

IBM Watson

Building Conversational Solutions

Building a conversation

Aco Vidović

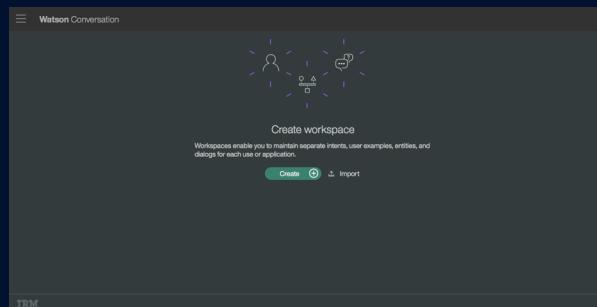


Watson Assistant (WA)

- An API for Developers or Technical LOB that want to **BUILD** a chatbot.
- Create conversational experiences across any channel (e.g. mobile, messaging, IoT, etc.)
- Integrated dialog builder allows subject matter experts the ability to easily construct dialog flows for chat bots.
- Combines intents, entities and dialog into a seamless experience

Includes:

- Access to a broad set of platform services that can augment conversational use cases (e.g. Speech, Empathy)
- Enterprise support with the Premium Plan (e.g. data isolation, e2e encryption, PII support)
- Code samples
- Software Development Kits (SDKs)



Key terms

WA uses natural language understanding and machine learning to extract meaning from the end-user's input.

1. An Utterance or User's Example is something the user says.
2. An Intent is specific goal or idea conveyed in the user's example
3. An Entity is the term or object which provides contextual details of an intent
4. An Context variable is data passed back and forth between the application and Watson
5. Dialog leverages conditional and tree logic to process the intents you want your conversation to handle.

An utterance:

“I’m frustrated, I haven’t been able to login into your online billing system.”

Understand the Customer's Intent

- Leverages state of the art Deep Learning techniques to derive intent
- Watson has read Wikipedia enabling it to understand language and concepts
- Learns over time based on usage
- Handcrafted rules unable to scale and do not benefit from data

I forgot my password...

How do I get a new password?

Can't login into your site...

My login isn't working, please help...

Can you reset my password?

Intent = Password Reset

Extract Other Key Information From a Question

“I’m frustrated, I haven’t been able to login into your online billing system.”

Intent Password Reset

Extract Other Key Information From a Question

“I’m frustrated, I haven’t been able to login into your **online billing system.**”

Intent Password Reset

Entities Online Billing System

Extract Other Key Information From a Question

“I’m frustrated, I haven’t been able to login into your online billing system.”

Intent Password Reset

Entities Online Billing System

Context Bill Smith, 47, Gold Member, High Value

Context Mobile

Take Action: Responses Come in Different Forms

Question		Response
How do I reset my password?		DIALOG → Guide the user through a set of steps
Someone has stolen my credit card.	DEFLECT →	Transfer to human agent
Where is the nearest store?	MAP →	Application launches map with directions
I need to pay my outstanding invoice.	APP NAV. →	Bring user to pay bill screen
Can I pay my bills using my credit card?	INFO RETRIEVAL →	Bring back an answer

Workspace

Watson Conversation



Create workspace

Workspaces enable you to maintain separate intents, user examples, entities, and dialogs for each use or application.

Watson Conversation / ConvWks-170601-LV / Deploy

Deploy Options

Credentials



Workspace Details

Workspace name

ConvWks-170601-LV

Workspace ID

Workspace URL

<https://gateway.watsonplatform.net/conversation/api/v1/workspaces/>/message/

Service Credentials

[Manage credentials](#)

Service name

Conversation-170601-LV



Credential name

Credentials-1

Username

Password

#intent is the specific goal or idea of a user's input

- # used to refer to intents
- Are not case sensitive
- Names cannot contain spaces
- Character limits is 128
- Characters can be
 - Letters
 - Number
 - Underscores,
 - Hyphens
 - dots

The screenshot shows the IBM Watson Intent builder interface. At the top, there is a field labeled "Intent name" containing "#eat". A red arrow points from the text "Intent" to the right side of the slide, indicating the context of the word "Intent" in the slide's title. Below the intent name is a "Description" field with the placeholder "Add a description to this intent". Underneath is a "Add user examples" section with a "User examples (8)" button. A red arrow points from the text "Utterances / User's examples" to the right side of the slide, indicating the context of the examples listed below. The user examples are:

- Hello I'm starving I'm looking for a place to eat
- I am hungry
- I am looking for a restaurant
- I am really hungry you know a good place to eat around here
- I am starving
- I want pasta

Content Catalog – Use prebuilt intent to jumpstart your assistant

Content Catalog

Intents	Entities	Dialog	Content Catalog
Get started faster by adding existing intents from the content catalog. These intents are trained on common questions that users may ask.			
Category	Description	Intents	
Banking	Basic transactions for a banking use case.	13	Add to workspace
Bot Control	Functions that allow navigation within a conversation.	9	Add to workspace
Customer Care	Understand and assist customers with information about themselves and your business.	18	Add to workspace
eCommerce	Payment, billing, and basic management tasks for orders.	14	Add to workspace
General	General conversation topics most users ask.	10	Add to workspace
Insurance	Issues related to insurance policies and claims.	12	Add to workspace
Telco	Questions and issues related to a user's telephony service, device, and plan.	21	Add to workspace
Utilities	Help a user with utility emergencies and their utility service.	10	Add to workspace

Category Details (i.e. Banking)

Description	Intent	Examples
Description (13)		
View the activity on an account.	#Banking_View_Activity	Can I get statement for account activities in past 10 days? Do you know about account activities of my checking account? From where did I get the latest credit in my account 17 more examples...
Cancel a card.	#Banking_Cancel_Card	What is the process for closing credit card? What is the procedure for credit card deactivation? What are the ways for closing credit card? 17 more examples...
Activate a card.	#Banking_Activate_Card	When will my credit card begin working? What should I do to setup my credit card for online payments? What is the process to activate credit card after cancellation? 17 more examples...
Replace a card.	#Banking_Replace_Card	Can I have helpline number to ask credit card replacement? Can I request a replacement for my card online? Can you tell me how to re-issue a credit card? 17 more examples...
View pending charges on a card account.	#Banking_View_Pending_Charges	Please tell me about the pending charges against me Any outstanding charges Can I get some info related to pending charges for my credit card using mobil... 17 more examples...
Request a card member agreement.	#Banking_Request_Card_Member_Agreement	Can I see the agreement? Can you tell me how can I request card holder agreement? Does my card member agreement give all information about charges on cred... 17 more examples...

Intent Conflict Resolution – Premium only

- As Users add more and more user utterances, intents can overlap with similar examples
- Intent Conflict Resolution automatically detects conflicts across intents

The screenshot shows the configuration page for the '#capabilities' intent. It includes fields for Intent name (#capabilities), Description (Add a description to this intent), and Add user examples (Add user examples to this intent). A sidebar on the left provides navigation icons. At the bottom, there's a section for User examples (5) with a dropdown menu, a switch for 'Show only conflicts', and five examples listed with 'Resolve conflict...' buttons:

- Can I teach you?
- can i training you?
- Can you hear me?
- can you read me
- can you speak something with me?

The screenshot shows the Watson Intent Conflict Resolution tool comparing two intents: '#compound_questions' and '#turn_off'. It displays a list of user examples for each intent and highlights potential conflicts with checkboxes. Below each intent, there are sections for 'Similar examples' with checkboxes:

#compound_questions

- can you please turn the light on off ?
- can you please turn the light either on or off ?
- Turn the lights on off
- turn off on off the music
- turn on off the ac
- can you turn on the turn off the AC
- turn off the heater and turn on the AC
- turn off wipers and turn on the lights
- sorry turn off the lights and turn on the AC
- turn on the lights, then turn them off.
- turn on the wipers then turn them off

#turn_off

- can you please turn the light on off ?
- turn off on off the music
- turn the heater off
- off
- turn off
- turn off the wipers please
- can I turn off the wipers
- turn off my radio please
- i want to turn off
- turn off the lights for me
- will you turn my ac off please

@Entities handles part of an input that will alter the way that Watson will respond to the user's intent.

- @ used to refer to entities
- Are divided into 3 levels : name, values, synonyms. Character limits are 64 for each
- Are no case sensitive
- Characters can be: Letters, Number, Underscores, Hyphens, dots, Space
 - If your entity contains a space then when you refer to it in the dialog node, you must enclose the name in ()
 - Names cannot begin with sys-

The screenshot shows the IBM Watson Entity Manager interface. At the top, there is a search bar with the placeholder 'Enter value' and a dropdown menu labeled 'Synonyms'. Below the search bar, there is a button labeled 'Add value' and a 'Show recommendations' button. The main area displays a table of entities. The first row shows the entity name '@restaurant' with a red arrow pointing to it from the left. The second row shows 'chinese_restaurant' with a red arrow pointing to it from the left. The third row shows 'coffee_shop' with a red arrow pointing to it from the left. The fourth row shows 'fast_food' with a red arrow pointing to it from the left. The fifth row shows 'french_restaurant' with a red arrow pointing to it from the left. The sixth row shows 'italian_restaurant' with a red arrow pointing to it from the left. The seventh row shows 'japanese_restaurant' with a red arrow pointing to it from the left. The eighth row shows 'pizza_restaurant' with a red arrow pointing to it from the left. The ninth row shows 'steak_house' with a red arrow pointing to it from the left. The columns in the table are 'Type' (which is 'Entity values (8)' for the first row), 'Synonyms' (which is 'Synonyms' for all rows except the first), and 'Values' (which lists various food and drink names for each entity type). A red arrow also points to the 'Values' column header.

Type	Synonyms	Values
Entity values (8)		
chinese_restaurant	Synonyms	chinese, chinese food, noodles, spring roll, chinese restaurant
coffee_shop	Synonyms	starbucks, dunking, dunkin, coffee shop, coffee place
fast_food	Synonyms	junk food, hamburger, fast food
french_restaurant	Synonyms	french, french food, macaron, frog legs, brasserie, french restaurant
italian_restaurant	Synonyms	italian, pasta, italian restaurant, italian place, italian food, italian cuisine
japanese_restaurant	Synonyms	japanese, sushi, japanese restaurant, japanese food
pizza_restaurant	Synonyms	pizzeria, pizza pie, pizza, pizza restaurant
steak_house	Synonyms	mexican, texan, tex-mex, meat, beef, steak house

Entity recommendations

Synonyms are recommended to you as you create and edit entity values.

The screenshot shows the IBM Watson Entity Recommendations interface. On the left is a dark sidebar with icons for navigation, search, and refresh. The main area has a header with a back arrow, the entity name '@brands', and a 'Last modified' timestamp. Below the header, the 'Entity name' is set to '@brands' with a 'Fuzzy' filter applied. A purple banner displays 'Recommended synonyms for "Automobile"'. Below the banner is a list of car brands with checkboxes: Volkswagen, Maserati, Lamborghini, Aston Martin, Alfa Romeo, Jaguar, Sportscar, Panamera, Bugatti, and Passat. At the bottom, there's a section for adding a value named 'Automobile', where 'Synonyms' are listed as BMW, Porsche, and Audi, each with a minus sign to remove and a plus sign to add more. A blue 'Add value' button is at the bottom left, and a note at the bottom right encourages users to begin adding values, synonyms, and patterns to entities to help their bot learn.

Entity name
@brands

Last modified

Fuzzy

Recommended synonyms for "Automobile"

volkswagen maserati lamborghini aston martin alfa romeo jaguar sportscar panamera bugatti passat

Value name
Automobile

Synonyms

Synonyms

BMW

Porsche

Audi

Add synonym...

Add value

No values yet.

Once you've named your entity, begin by adding values, synonyms, and patterns to entities to help your bot learn and understand important details that your users mention.

Entity & Intent correlation

Entities values and synonyms impact the intent confidence levels

For example:

if you have an intent with variation « I want a dog » and
an entity @animal containing values « cat » and « dog » then
a user's input « I want a cat » will have a higher confidence level
regarding intent than if the @animal entity didn't exist.

Annotate intents or Entities in context (1)

Annotate an Entity in user's example – it impacts how a word is identified as entity

- *Extract unknown entity value*

Boston is an entity of @location

If you have annotated the word Boston as entity @location in the user's example « I want to go to *Boston* » then,

in the user's input « I want to go to New York », the group of words New York will be likely identified as entity @location even it is not a value or synonym of this entity.

Annotate intents or Entities in context (2)

Annotate an Entity in user's example – it impacts how a word is identified as entity

- **Examples and counter examples:** anchovies is an entity of @toppings,

if you annotated the word anchovies as entity @toppings

in the user's example « I 'd like a small pizza with *anchovies* » then

the word anchovies will be identified as entity @toppings. That's an example

if you haven't annotate the word anchovies as entity @toppings

in the user's example « I 'd like a big pizza with *peppers* but no anchovie» then the word anchovies won't be identified as entity @toppings. That's a counter example

@System entities

- **@sys-number:** detects numbers that are written using either numerals or words. In either case, a numeric value is returned.
- **@sys-currency:** detects monetary currency values that are expressed in an utterance with a currency symbol or currency-specific terms. A numeric value is returned.
- **@sys-percentage:** detects percentages that are expressed in an utterance with the percent symbol or written out using the word percent. In either case, a numeric value is returned.
- **@sys-date, @sys-time and \$timezone:**
- **@sys-location :** extracts place names (country, state/province, city, town, etc.) **BETA, English-only**
- **@sys-person :** extracts names from the user's input. **BETA, English-only**

@sys-date, @sys-time and \$timezone:

- Set the \$timezone = Europe/Paris ; Europe/Berlin ; EST ; UTC ...
- @sys-date
 - stored in the format yyyy-MM-dd e.g 2017-08-30
 - can extract : now, Friday, today, November 1, 2 days from now
 - ranges: the weekend ; next week ; from Monday to Friday
the start and end dates will be returned
- @sys-time
 - stored in the format HH:mm:ss e.g 13:00:00
 - Can extract at 2pm, at 4, at 15:30
 - Ranges: from 2 to 3 ...

Pattern-defined entities

As an example, for entity "ContactInfo", the patterns for phone, website, and email value can be defined as follows:

- Phone
 - US: `(\d{3})-(\d{4})`, e.g. 426-4968
 - US (area code): `(\d{3})-(\d{3})-(\d{4})`, e.g. 800-426-4968
 - International: `^(\(?|\+?[0-9]*\)?)?[0-9_\- \()]*$`, e.g. +44 1962 815000
- Website:
 - `(https?:\/\/)?([\da-z\.-]+)\.([a-zA-Z]{2,6})([\w\.-]*)*\/?$/`, e.g. <https://www.ibm.com>
- Email:
 - `.+\@\.+` e.g. name@ibm.com
-

Dialog is the logical flow that determines the response your bot will give when conditions are met

The screenshot shows the Watson Conversation interface with the following details:

- Left Sidebar:** Icons for Intents, Entities, and Dialog.
- Header:** Watson Conversation / ConvWks-170601-LV / Build.
- Toolbar:** Add node, Add child node.
- Conversation Node:** A blue box labeled "Node" containing "start of the conversation" and "conversation_start". It has a red arrow pointing to it labeled "Trigger / condition".
- Responses:** "3 Responses / 0 Context set / Jump to".
- Actions:** "Jump to welcome (Evaluate responses)".
- Child Node:** "welcome" with "1 Response / 0 Context set".
- Conditions:** "If bot recognizes: conversation_start".
- Responses:** "Then respond with: now().before('12:00:00')".
- Responses:** "1. Good Morning!" (labeled "Response").
- Conditions:** "now().after('12:00:00')".
- Responses:** "1. Good Afternoon!"

\$Context Variables is the mechanism for passing information between your bot and the application that submits the user input

```
1 {  
2   "context": {  
3     "restaurant": "<?@restaurant?>"  
4   },  
5   "output": {}  
6 }
```

Then set context:

Variable	Value
\$ restaurant	@restaurant

[+ Add variable](#)

Shorthand : \$variable_name
Full syntax : context.variable_name

The screenshot shows the IBM Watson Assistant interface. On the left, a context variable '\$restaurant' is defined. This variable is then used in a 'Jump to true' condition, which leads to a response 'true'. On the right, the variable '\$restaurant' is used in an 'If bot recognizes:' condition, which then triggers a 'Then respond with:' action. In the response, the variable '\$restaurant' is used in a message template.

Then set context:

Variable	Value
\$ restaurant	@restaurant

[+ Add variable](#)

If bot recognizes:

\$restaurant

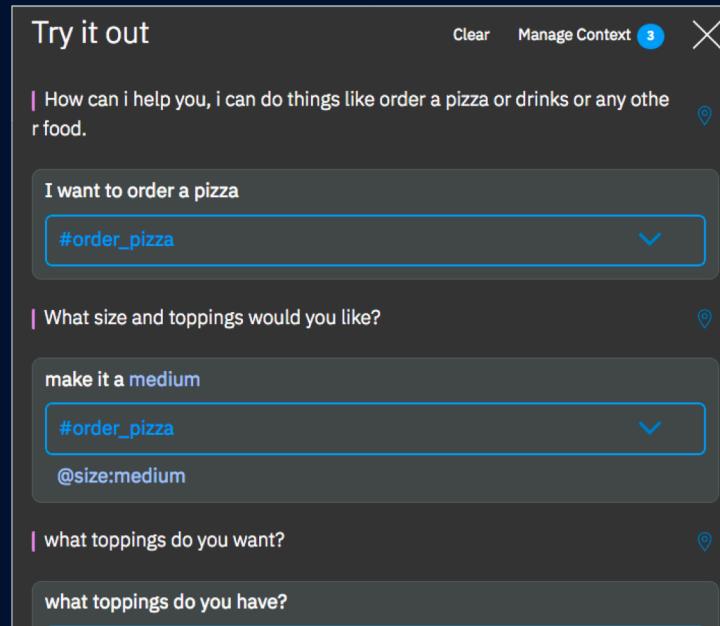
Then respond with:

[+ Add response condition](#)

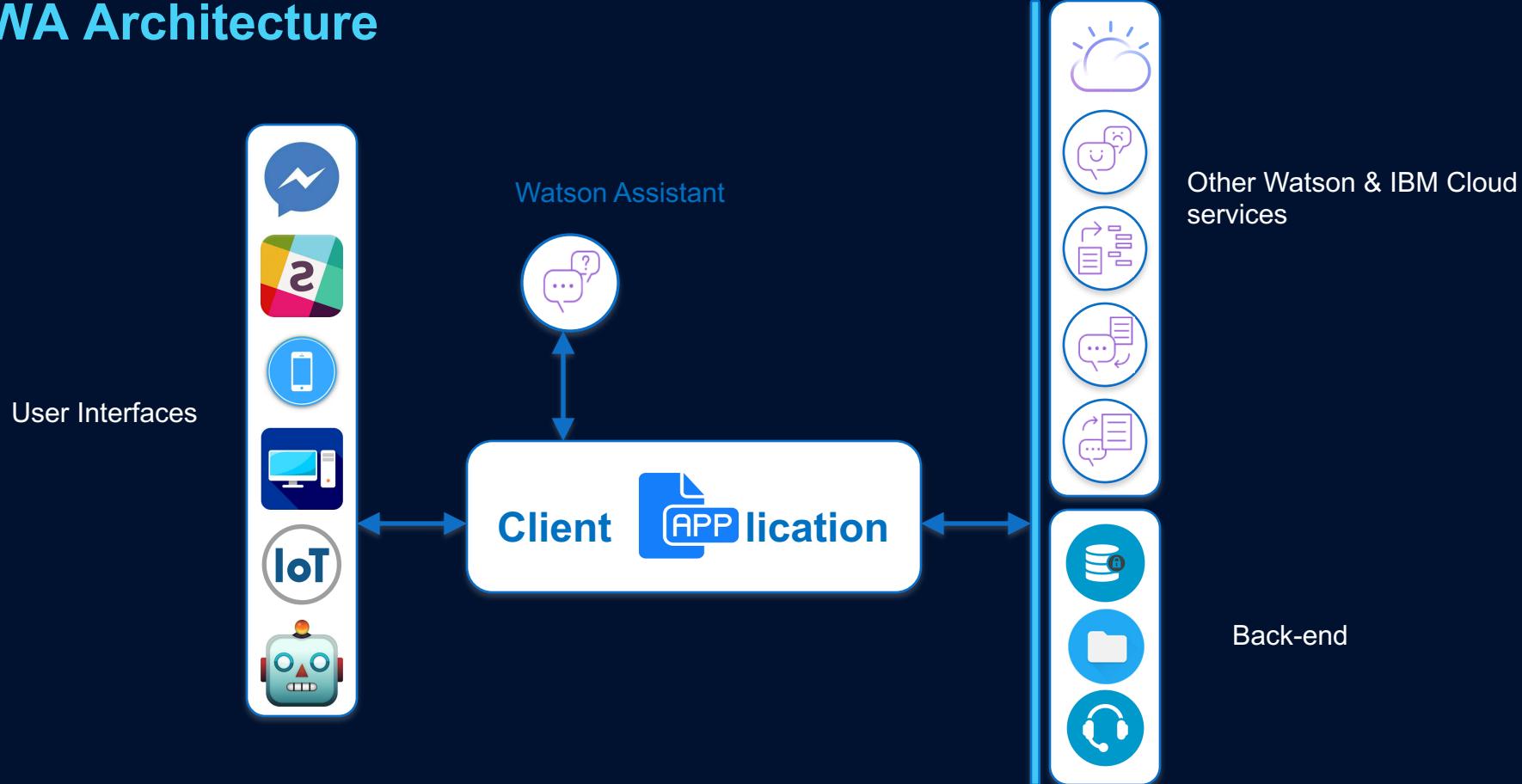
1. I am glad to know you appreciate \$restaurant!

Add a variation to this response

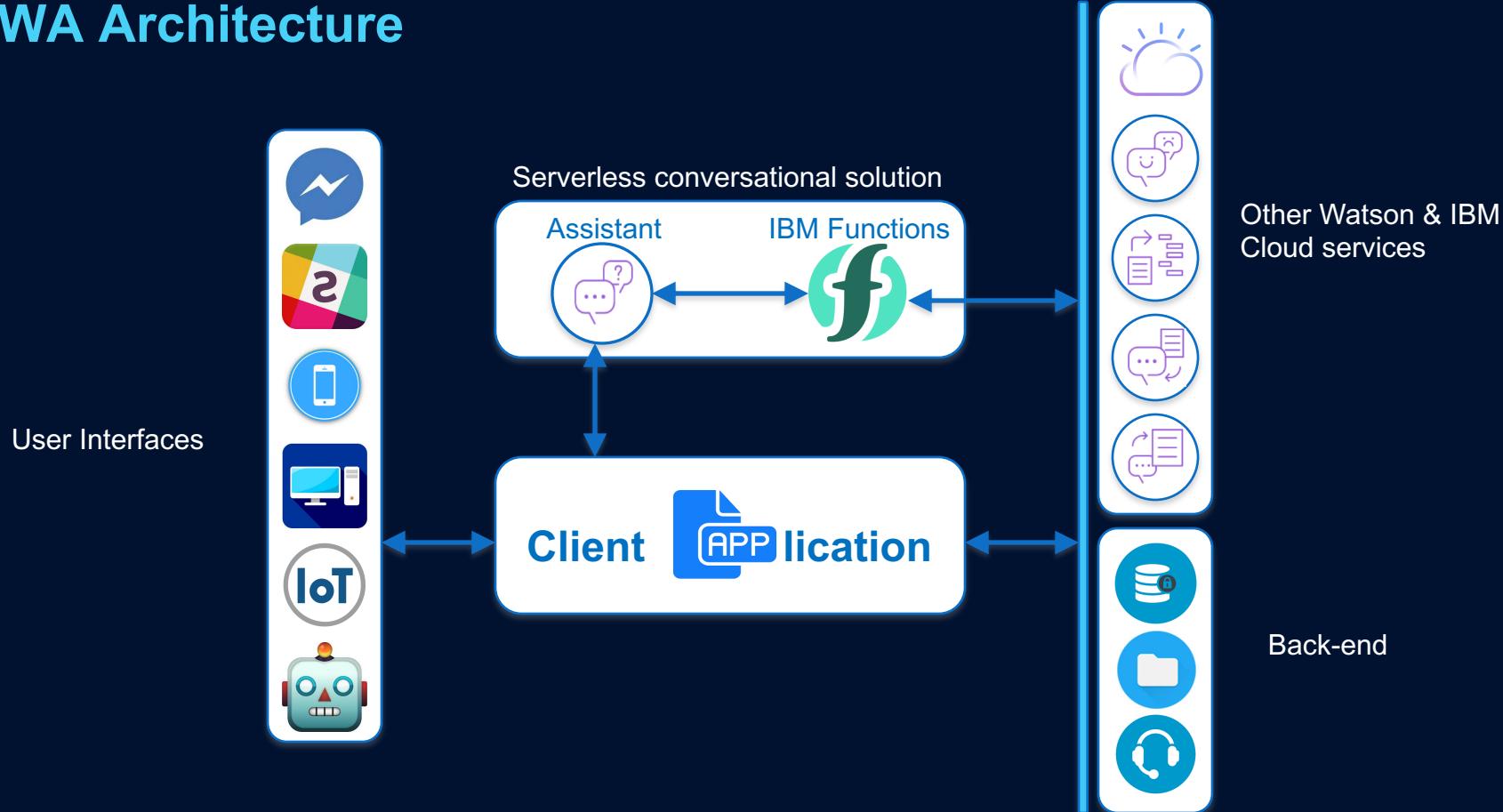
Test your conversation



WA Architecture



WA Architecture



Let's get started !