Build a Watson AI Chatbot from Db2

Sanjula Ganepola, IBM
Software Developer – IBM i App Dev & AI Toolchain
Sanjula.Ganepola@ibm.com

© Copyright IBM Corporation 2025

Agenda

IBM i
continuous innovation
continuous integration

- Overview of Watsonx Assistant
- Planning Your Assistant
- Terminology You Should Know
- Let’s Build a Chatbot
- Integrate with Db2
- Next Steps

© Copyright IBM Corporation 2024

Have you ever built a chatbot?

Choose 1:

1. Yes, with Watsonx Assistant
2. Yes, with another tool
3. No, but we want to
4. No, we don’t want to
5. No, never thought about it

© Copyright IBM Corporation 2024

Overview of Watsonx Assistant

© Copyright IBM Corporation 2024

What is Watsonx Assistant?

IBM i
continuous innovation
continuous integration

"Conversational AI solution that empowers anyone to effortlessly build generative AI Assistants that deliver frictionless self-service experiences to customers"

↓

Use Watsonx Assistant to build your own branded live chatbot

- 💻 Bring the assistant to your customers, where they are
- 🧠 Create AI-driven conversational flows
- 📑 Embed existing help content
- 🤝 Connect to your customer service teams
- 🎯 Track customer engagement and satisfaction

© Copyright IBM Corporation 2024

How Does It Work?

© Copyright IBM Corporation 2024

Planning Your Assistant

© Copyright IBM Corporation 2024

Before building an assistant…

1. Select an initial channel
   - Where will customers use your assistant?
2. Select starting domain
   - What topic domain can your assistant unify and automate?
3. Outline frequent topics
   - What are the most frequent topics which are mostly informational in nature?
4. Collect content sources
   - What help content is available to customers today?
5. Plan handoff strategy
   - How should customers be routed to human agents?

© Copyright IBM Corporation 2024

Terminology You Should Know

© Copyright IBM Corporation 2024

What are Actions and Phrases?

- An *action* is a problem or a task that your customer wants to resolve
- *Phrases* are what customers type or say to start an *action*
- Add multiple *phrases* to better train your assistant to recognize what customers want

© Copyright IBM Corporation 2024

What are Steps and Conditions?

- A *step* is a back-and-forth interaction between your assistant and your customer
- *Conditions* are requirements which must be met for the step to be triggered

© Copyright IBM Corporation 2024

Let’s Build a Chatbot

© Copyright IBM Corporation 2024

Demo Example – ConnectMe Inc.

ConnectMe Inc. is a telecommunications company with cable, internet, and phone services

Goals

- Streamline bill payment services
- Update account data in real-time
- Provide 24/7 support

© Copyright IBM Corporation 2024

Create Watsonx Assistant Instance

IBM i
continuous innovation
continuous integration

IBM Cloud | Search resources and products... | Catalog | Manage | Sanjula Ganepola's Account

Catalog /

watsonx Assistant

IBM watsonx Assistant lets you build conversational interfaces into any application, device, or channel.

Create | About

Type
Service

Provider
IBM

Last updated
10/18/2024

Category
AI / Machine Learning

Compliance
EU Supported
HIPAA Enabled
IAM-enabled

Location
Sydney
Frankfurt
London
Tokyo
Washington DC
Dallas

Related links
API docs
Docs
Terms

Select a location

Washington DC (us-east)

30 DAY TRIAL!

Select a pricing plan

Displayed prices do not include tax. Monthly prices shown are for country or location: United States

Plan	Features and capabilities	Pricing
Trial	**30 Day trial period (no credit card required)** Up to 5,000 MAUs Up to 50,000 messages per month --- Features --- - Everything available in Plus - A low risk way to test paid features - Export or analyze chat logs anywhere you want by connecting to webhooks and API endpoints --- Limits --- Actions: - 10 assistants per instance - Up to 100 actions - 5 custom extensions per assistant - 7 days of usage analytics - Session inactivity timeout 5 minutes - Services are deleted after 30 days of inactivity Dialog: - Same as Lite When your 30 day trial is over you can upgrade to Plus to continue using these features or export your content and create a lite instance to work off of. **Lite plan services are deleted after 30 days of inactivity.**	Free
Lite	**Everything you need to get started, free for as long as you need it** Up to 1,000 unique monthly active users (MAUs) chatting with your assistant Up to 10,000 messages per month --- Features --- - World-class conversational AI	Free

Summary

watsonx Assistant Free
Location: Washington DC
Plan: Trial
Service name: watsonx Assistant-o7
Resource group: Default

☐ I have read and agree to the following license agreements:
Terms

Create

Add to estimate

© Copyright IBM Corporation 2024

Create Watsonx Assistant

IBM i
continuous innovation
continuous integration

Video Demo: https://www.youtube.com/watch?v=JTcrllB82QE

Create a new assistant

Assistant name

ConnectMe

Your assistant name will be kept internally and not visible to your customers

Description (optional) 57/128

Chatbot assistant focused on helping ConnectMe customers.

Assistant language

English (US)

This is the language your assistant will speak.

Cancel | Create assistant

© Copyright IBM Corporation 2024

Customize Web Chat

IBM i
continuous innovation
continuous integration

Web chat Draft

Close | Save and exit

Style | Launcher | Home screen | Live agent | Suggestions | Security | Embed | Resources

Customize your chat UI

Update the style to match your brand and your website. A developer can also add more advanced styling changes with code. Learn more

Assistant's name as known by customers

ConnectMe

Intended purpose

- (●) Standard: For virtual agents and customer support experiences.
- ( ) Carbon for AI: For use in internal IBM products.

Choose a theme

Light | Dark

Primary color

#FFFFFF

Chat header

Secondary color

#3D3D3D

User message bubble

Accent color

#0354E9

Significant and interactive objects

Add an avatar image

Restart conversation

ConnectMe

Hi! I'm a virtual assistant. How can I help you today?

Example: Find nearby location

Example: Check account balance

Example: See how I can help

© Copyright IBM Corporation 2024

Create Action From Scratch and Set Initial Phrase

© Copyright IBM Corporation 2024

Add More Example Phrases

IBM i
continuous innovation
continuous integration

© Copyright IBM Corporation 2024

Create First Step

© Copyright IBM Corporation 2024

Add Custom Response Options

© Copyright IBM Corporation 2024

Create Another Clarification Step

IBM i
continuous innovation
continuous integration

I want to pay my bill please

Editor | Visualization

Customer starts with:
I want to pay my bill please

Conversation steps

1 What type of account are we talking about here?
Cable | Internet | + 1
Continue to next step

2 What's your account number?
Continue to next step

New step +

Step 2

Is taken without conditions

Set variable values f_x

Assistant says

What's your account number?

Define customer response

System
- Options
- Confirmation
- Free text
- Regex
- Number
- Date
- Time

Saved

Number
Enable customers to enter a numeric amount.

As numerals
2,000

As alphanumeric text
two thousand

© Copyright IBM Corporation 2024

Add Condition

© Copyright IBM Corporation 2024

Create an Agent Handoff Step

© Copyright IBM Corporation 2024

Connect to Agent

© Copyright IBM Corporation 2024

Create Final Response Step

© Copyright IBM Corporation 2024

Edit Response in JSON View

Assistant says

JSON view

```
1 {
2   "generic": [
3     {
4       "response_type": "text",
5       "values": [
6         {
7           "text_expression": {
8             "concat": [
9               {
10                "scalar": "To pay your "
11              },
12              {
13                "variable": "step_919"
14              },
15              {
16                "scalar": " bill, you can head to our [link]
(https://connectme/onlineportal.com)."
17              }
```


© Copyright IBM Corporation 2024

End the Action

© Copyright IBM Corporation 2024

Use Visualization Tool

© Copyright IBM Corporation 2024

Preview Your Action

© Copyright IBM Corporation 2024

Integrate with Db2

© Copyright IBM Corporation 2024

Have you ever used Mapepire?

IBM i
continuous innovation
continuous integration

Choose 1:

1. Yes, mapepire-java
2. Yes, mapepire-python
3. Yes, mapepire-js
4. Yes, more than one of the above SDKs
5. No, but heard of it
6. No, never heard of it

© Copyright IBM Corporation 2024

What is Mapepire?

IBM i
continuous innovation
continuous integration

Welcome to Mapepire

A cloud-friendly IBM i database access layer, built with simplicity and performance in-mind.

Find out more →

Pick your client language ⓘ

Super easy to use way to access Db2 for i from any application

Java node.js python™ C# php

© Copyright IBM Corporation 2024

Create Table

IBM i
continuous innovation
continuous integration

Video Demo: https://www.youtube.com/watch?v=RmDchLsPc18

ibmi-talks

account.sql

Build a Watson AI Chatbot from Db2 > server > account.sql

```sql
-- Create Schema
CREATE SCHEMA CONNECTME;

-- Set Schema
SET CURRENT SCHEMA CONNECTME;

-- Create Table
CREATE OR REPLACE TABLE ACCOUNT (
    EMAIL_ADDRESS VARCHAR(100) NOT NULL,
    NAME VARCHAR(100) NOT NULL,
    ACCOUNT_NUMBER INT NOT NULL,
    PRIMARY KEY(EMAIL_ADDRESS)
)
ON REPLACE DELETE ROWS;

-- Insert Data
INSERT INTO ACCOUNT (EMAIL_ADDRESS, NAME, ACCOUNT_NUMBER) VALUES
('john.doe@example.com', 'John Doe', 1111),
('jane.smith@example.com', 'Jane Smith', 2222),
('alice.jones@example.com', 'Alice Jones', 3333),
('bob.brown@example.com', 'Bob Brown', 4444);

-- Query Table
SELECT * FROM CONNECTME.ACCOUNT;
```

main* 0↓ 10↑ ⊗ 0 ⚠ 0 0 githubadm@ossbuild.rzkh.de Project: Live Share

EMAIL_ADDRESS	NAME	ACCOUNT_NUMBER
john.doe@example.com	John Doe	1111
jane.smith@example.com	Jane Smith	2222
alice.jones@example.com	Alice Jones	3333
bob.brown@example.com	Bob Brown	4444
Loaded 4. End of data.		064241/QUSER/QZDASOINIT

© Copyright IBM Corporation 2024

Create REST Server

IBM i
continuous innovation
continuous integration

Server Source Code: [server.js]

server.js

home > GITHUBADM > connectme > server > server.js > createSQLJob

```javascript
app.get('/accounts', async (req, res) => {
    // Extract and verify required query parameters
    const { EMAIL_ADDRESS } = req.query;

    let job;
    try {
        // Create SQL job
        job = await createSQLJob();

        // Execute query
        const query = `SELECT * FROM CONNECTME.ACCOUNT WHERE EMAIL_ADDRESS = ?`;
        const parameters = [EMAIL_ADDRESS];
        const result = await job.execute(query, { parameters: parameters });

        // Check result
        if (result.success && result.data.length > 0) {
            res.json({
                EMAIL_ADDRESS: result.data[0].EMAIL_ADDRESS,
                NAME: result.data[0].NAME,
                ACCOUNT_NUMBER: result.data[0].ACCOUNT_NUMBER,
                MESSAGE: 'Successfully retrieved account.'
            });
        } else {
            res.status(500).json({
                MESSAGE: `Failed to retrieve account with email address ${EMAIL_ADDRESS}.`
            });
        }
    } catch (error) {
        res.status(500).json({
            MESSAGE: `Internal server error.`
        });
    } finally {
        await job.close();
    }
});
```

SELECT * FROM CONNECTME.ACCOUNT
WHERE EMAIL_ADDRESS = ?

server.js

Build a Watson AI Chatbot from Db2 > server > server.js > ...

```javascript
app.put('/accounts', async (req, res) => {
    // Extract and verify required body parameters
    const { EMAIL_ADDRESS, NAME, ACCOUNT_NUMBER } = req.body;

    let job;
    try {
        // Create SQL job
        job = await createSQLJob();

        // Execute query
        const query = `UPDATE CONNECTME.ACCOUNT SET NAME = ?, ACCOUNT_NUMBER = ? WHERE EMAIL_ADDRESS = ?`;
        const parameters = [NAME, ACCOUNT_NUMBER, EMAIL_ADDRESS];
        const result = await job.execute(query, { parameters: parameters });

        // Check result
        if (result.success && result.update_count === 1) {
            res.json({
                MESSAGE: `Successfully updated account`
            });
        } else {
            res.status(500).json({
                MESSAGE: `Failed to update account with email address ${EMAIL_ADDRESS}.`
            });
        }
    } catch (error) {
        res.status(500).json({
            MESSAGE: `Internal server error.`
        });
    } finally {
        await job.close();
    }
});
```

UPDATE CONNECTME.ACCOUNT SET NAME = ?,
ACCOUNT_NUMBER = ? WHERE EMAIL_ADDRESS = ?

© Copyright IBM Corporation 2024

Create Service Commander Definition to Start Server

IBM i
continuous innovation
continuous integration

Service Commander
A utility for managing services and applications running on IBM i

connect-me.yaml

home > MAPEPIRE > connectme > server > connect-me.yaml

```yaml
name: ConnectMe Server
dir: .
start_cmd: npm run start
check_alive: 3001
```

```
## Start server
sc start connect-me.yaml

## Stop server
sc stop connect-me.yaml

## Check server status
sc check connect-me.yaml
```


© Copyright IBM Corporation 2024

Create OpenAPI Specification (in JSON format)

IBM i
continuous innovation
continuous integration

swagger.json

Build a Watson AI Chatbot from Db2 > server > swagger > swagger.json > paths > /accounts > put

```
1  {
2    "openapi": "3.0.3",
3    "info": {
4      "title": "ConnectMe Server API",
5      "description": "API for managing ConnectMe accounts.",
6      "version": "1.0.0"
7    },
8    "servers": [
9      {
10       "url": "http://{host}:3001",
11       "description": "IBM i",
12       "variables": {
13         "host": {
14           "default": "localhost",
15           "description": "Host name of IBM i"
16         }
17       }
18     }
19   ],
20   "tags": [
21     {
22       "name": "Account Services",
23       "description": "Account Services provide APIs to manage accounts."
24     }
25   ],
26   "paths": {
27     "/accounts": {
28       "get": {
29         "summary": "Get an account.",
30         "tags": [
31           "Account Services"
32         ],
33         "parameters": [
34           {
35             "name": "EMAIL_ADDRESS",
36             "description": "The email address associated with the account.",
37             "required": true,
38             "in": "query",
39             "schema": {
40               "type": "string"
41             }
42           }
```

Swagger
Supported by SMARTBEAR

swagger.yaml | Explore

ConnectMe Server API 1.0.0 OAS 3.0

swagger.yaml

API for managing ConnectMe accounts.

Servers

http://{host}:3001 - IBM i

Computed URL: http://localhost:3001

Server variables

host localhost

Account Services

Account Services provide APIs to manage accounts.

GET /accounts Get an account.

PUT /accounts Update an account.

© Copyright IBM Corporation 2024

Test OpenAPI Specification

IBM i
continuous innovation
continuous integration

Curl

```
curl -X 'GET' \
  'http://ossbuild.rzkh.de:3001/accounts?EMAIL_ADDRESS=john.doe%40example.com' \
  -H 'accept: application/json'
```

Request URL

```
http://ossbuild.rzkh.de:3001/accounts?EMAIL_ADDRESS=john.doe%40example.com
```

Server response

Code	Details
200	Response body

```
{
  "EMAIL_ADDRESS": "john.doe@example.com",
  "NAME": "John Doe",
  "ACCOUNT_NUMBER": 1111,
  "MESSAGE": "Successfully retrieved account."
}
```

Download

Curl

```
curl -X 'PUT' \
  'http://ossbuild.rzkh.de:3001/accounts' \
  -H 'accept: application/json' \
  -H 'Content-Type: application/json' \
  -d '{
  "EMAIL_ADDRESS": "john.doe@example.com",
  "NAME": "Jonathan Doe",
  "ACCOUNT_NUMBER": 1111
}'
```

Request URL

```
http://ossbuild.rzkh.de:3001/accounts
```

Server response

Code	Details
200	Response body

```
{
  "MESSAGE": "Successfully updated account"
}
```

Download

© Copyright IBM Corporation 2024

Build Custom Extension

IBM i
continuous innovation
continuous integration

Custom extension

Get started | Basic information | Import OpenAPI | Review extension

Basic information

Having a clear name and detailed description will help provide context and clarity to what your extension does.

Extension name

ConnectMe Server

Extension description 52/128

This extension integrates with the ConnectMe server.

© Copyright IBM Corporation 2024

Import OpenAPI Specification

IBM i
continuous innovation
continuous integration

Custom extension

Get started | Basic information | Import OpenAPI | Review extension

Import OpenAPI

Import an OpenAPI document in a .json format, describing the authentication and methods for your extension.

Drag and drop file here or click to upload

swagger.json ×

Review servers

Provided is a list of the servers and server variables found within the OpenAPI document.

URL	Description	Variables
http://{host}:3001	IBM i	host

Review operations

This table shows the operations defined in the OpenAPI document.

Operation	Method	Resource
Get an account.	GET	/accounts
Update an account.	PUT	/accounts

Get an account.

Request parameters

- EMAIL_ADDRESS
  string | Required

Response properties

- EMAIL_ADDRESS
  string
- NAME
  string
- ACCOUNT_NUMBER
  number
- MESSAGE
  string

Update an account.

Request parameters

- EMAIL_ADDRESS
  string | Required
- NAME
  string | Required
- ACCOUNT_NUMBER
  number | Required

Response properties

- MESSAGE
  string

© Copyright IBM Corporation 2024

Add Extension to Watsonx Assistant

© Copyright IBM Corporation 2024

Create New Action with Initial Step

© Copyright IBM Corporation 2024

Create Step with Extension

IBM i
continuous innovation
continuous integration

© Copyright IBM Corporation 2024

Create Success and Failure Steps

IBM i
continuous innovation
continuous integration

Extension Success

Extension Failure

© Copyright IBM Corporation 2024

Preview Your Action

IBM i
continuous innovation
continuous integration

2:46 PM

Greet customer [default]

Welcome, how can I assist you?

You 2:58 PM

View my account

2:58 PM

I want to view my account information recognized

I would be happy to help you view your account information. What is your email address?

You 2:58 PM

john.doe@example.com

2:58 PM

Extension called

Your current account information:

- **Name**: John Doe
- **Email Address**: john.doe@example.com
- **Account Number**: 1111

© Copyright IBM Corporation 2024

Duplicate Action and Update Phrase + Initial Step

© Copyright IBM Corporation 2024

Create Clarification Step

© Copyright IBM Corporation 2024

Create Step with Extension

IBM i
continuous innovation
continuous integration

© Copyright IBM Corporation 2024

Create Final Step

© Copyright IBM Corporation 2024

Preview Your Action

© Copyright IBM Corporation 2024

Next Steps

© Copyright IBM Corporation 2024

Add More Actions with Templates

© Copyright IBM Corporation 2024

Adjust Default Actions

© Copyright IBM Corporation 2024

Adjust Global Settings

IBM i
continuous innovation
continuous integration

Clarifying Questions

Show options when multiple actions seem to match what the customer wants

Change Conversation Topics

Switch to other actions when customers ask about other topics

Intelligent Information Gathering

The assistant retrieves and uses prior inputs to streamline the conversation

© Copyright IBM Corporation 2024

Search Integration with Watson Discovery

continuous innovation
continuous integration

Search Integration

Extend the scope of what your assistant can answer by searching documents and websites.

© Copyright IBM Corporation 2024

Takeaways

IBM i
continuous innovation
continuous integration

01

Building a chatbot with Watsonx Assistant is easy!

02

Planning is critical and building can be an incremental process.

03

Integrating your chatbot with Db2 is as simple as creating a REST server with Mapepire.

© Copyright IBM Corporation 2024

Any Questions?

© Copyright IBM Corporation 2024

IBM i

IBM