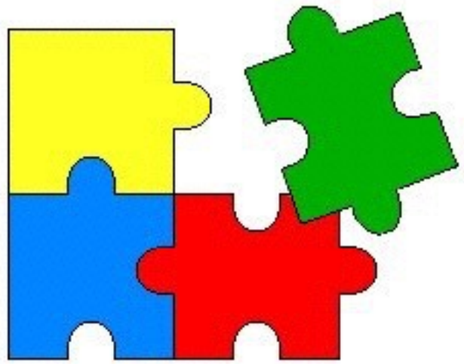
Default or fall through intent when no others match (fully configured)

Intent Sections

User says

Action

Response



Context

Custom Intents

BookRooms

BookCars

Intents

Manage Conversation flow in DialogFlow chatbots

Contexts & Follow-ups

Contexts represent the current context of a user's request.

"Get me more of that?"

Non-Linear Dialogs

May have several branches, depending on users' answers

A customer satisfaction survey for a hotel

Linear Dialogs

Collect the information necessary to complete the required action.

Slot filling using required parameters and prompts

A Conversation

Book a room for me please

Which city do you plan to visit?

Bangalore

What date should I book for?

This Friday

Any room preference?

A
double room

Slots to be Filled

Book a room for me please

Which city do you plan to visit?

Bangalore

What date should I book for?

This Friday

Any room preference?

A double room

Parameter values

Bangalore

This Friday

A
double room

Entities are used to extract parameter values from user queries

Entities

Book a room for me please

Which city do you plan to visit?

Bangalore

What date should I book for?

This Friday

Any room preference?

A double room

Entities

city

date

room

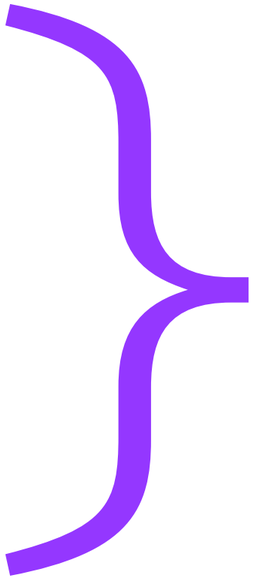
All the information we need in a user query will have a corresponding entity

Type of Data Expected

city

date

room



System entities

Developer entity

Entities

city

date

room

User entities are those that can be defined at a session level i.e. a user's playlist

BookRooms Intent

City

Date

Room type

BookCars Intent

City

Date

Car type

A Conversation

Book a room for me please

Which city do you plan to visit?

Bangalore

What date should I book for?

This Friday

Any room preference?

A
double room

Prompts

Book a room for me please

Which city do you plan to visit?

Bangalore

What date should I book for?

This Friday

Any room preference?

A
double room

Linear Dialogs

A Conversation

Book a room for me please

Which city do you plan to visit?

Bangalore

What date should I book for?

This Friday

Any room preference?

A
double room

A Conversation

This dialog is entirely configured within a single intent

Book a room for me please

Which city do you plan to visit?

Bangalore

What date should I book for?

This Friday

Any room preference?

A
double room

Collect information required to complete the action

May invoke one or more intents

A Conversation

Book a queen room for me in Bangalore tomorrow

Done.
Room booked!

Book a car too

…..

A Conversation

Book a queen room for me in Bangalore tomorrow

BookRooms intent

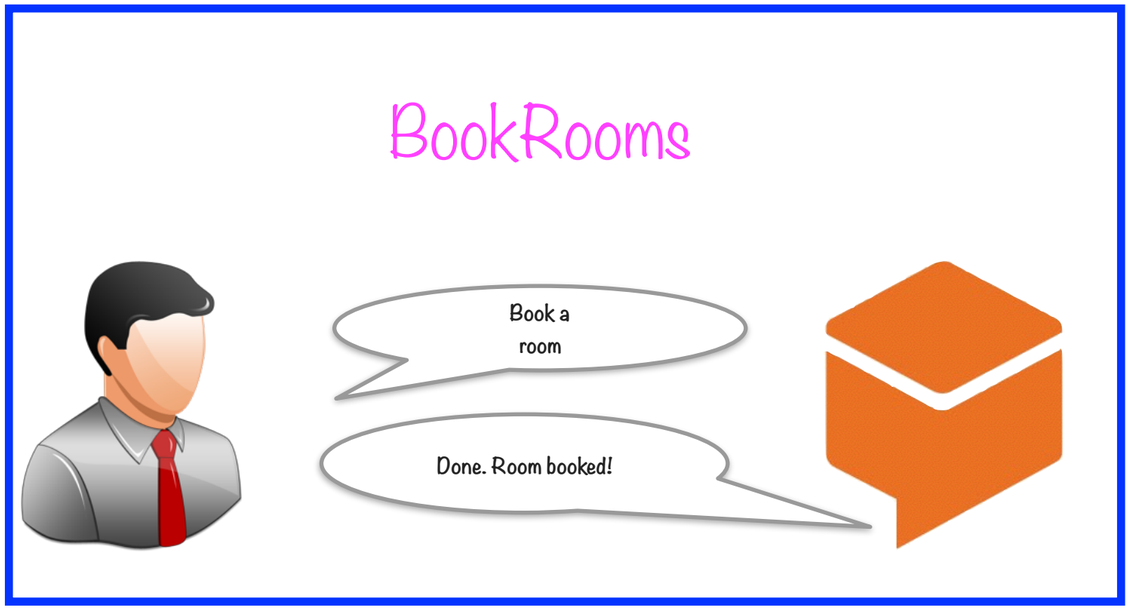
Done.
Room booked!

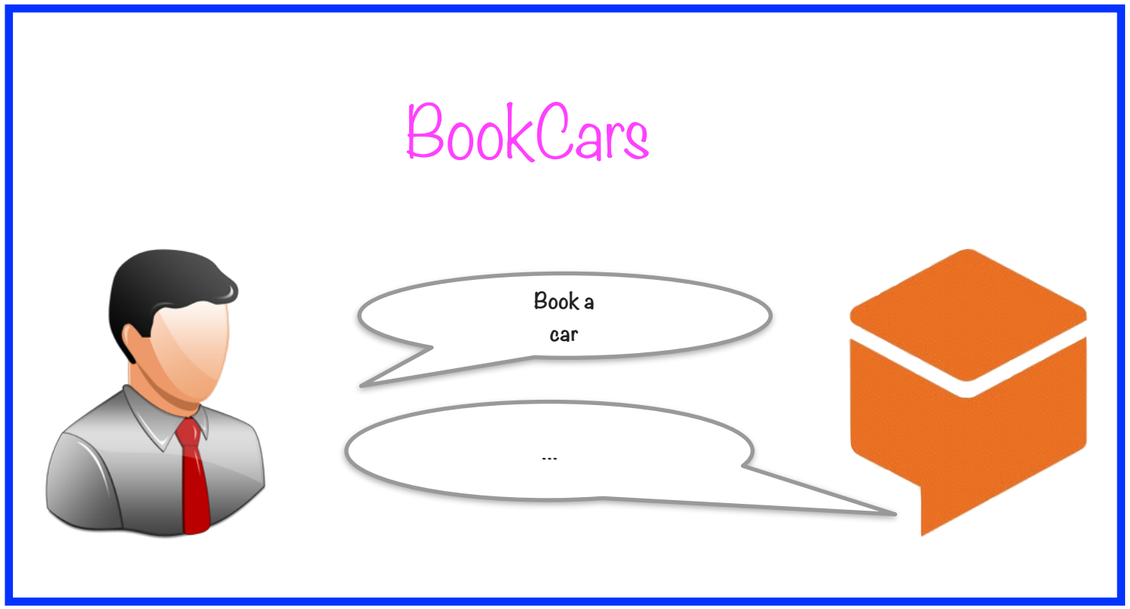
Book a car too

BookCars intent

.....

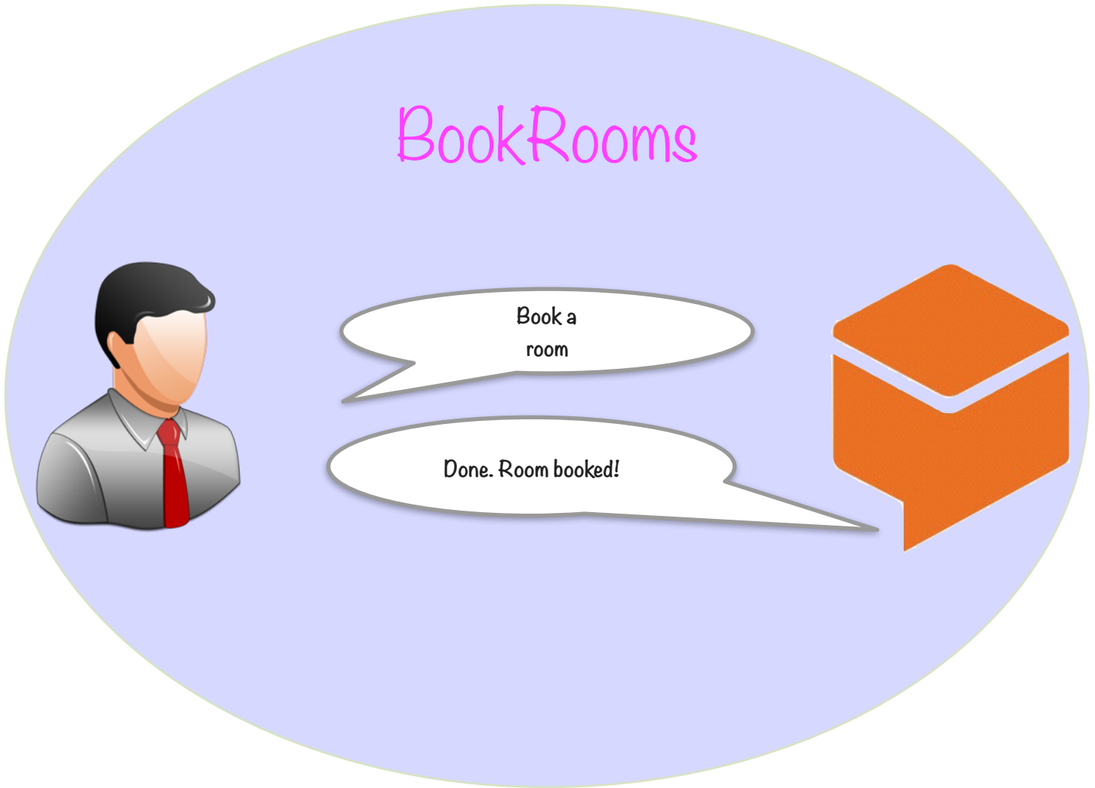
Context

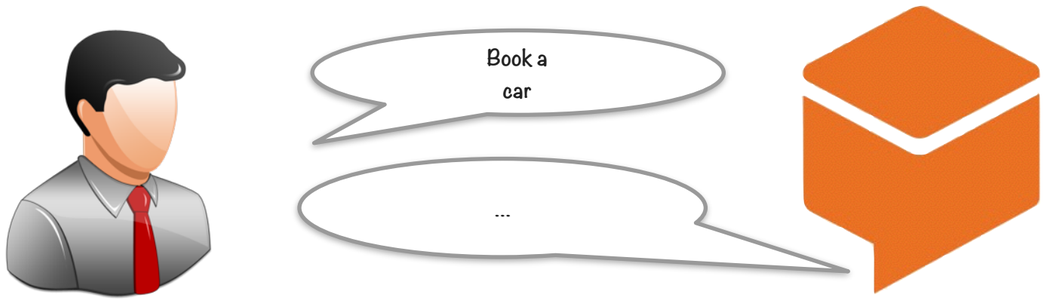




These are not 2 separate conversations - the car booking is an extension of the rooms conversation

Context

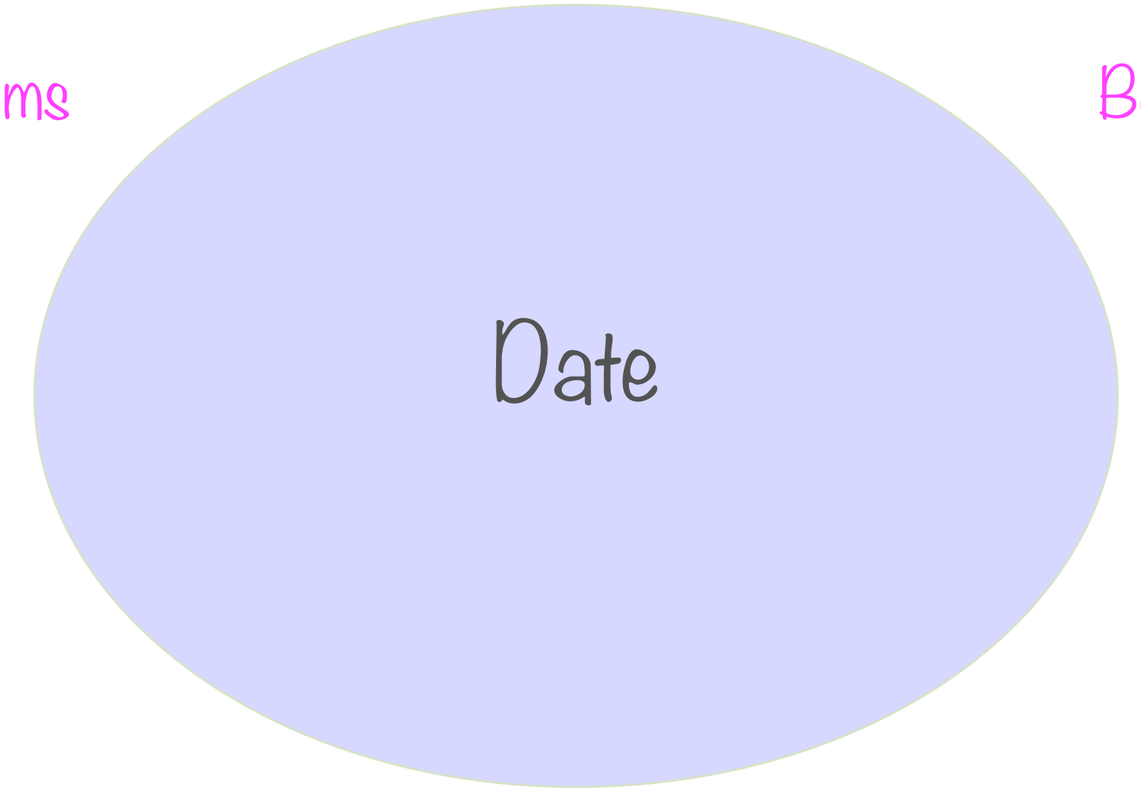




Information relevant to the second conversation needs to flow through from the first

Context

BookRooms



BookCars

Non-linear Dialog

Non-linear dialogs branch to the next intent based on responses from the previous intent

Customer Satisfaction Survey

Would you like to offer feedback on the hotel?

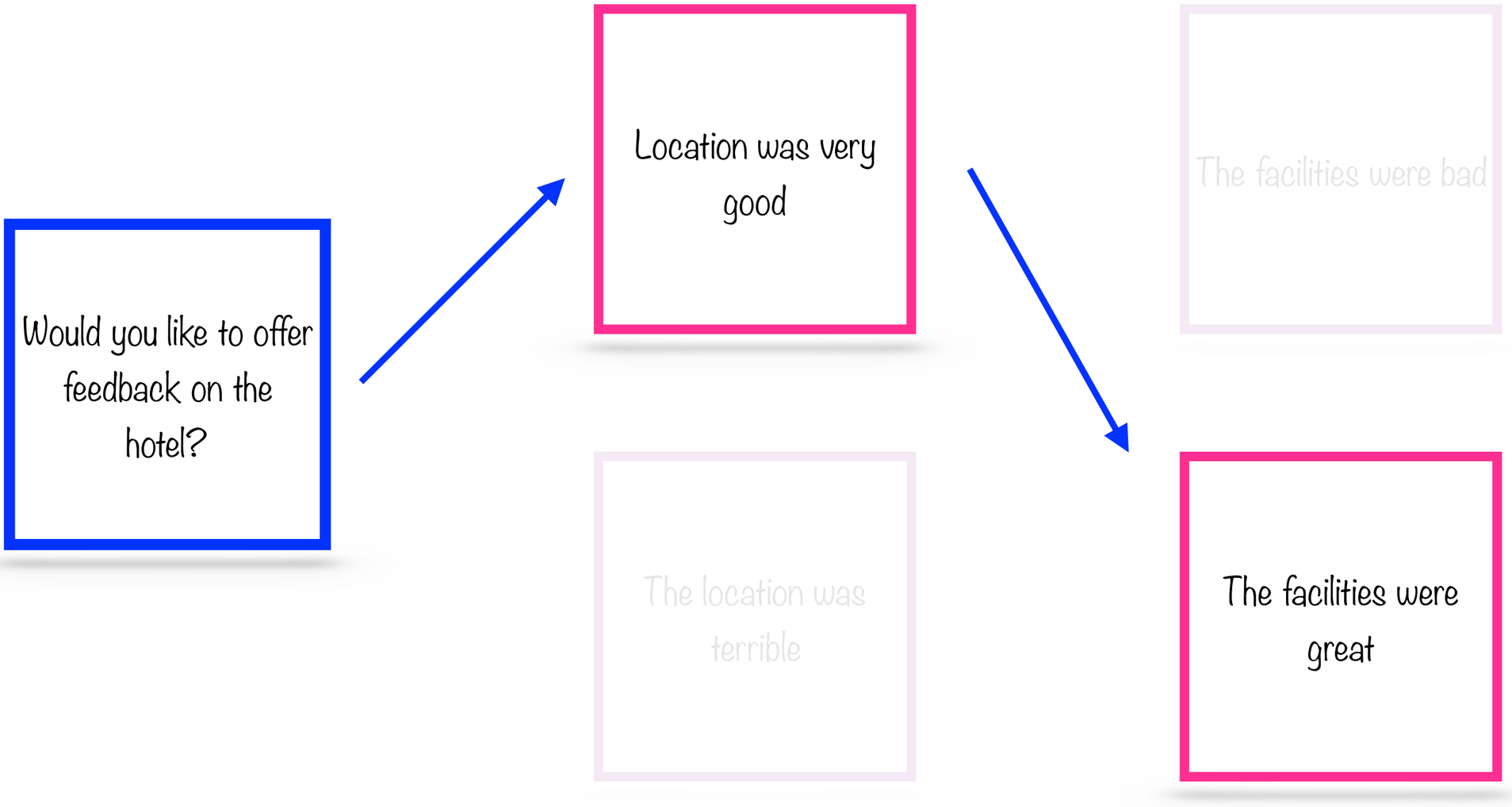
Location was very good

The facilities were bad

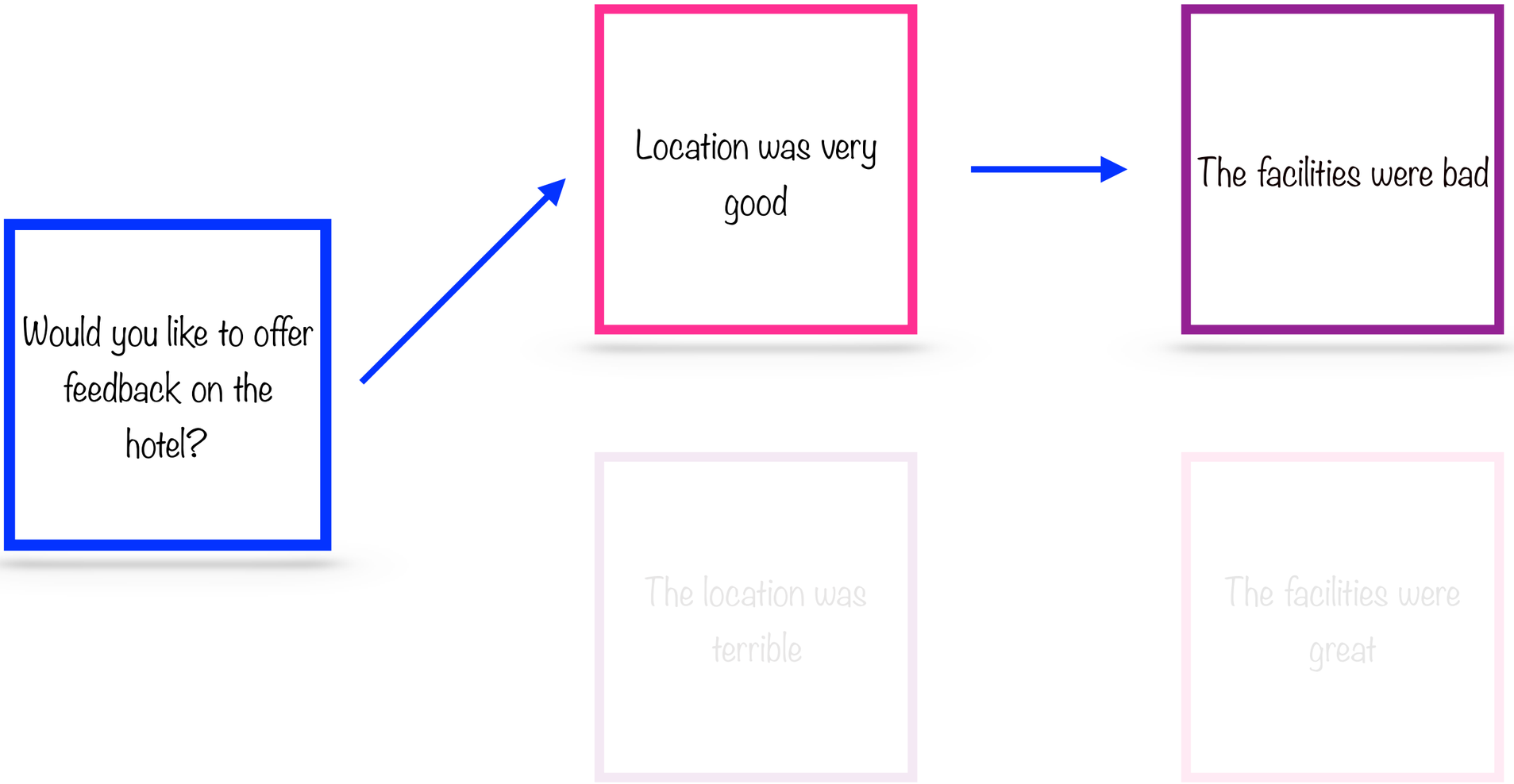
The location was terrible

The facilities were great

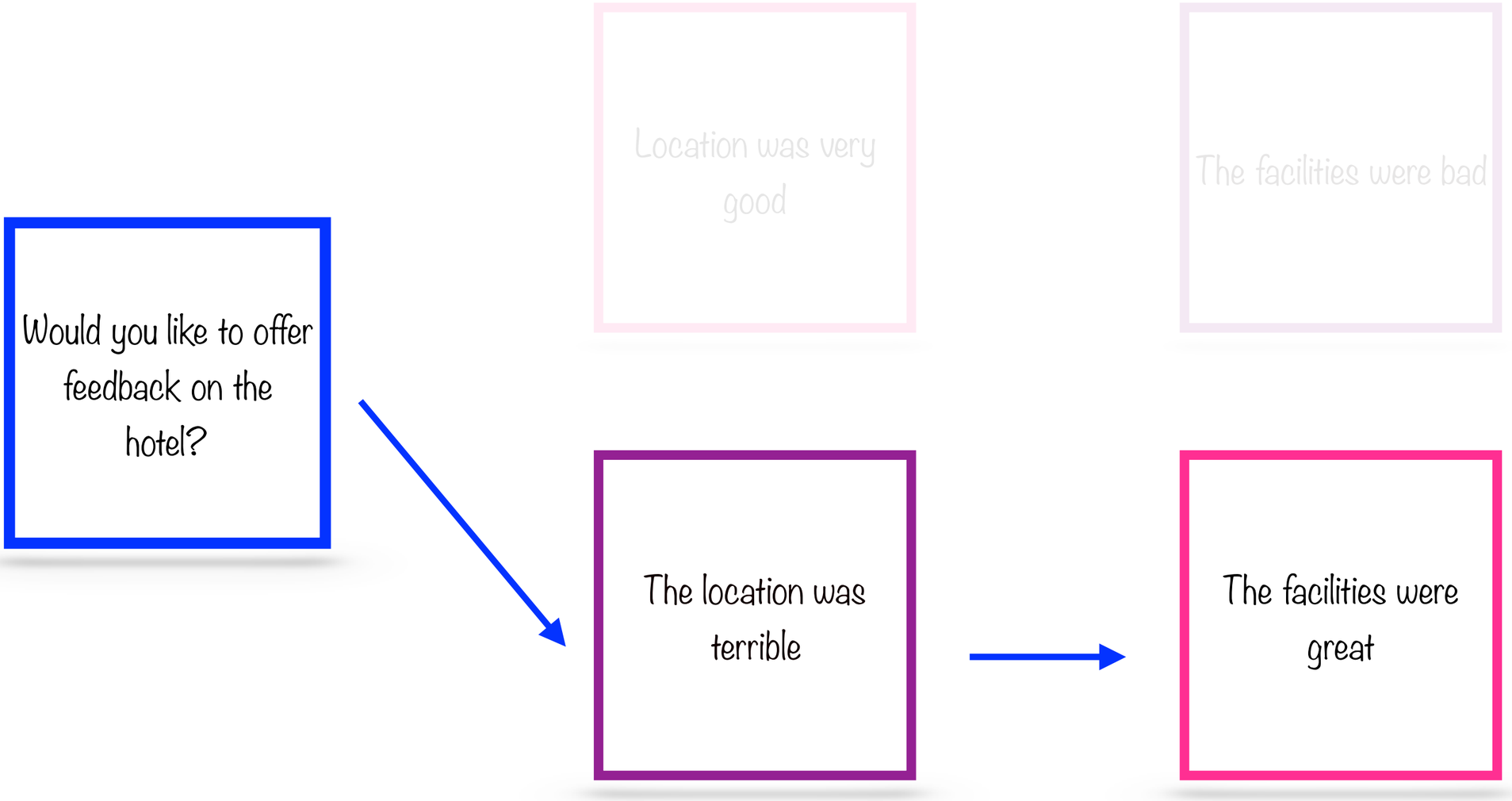
Customer Satisfaction Survey



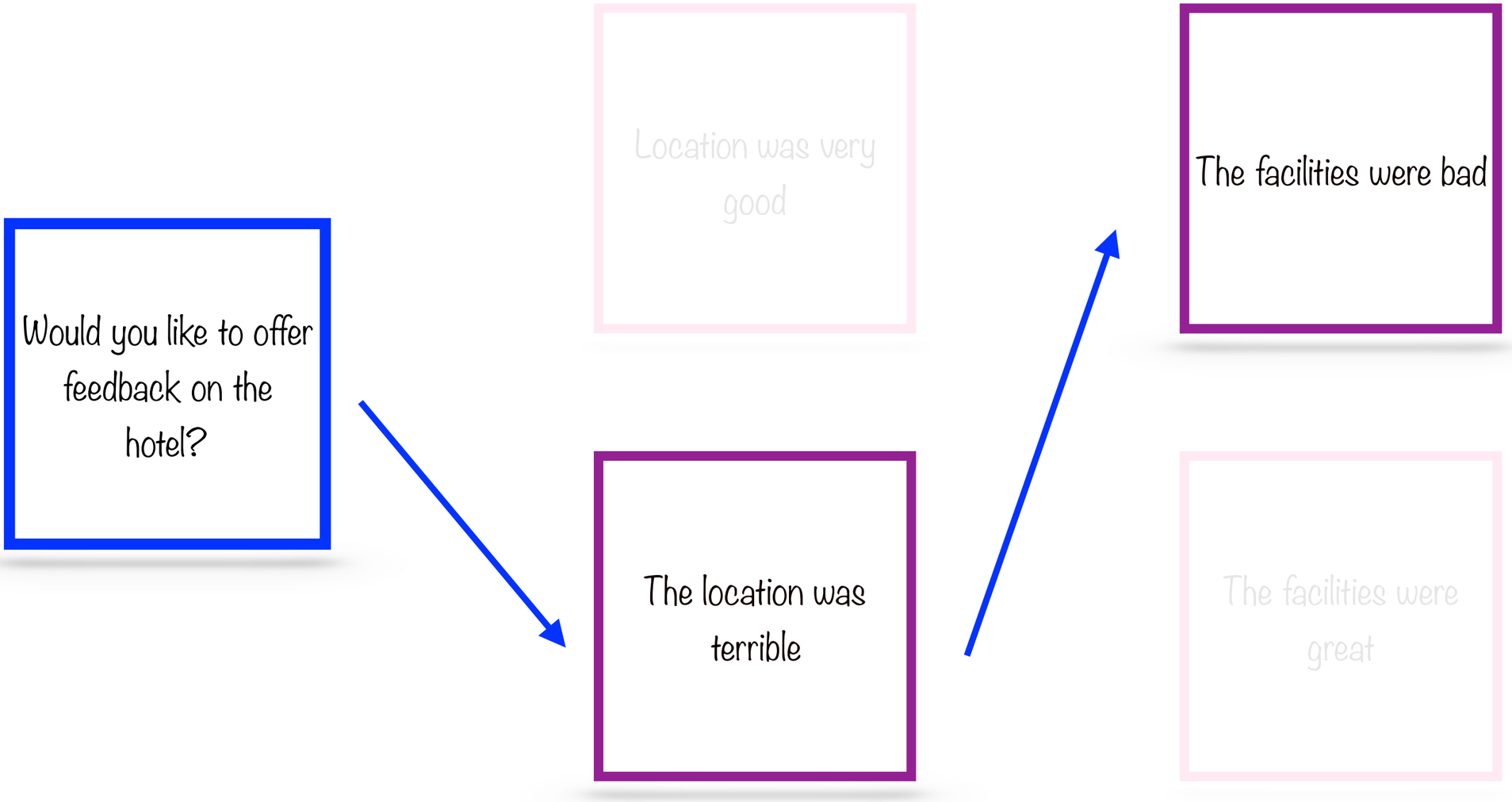
Customer Satisfaction Survey



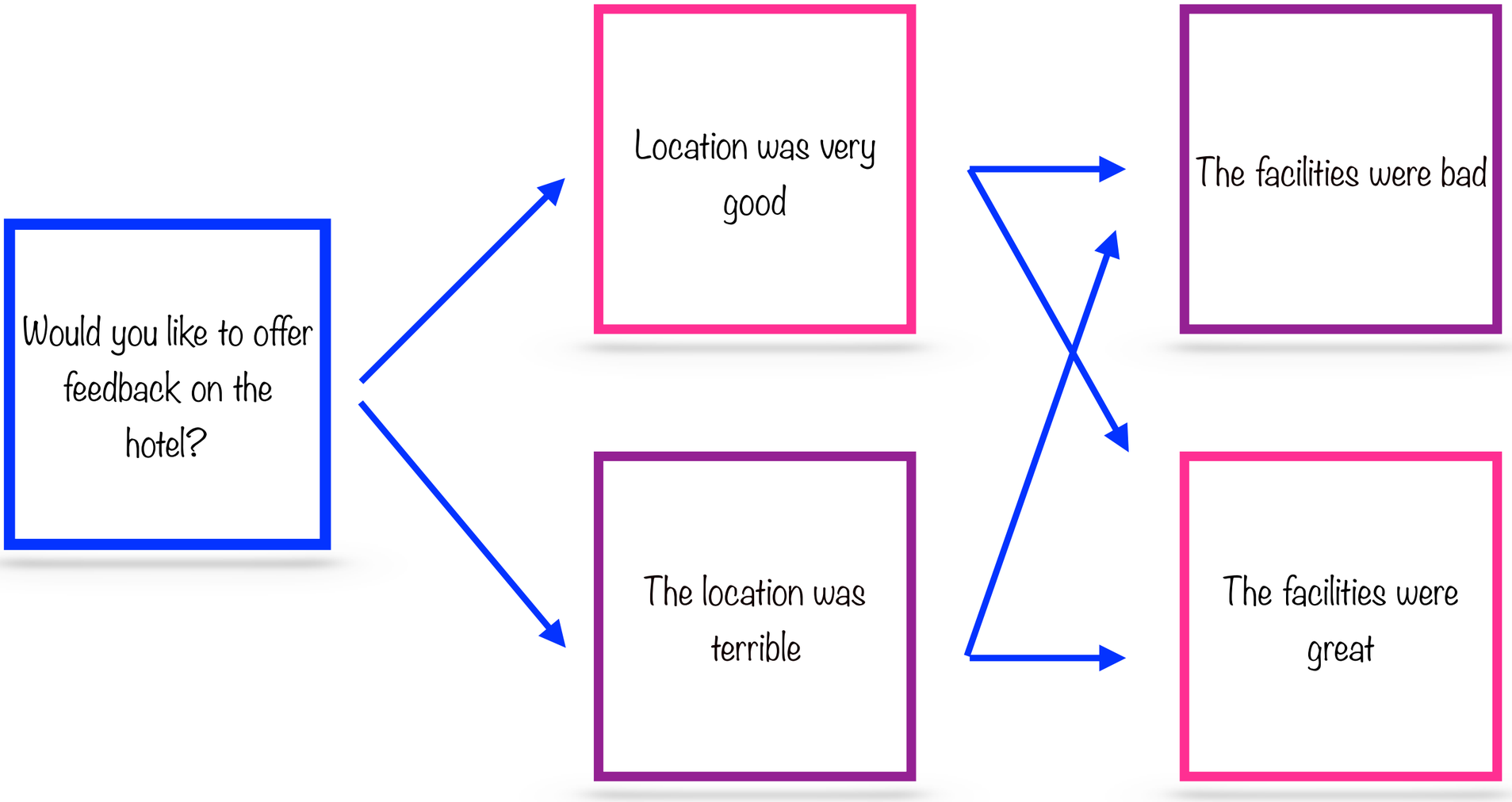
Customer Satisfaction Survey



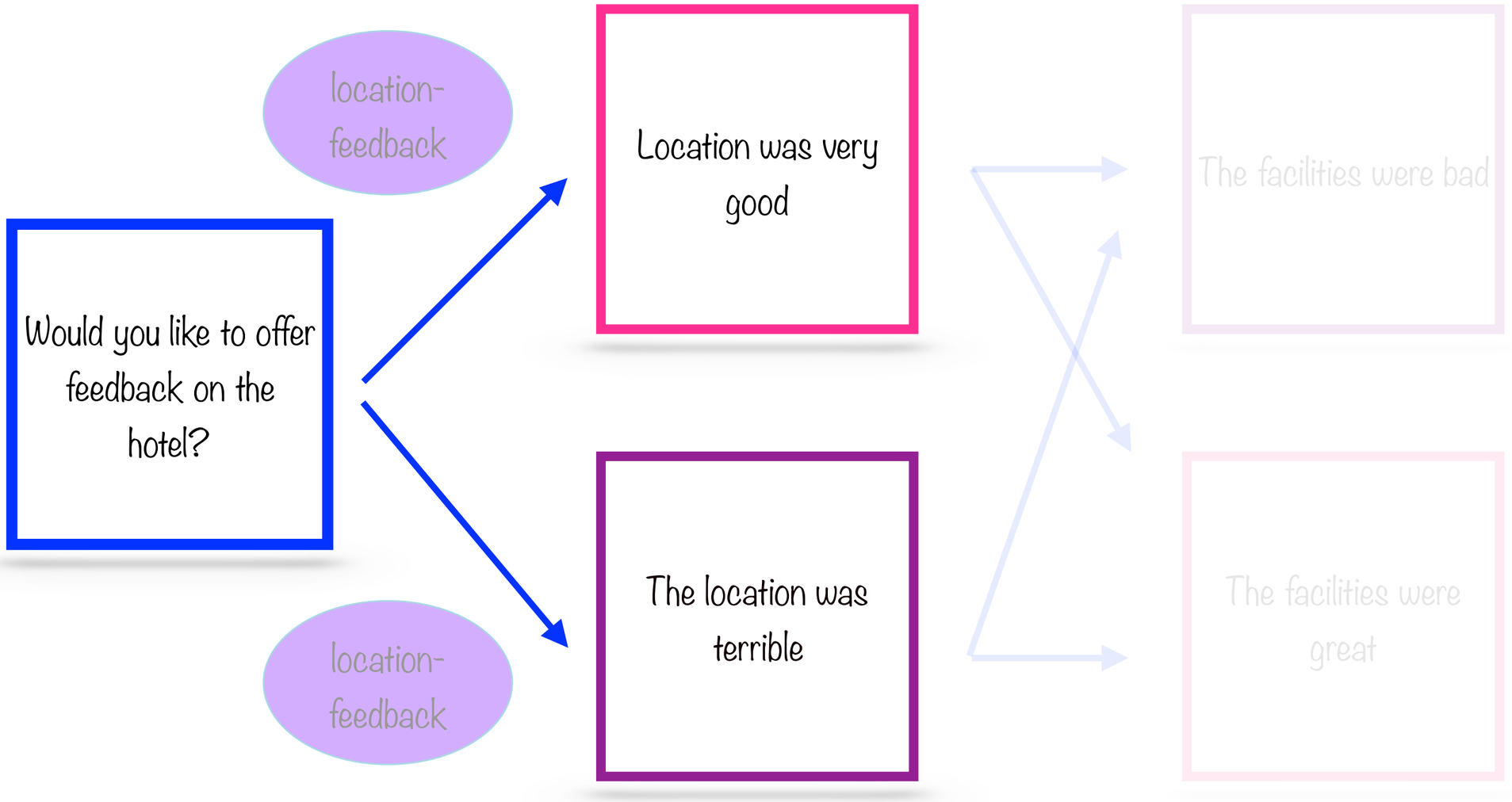
Customer Satisfaction Survey



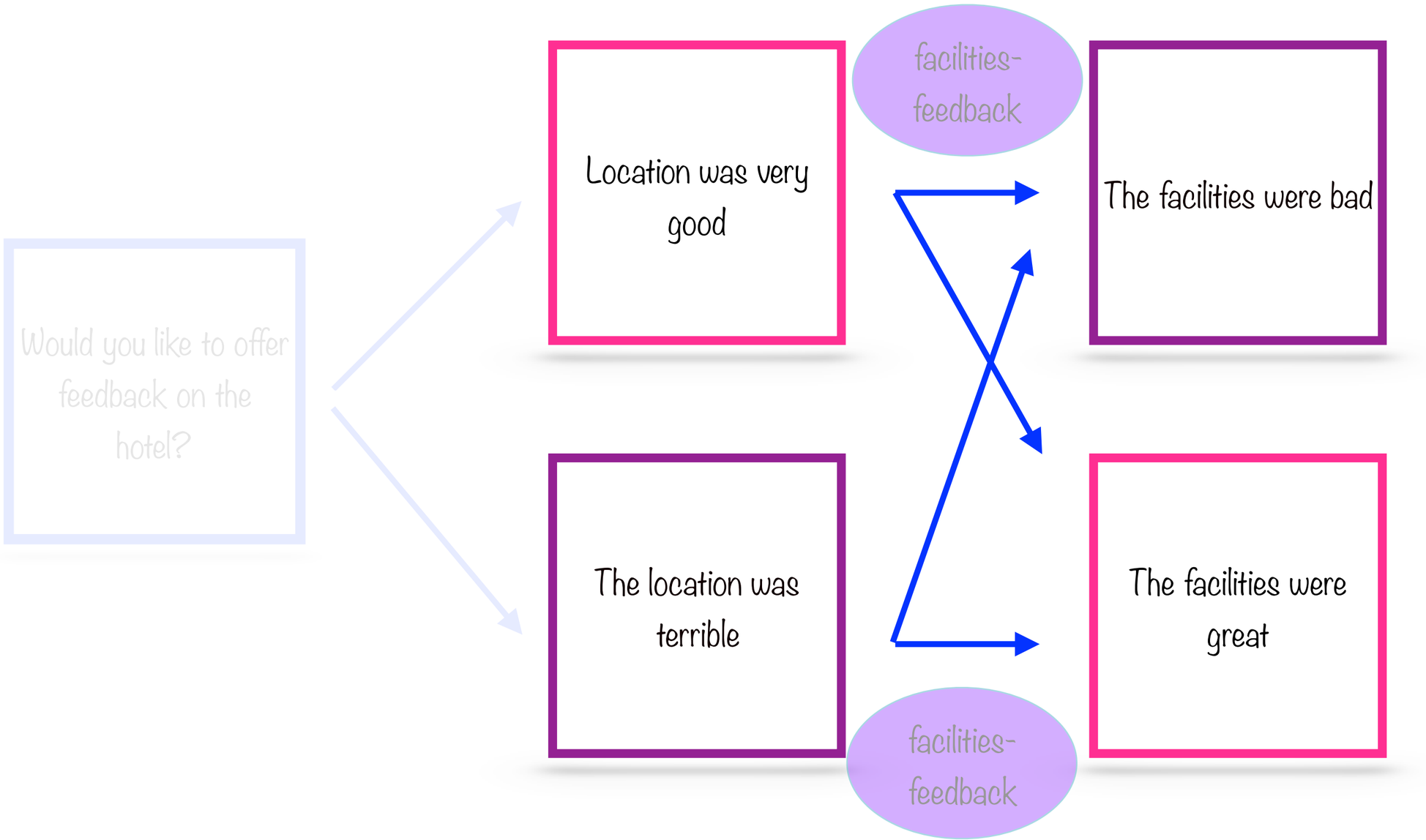
Customer Satisfaction Survey



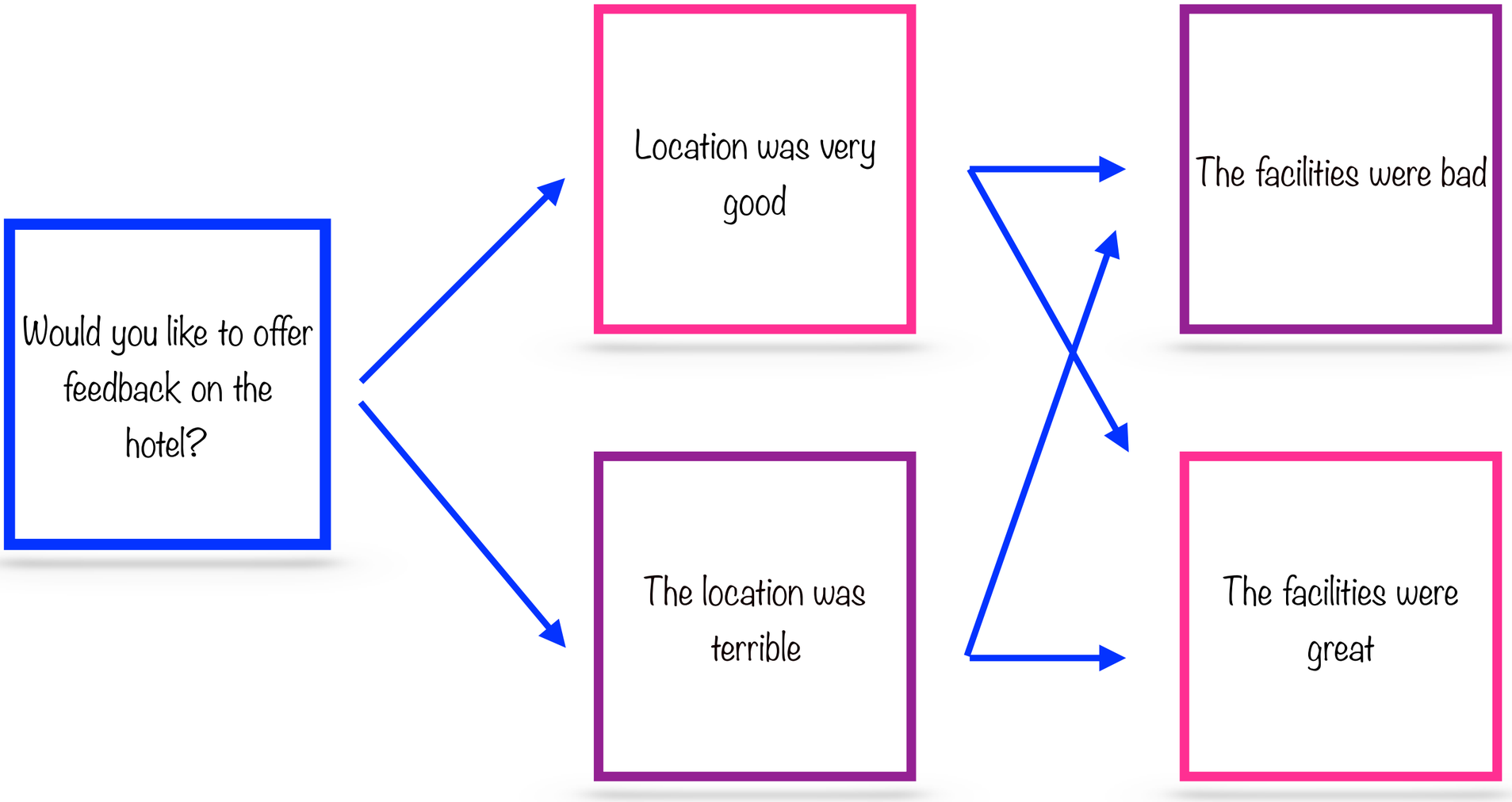
Customer Satisfaction Survey



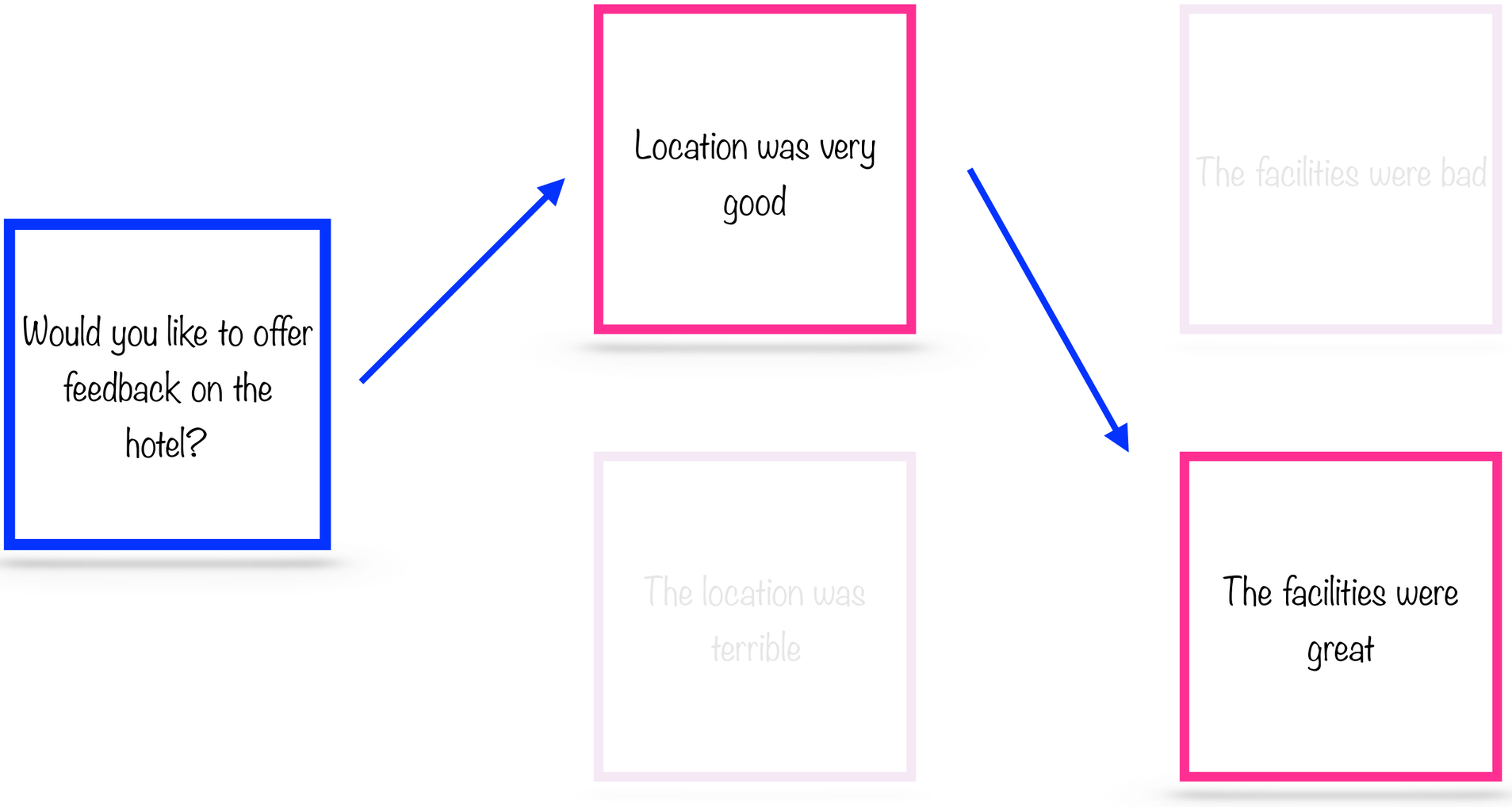
Customer Satisfaction Survey



Customer Satisfaction Survey



Customer Satisfaction Survey



Fulfillment and Deployment using External APIs

Fulfilling Intents using External APIs

In DialogFlow: Build a Bot

Set up intents, entities, contexts

Already done

In Github: Create a repository

Upload webhook

Create procfile & requirements.txt

In DialogFlow: Link Webhook to Intent

Enable Webhooks

Define fulfillment model in intent, test in console.

In Local Machine: Create a webhook

Build a flask app to fulfill intents

Detect intent, Extract parameters from intent request JSON, Invoke Weather API, Construct Response

In Heroku: Deploy Webapp

Connect to GitHub

Set Buildpack, Build branch, Deploy and get address

Integrate with Slack!

Can chat with the bot in Slack.

The Slack-DialogFlow Handshake

In Slack: Create a Slack app with a Bot user

Get credentials for OAuth

Slack app with Bot user to chat with

In DialogFlow: Activate Slack Integration

Get Event Request and OAuth URL

Need to paste in Slack credentials

In Slack: Link DialogFlow URLs

Event Requests and OAuth URLs

Also enable event subscription

In Slack: Add app to workspace

Manage distributions of Slack app

Bot comes online in Slack

Use the app!

Can chat with the Bot