

# Anatomy of a chatbot and building a meaningful conversation

IBM Code

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# Watson Assistant

IBM Cloud

Catalog

Docs

Support

Manage

Search for resource...

UPKAR LIDDER's Acco...



## Catalog

Search the catalog...

Filter

### All Categories

Compute  
Containers  
Networking  
Storage  
**AI**

Analytics  
Databases  
Developer Tools  
Integration  
Internet of Things  
Security and Identity  
Starter Kits  
Web and Mobile  
Web and Application

### AI

<p><b>Watson Assistant (formerly Conversation)</b> Lite • IBM</p> <p>Add a natural language interface to your application to automate interactions with your end users. Common applications inclu...</p>	<p><b>AI OpenScale</b> Lite • IBM</p> <p>IBM AI OpenScale is an enterprise-grade environment for AI infused applications that provides enterprises with visibility into how...</p>	<p><b>Compare Comply</b> IBM • Beta</p> <p>Process governing documents to convert, identify, classify, and compare important elements</p>	<p><b>Discovery</b> Lite • IBM</p> <p>Add a cognitive search and content analytics engine to applications.</p>	<p><b>Knowledge Catalog</b> Lite • IBM</p> <p>Discover, catalog, and securely share enterprise data.</p>
<p><b>Knowledge Studio</b> Lite • IBM</p> <p>Teach Watson the language of your domain.</p>	<p><b>Language Translator</b> Lite • IBM</p> <p>Translate text, documents, and websites from one language to another. Create industry or region-specific translations via...</p>	<p><b>Machine Learning</b> Lite • IBM</p> <p>IBM Watson Machine Learning - make smarter decisions, solve tough problems, and improve user outcomes.</p>	<p><b>Natural Language Classifier</b> IBM</p> <p>Natural Language Classifier performs natural language classification on question texts. A user would be able to train their data and th...</p>	<p><b>Natural Language Understanding</b> Lite • IBM</p> <p>Analyze text to extract meta-data from content such as concepts, entities, emotion, relations, sentiment and more.</p>
<p><b>Personality Insights</b> Lite • IBM</p> <p>The Watson Personality Insights derives insights from transactional and social media data to identify psychological traits</p>	<p><b>Speech to Text</b> Lite • IBM</p> <p>Low-latency, streaming transcription</p>	<p><b>Text to Speech</b> Lite • IBM</p> <p>Synthesizes natural-sounding speech from text.</p>	<p><b>Tone Analyzer</b> Lite • IBM</p> <p>Tone Analyzer uses linguistic analysis to detect three types of tones from communications: emotion, social, and...</p>	<p><b>Visual Recognition</b> Lite • IBM</p> <p>Find meaning in visual content! Analyze images for scenes, objects, faces, and other content. Choose a default model off the she...</p>
<p><b>Watson Studio</b> Lite • IBM</p> <p>Embed AI and machine learning into your business. Create custom models using your own data.</p>	<p><b>PowerAI</b> Third Party</p> <p>The accelerated deep learning platform for enterprise. Built on the IBM PowerAI platform, powered by Nimbix.</p>			

FEEDBACK

# Meet Jill Watson – Georgia Tech (Fall 2015)

Resolved Unresolved

1 year ago Should we be aiming for 1000 words or 2000 words? I know, its variable, but that is a big difference...

Jill Watson 1 year ago There isn't a word limit, but we will grade on both depth and succinctness. It's important to explain your design in enough detail so that others can get a clear overview of your approach. It's also important to keep things clear and short.

1 year ago Jill can you please elaborate on "It's important to explain your design in enough detail". what kind of design are you referring to?

Lalith Polepeddi 1 year ago I think Jill is using "design" as a catch-all statement. For the midterm, it refers to the shortcomings of each technique. For the assignments and projects, it refers to the agent's approach.

1 year ago Sure enough thanks Lalith.

1 year ago Im beginning to wonder if Jill is a computer, if there is anything this class has taught me, is that i should always question if someone ive met online is an AI or not

1 year ago her name is Watson ;)

1 year ago seriously, I had the same doubt last week because we were getting such speedy responses from TAs :) I checked on google and found some reasons to believe that they are all humans; hopefully Ashok Goel has not created facebook and linkedin profiles for the TA agents, if any, that he is using in this course.

**Student User** 1 month ago Is it the case that only basic problems have the problem text data available?

Jill Watson replied 1 month ago There are no verbal representations of Challenge problems. They'll only be run as visual problems. But you're welcome to write your own verbal representations to try them out!

**Student User** 1 month ago Is it permissible for Project 3 to be in a different language than our Project 1 and 2 submissions? (from Java to Python).

Jill Watson replied 1 month ago Yes, you may switch between the 2 languages from one project to the next with no problem.

Are we allowed to use any modules from PILLOW? Sorry, if this was already stated somewhere.

Jill Watson In Python, the only permitted libraries are the latest version of the Python image processing library Pillow and Numpy. You can use all modules inside these external libraries. No external libraries are permitted in Java.

What is the allowed maximum running time the agent can take to solve one problems? Is there any constraints on the running time ??

Thanks!

From the doc for project 1 (note the 15 minutes) -

## Efficiency

Efficiency can be a major concern with these agents; some problems can require reasoning that takes an enormous amount of time. It is acceptable for your agent to take a few minutes to address the problems, but it should not take significantly longer than that. We may cut your agent off if it goes over 15 minutes to address the test as a whole. However, your agent should show some signs of progress to show that it is not stuck in an infinite loop. For example, you may use print statements to output when each problem has been solved or when a step has been successfully completed.

Currently getting about 11D/10E correct with run-time of approx 2 seconds per RPM.

Jill Watson 22 days ago It's fine if your agent takes a few minutes to run. If it's going to take more than 15 minutes to run, please leave notes in the submission about how long we should expect it to take. We can't have all the projects taking a long time because we have to run them in a reasonable period of time.

Does the 15 minute time limit cover both the Basic and Test problems or is it 15 minutes for each?

# My First bot

- nodejs middleware
  - botkit.js

<https://github.com/howdyai/botkit>

- slack frontend

The screenshot shows a Slack interface with a dark theme. On the left is a sidebar for the channel 'botsandbox' with members 'lidderpuk' and 'yogibot'. The main area shows a conversation between 'lidderpuk' and 'yogibot'. 'lidderpuk' asks for help, and 'yogibot' responds with a sutra from Pada-Sutra. 'lidderpuk' then asks for sutra 1-2, and 'yogibot' provides the definition of Yoga as suppression of modifications of mind. 'lidderpuk' then asks for sutra 1-444, and 'yogibot' informs them that it does not exist.

Slack

@yogibot active | Yogi Bot Today

Search @ ☆

lidderpuk 3:02 PM help

yogibot BOT 3:02 PM Help

You can ask me about sutras by just typing the pada-sutra information. For example 1-1 or 1:1. More features will be added soon. Stay tuned !

lidderpuk 3:02 PM 1-1

yogibot BOT 3:02 PM अथ योगानुशासनम्॥१॥ Atha yogānuśāsanam||1|| And now begins (atha) the instruction (anuśāsanam) regarding Yoga (yoga)||1||

lidderpuk 3:02 PM 1-2

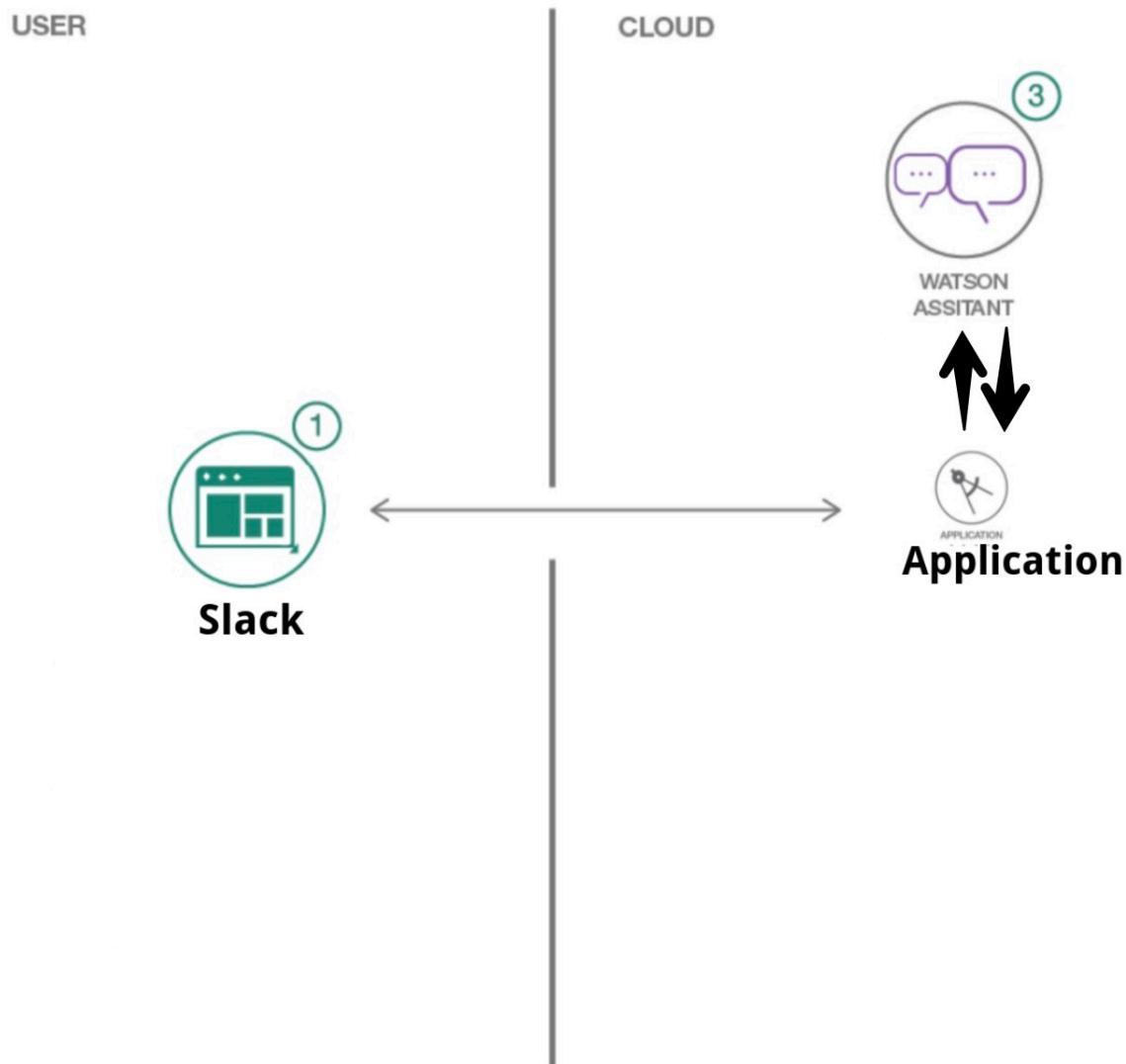
yogibot BOT 3:02 PM योगश्चित्तवृत्तिनिरोधः॥२॥ Yogaścittavṛttinirodhah||2|| Yoga (yogaḥ) is the suppression (nirodhah) of the modifications (vṛtti) of mind (citta)||2||

lidderpuk 3:02 PM 1-444

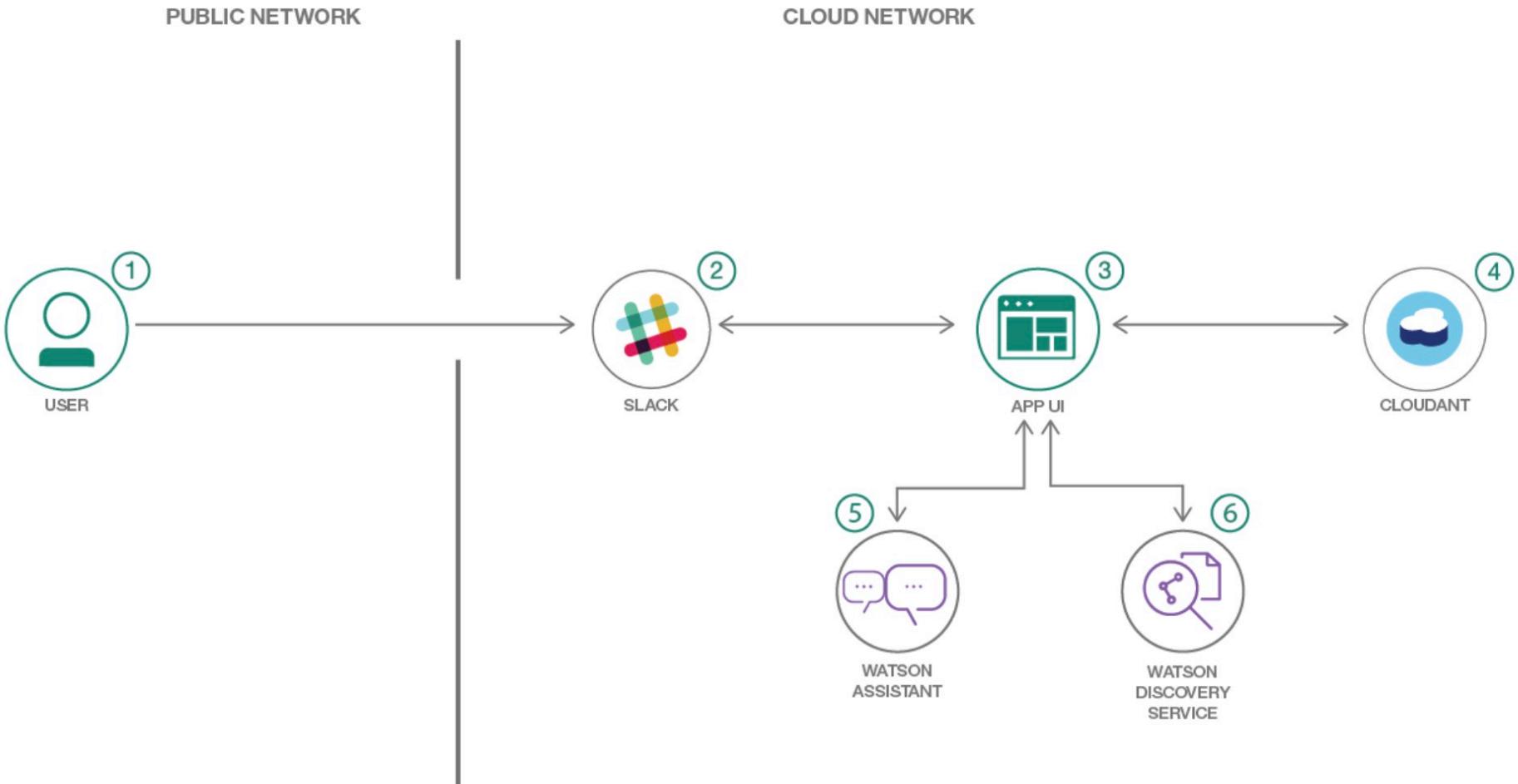
yogibot BOT 3:02 PM The sutra you have entered '1-444' does not exist. Please try again with this format pada-sutra or pada:sutra.

Message @yogibot

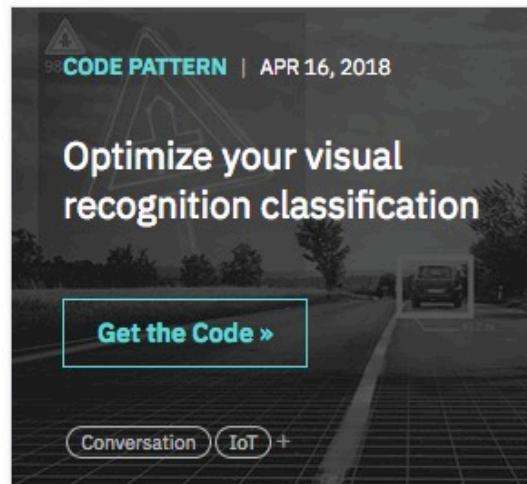
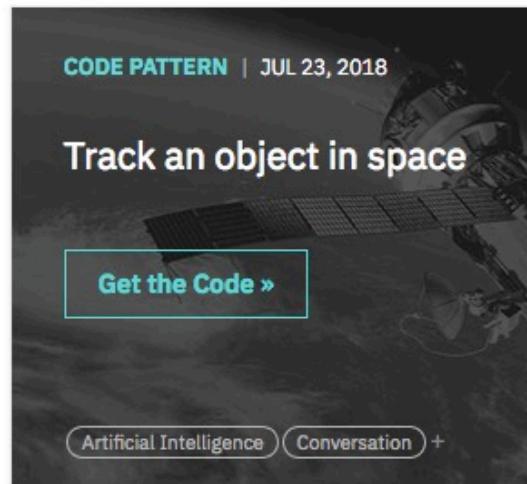
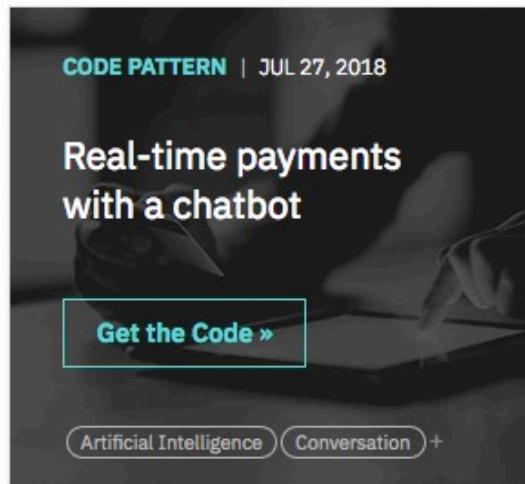
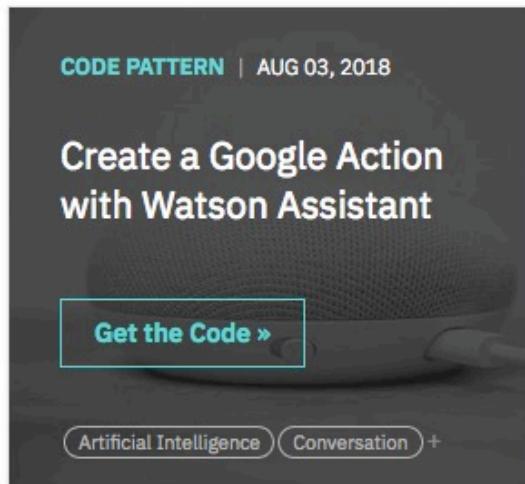
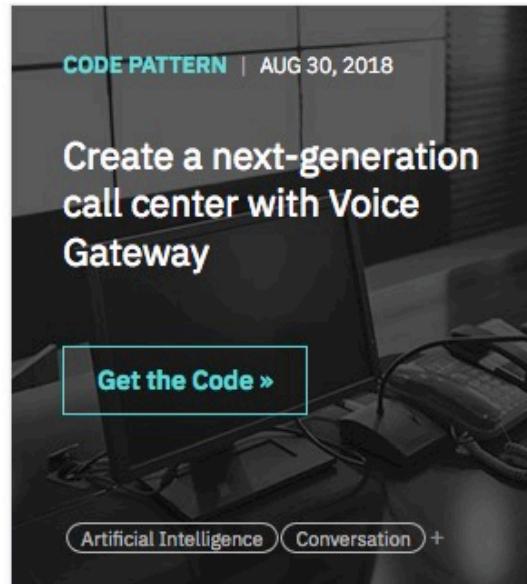
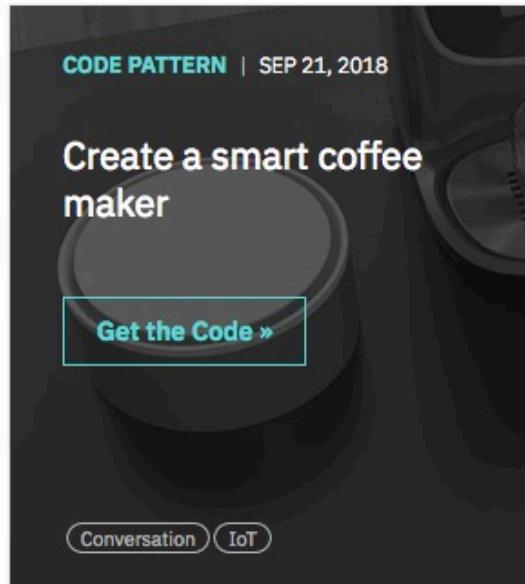
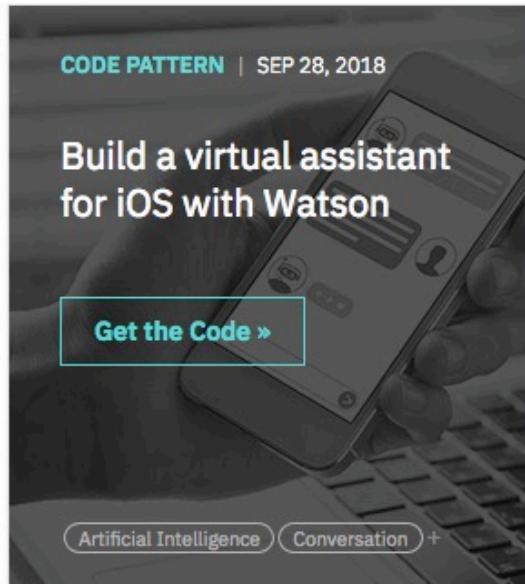
# Code Pattern - <https://developer.ibm.com/code/patterns/>



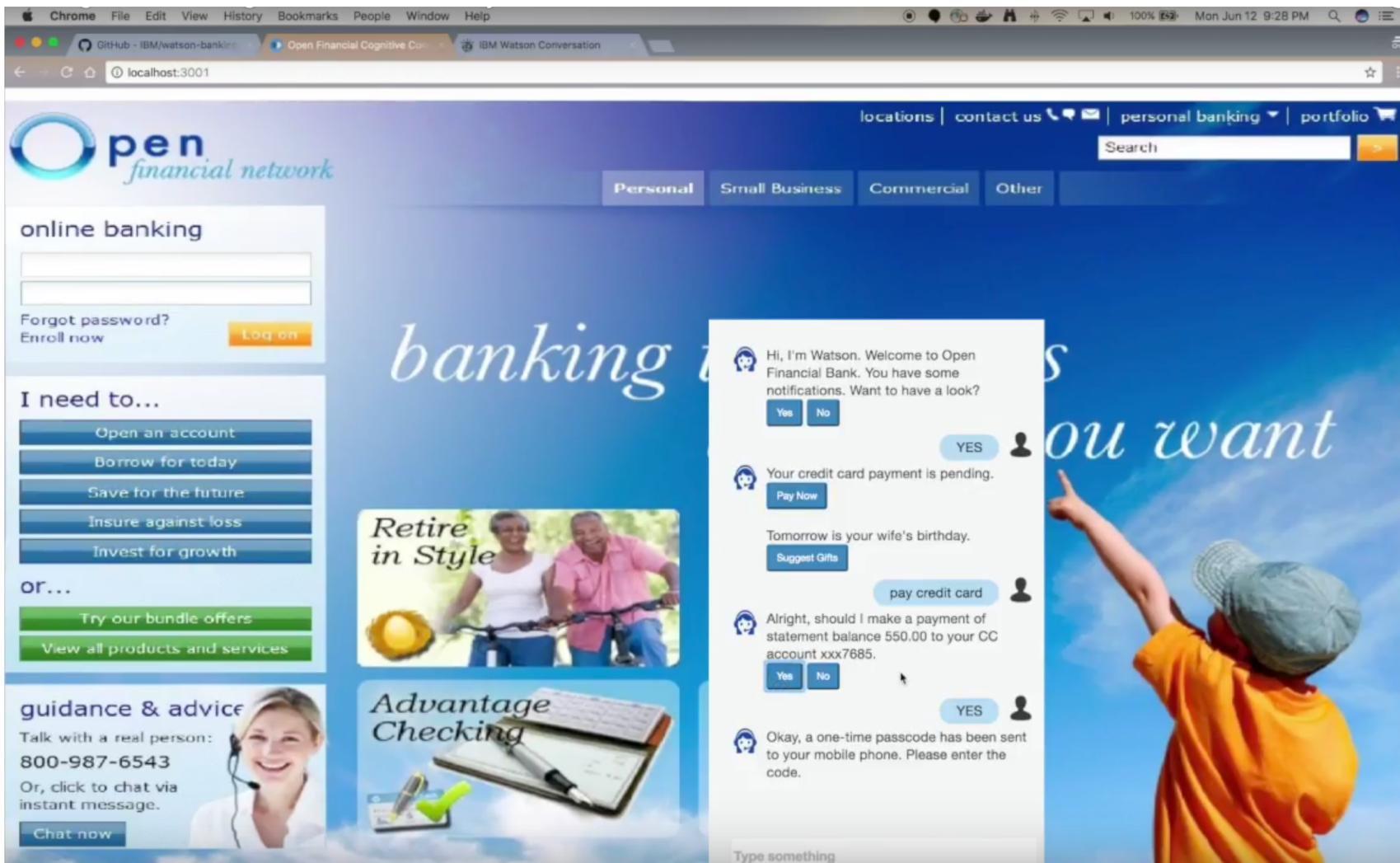
# Code Pattern - <https://developer.ibm.com/code/patterns/>



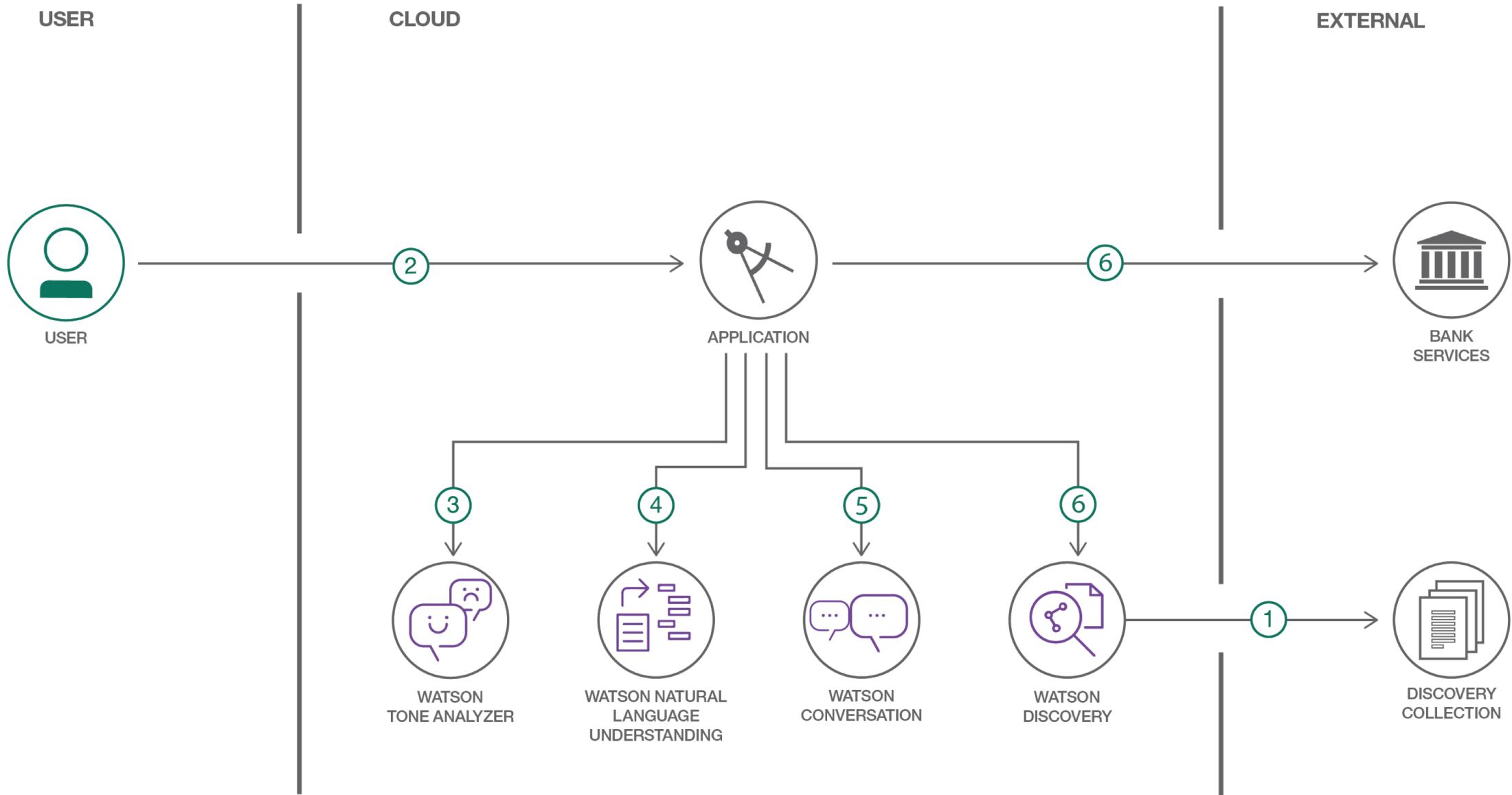
# Code Patterns



# Cognitive banking chatbot



# Code Pattern - <https://developer.ibm.com/code/patterns/>



# Workspace

Collection of artifacts – Intents,  
Entities and Dialogs

Build

Deploy

Improve / Metrics

IBM Watson Assistant

The screenshot shows the IBM Watson Assistant interface. On the left is a vertical sidebar with four icons: wrenches (Intents), a circular arrow (Entities), a line graph (Dialog), and a grid (Content Catalog). The main area has a header with the title 'Workspaces / SampleWorkspace / Build' and tabs for 'Intents', 'Entities', 'Dialog', and 'Content Catalog'. Below the tabs is a large circular icon containing a network graph. The text 'No intents yet.' is displayed. A descriptive paragraph explains what an intent is: 'An intent is the goal or purpose of the user's input. Adding examples to intents helps your virtual assistant understand different ways in which people would say them.' Below this are three buttons: 'Add intent' (blue), 'Browse content catalog' (grey), and 'Import intents' (grey).

Workspaces / SampleWorkspace / Build

Intents Entities Dialog Content Catalog

No intents yet.

An intent is the goal or purpose of the user's input. Adding examples to intents helps your virtual assistant understand different ways in which people would say them.

Browse available intents to get started using the Content Catalog

Add intent

Browse content catalog

Import intents

# Intents

An *intent* is the goal or purpose of the user's input. Adding examples to intents helps your virtual assistant understand different ways in which people would say them.

Provide at least five examples for each intent.

[←](#) | #turn\_on

**Intent name**  
#turn\_on

**Description**  
Add a description to this intent

**Add user examples**  
Add user examples to this intent

[Add example](#)

User examples (693) ▾

80's music

activate the jams

activate the music

air condition on

Air conditioner on

air on

Air on please.

also turn on the lights

# 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.

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	<a href="#">+ Add to workspace</a>
Bot Control	Functions that allow navigation within a conversation.	9	<a href="#">+ Add to workspace</a>
Customer Care	Understand and assist customers with information about themselves and your business.	18	<a href="#">+ Add to workspace</a>
eCommerce	Payment, billing, and basic management tasks for orders.	14	<a href="#">+ Add to workspace</a>
General	General conversation topics most users ask.	10	<a href="#">+ Add to workspace</a>
Insurance	Issues related to insurance policies and claims.	12	<a href="#">+ Add to workspace</a>
Telco	Questions and issues related to a user's telephony service, device, and plan.	21	<a href="#">+ Add to workspace</a>
Utilities	Help a user with utility emergencies and their utility service.	10	<a href="#">+ Add to workspace</a>

# Entities

An *entity* is a portion of the user's input that you can use to provide a different response to a particular intent. Adding values and synonyms to entities helps your virtual assistant learn and understand important details that your users mention.

Entity name  
@appliance

---

Value name  
Enter value

Synonyms ▾

Add value

Synonyms

Add synonym... +

	Entity values (7) ▾	Type	
<input type="checkbox"/>	AC	Synonyms	ac, acs, air conditioner, air conditioners, air con
<input type="checkbox"/>	fan	Synonyms	cooler, fans
<input type="checkbox"/>	heater	Synonyms	heat, heating, heat vent, heat vents, hotter
<input type="checkbox"/>	lights	Synonyms	bulb, bulbs, foglight, fog light, foglights, fog lig
<input type="checkbox"/>	music	Synonyms	itune, itunes, music station, music stations, ra
<input type="checkbox"/>	volume	Synonyms	sound, speaker, speakers, vol
<input type="checkbox"/>	wipers	Synonyms	windscreen wiper, windscreen wipers, windsh

# System Entities

System entities are common entities created by IBM that could be used across any use case. They are ready to use as soon as you add them.

Intents    **Entities**    Dialog    Content Catalog

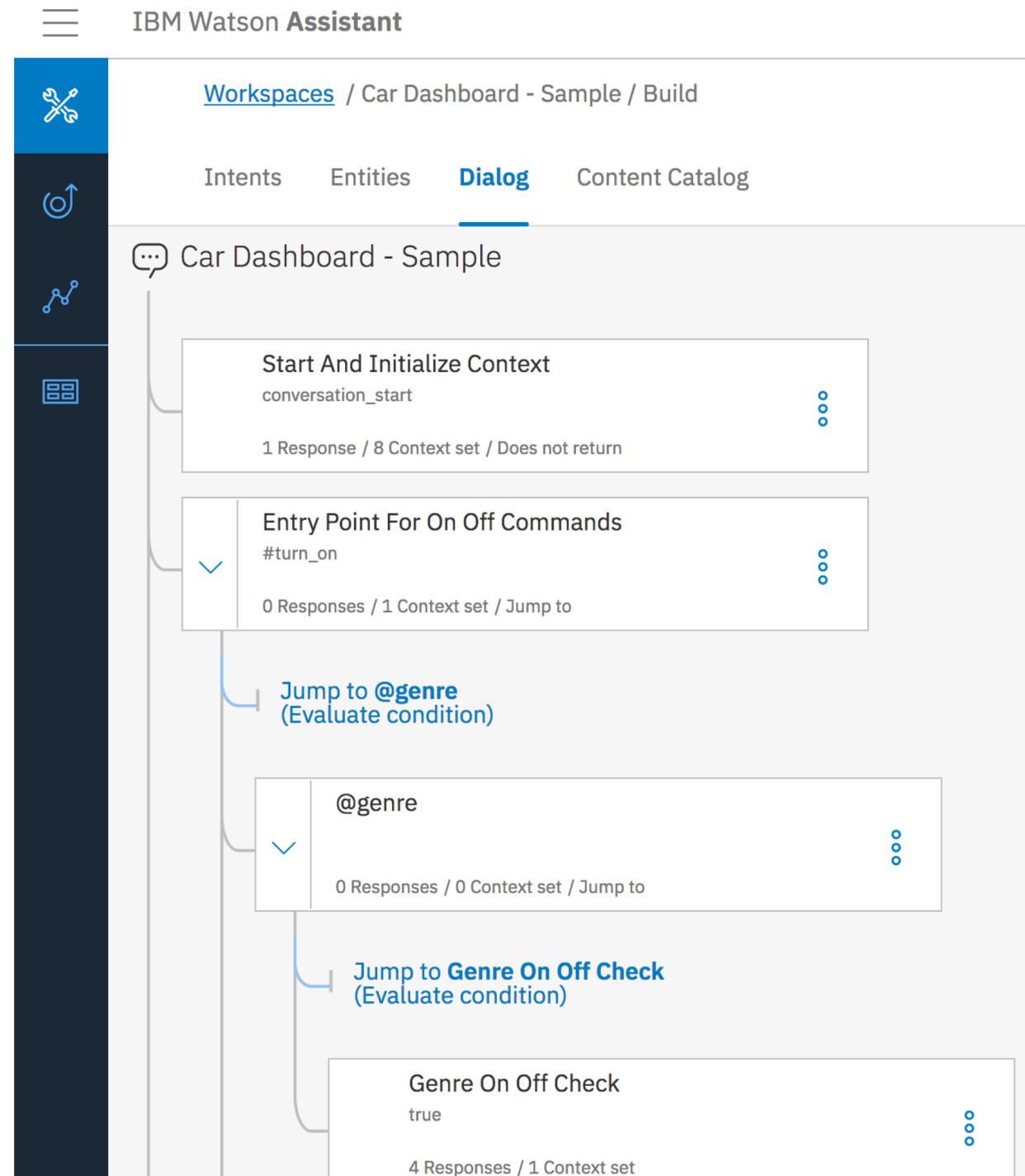
My entities    **System entities**

- > **@sys-currency** Extracts currency values from user examples including the amount and the unit. (20 cents)  Off
- > **@sys-date** Extracts date mentions (Friday)  Off
- > **@sys-location BETA** The @sys-location system entity extracts place names (country, state/province, city, town, etc.) from the user's input. (Boston)  Off
- > **@sys-number** Extracts numbers mentioned from user examples as digits or written as numbers. (21)  Off
- > **@sys-percentage** Extracts amounts from user examples including the number and the % sign. (15%)  Off
- > **@sys-person BETA** The @sys-person system entity extracts names from the user's input. (Anna)  Off
- > **@sys-time** Extracts time mentions (at 10)  Off

# Dialog

A dialog uses intents, entities, and context from your application to define a response to each user's input.

Creating a dialog defines how your virtual assistant will respond to what your users are saying.

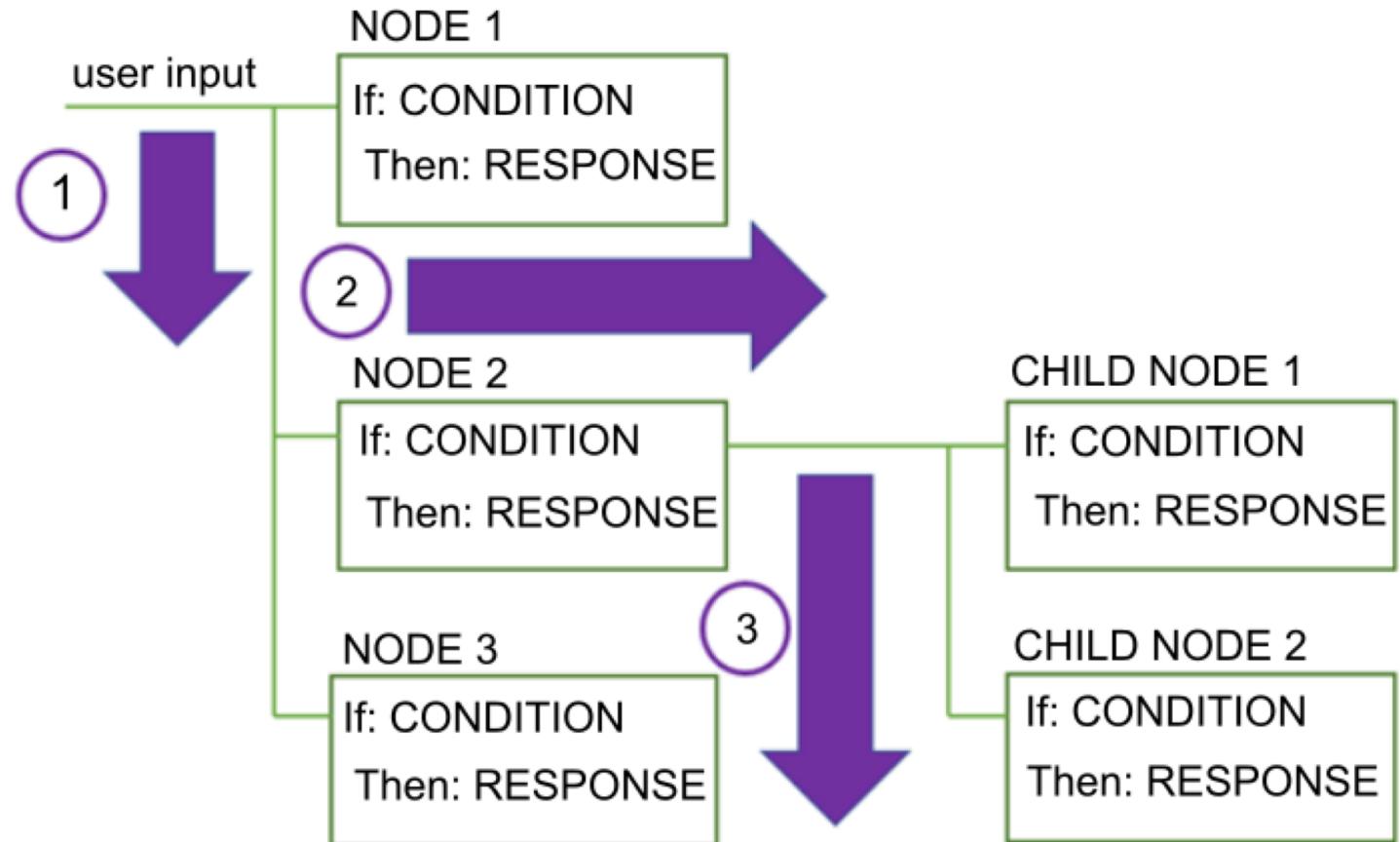


# Dialog

Dialog is processed by the service from the first node in the tree to the last.

If the service finds a condition that is met, it triggers that node.

It then moves along the triggered node to check the user input against any child node conditions.



# Slots

Add slots to a dialog node to gather multiple pieces of information from a user within that node.

Slots collect information at the users' pace. Details the user provides upfront are saved, and the service asks only for the details they do not.

## Book Reservation

Then check for:

Check for	Save it as	If not present, ask
1 @cuisine	\$cuisine	What type of cuisine would you like?
2 @sys-date	\$date	What day would you like to eat?
3 @sys-time	\$time	What time would you like to eat?
4 @sys-number	\$number	How many people will be eating?

 Add slot

# Digressions

Use digressions to handle interruptions and off topic short conversations.

Digressions allow the user to change topics or ask for more information and allows them to come back to the original intent.

Example:

Make an appointment.

I need to talk to an agent.

What times are you open?

The screenshot shows the IBM Watson Assistant interface. On the left, the 'Dialog' tab is selected in the workspace navigation bar. Below it, the 'Customer Service - Sample' dialog flow is visible, containing nodes like 'Opening welcome', 'Hours of Operation', 'Directions and location', 'Make an appointment', 'Transfer to agent', and 'Small Talk'. The 'Make an appointment' node is currently selected. A modal dialog titled 'Customize "Make an appointment"' is open over the workspace. This modal has two tabs at the top: 'Customize node' (selected) and 'Digressions' (highlighted with a blue border). The main content area of the modal is titled 'This node has **edited** digressions settings'. It contains two sections: 'Digressions can go away from this node' and 'Digressions can come into this node'. Both sections include descriptive text, icons, and toggle switches. The 'Allow digressions away while slot filling' switch is turned on (blue), and the 'Only digress from slots to nodes that allow returns' checkbox is unchecked. The 'Allow digressions into this node' switch is also turned on (blue), and the 'Return after digression' checkbox is unchecked. At the bottom right of the modal are 'Cancel' and 'Apply' buttons.

# Handlers

Use handlers to

- Help the user respond to a slot.
- Configure individual slots.

IBM Watson Assistant

Workspaces / Customer Service - Sample /

Intents Entities Dialog Content

Opening welcome  
1 Response / 1 Context set / Does not return

Hours of Operation  
#Customer\_Care\_Store\_Hours  
5 Responses / 0 Context set / Returns

Directions and location  
#Customer\_Care\_Store\_Location  
3 Responses / 0 Context set / Skip user input

Skip user input. The first child node

Provide location  
true  
1 Response / 0 Context set

Make an appointment  
#Customer\_Care\_Appointments  
3 Responses / 7 Context set / 5 Slots / Does not return

Transfer to agent  
#General\_Connect\_to\_Agent  
1 Response / 0 Context set / Does not return

Manage handlers for "Make an appointment"

Handlers are how your virtual assistant will respond when the user's answer to a prompt is not found. These handlers will be checked before trying the "Not found" responses in a slot.

If answer to any prompt is not found and:

	If bot recognizes	Respond with	
1	#Help	I see you need help making an appo	
2	#Cancel	OK. Canceling your request...	
3	#Thanks	You are welcome. Let's continue.	

Add handler

Cancel Save

# Some tips before you start

- Start on paper and have a conversation with a friend (***discover intents, entities and create dialog***).
- Don't repeat yourself too many times - unless the information is absolutely necessary to meet the goal or help the end user (***slots***).
- Keep it natural - let the users digress and come back to finish the current conversation (***digressions***).
- Give the users a way out ! (***handlers***)
- Remember details about the users (***context***)
- Forget details when the user starts again (***empty out context***)
- Confirm details in a natural way “I have booked a table for two at 7pm tonight”.
- Enable Fuzzy logic – beta feature

# IBM Code SF – Upcoming Events

17  
OCT

Wednesday, October 17, 2018, 9:30 AM

## Online Meetup: Anatomy of a chatbot and building a...



Hosted by Max K.

\*\*\* Please register at <https://www.crowdcast.io/e/anatomy-of-a-chatbot-and> Learn the fundamental concepts behind creating a chatbot that can have meaningful and natural conversations. You will learn about the Watson Assistant service and the building blocks of a conversation including intents, entities, slots, digressions, handlers...



Online Meetup  
Anatomy of a chatbot and building a meaningful conversation  
Learn the fundamental concepts behind creating a chatbot  
Wednesday, October 17, 9:30-10:00am PT  
4-part online meetup series (meetup #1)

Attend



Needs a location

31  
OCT

Wednesday, October 31, 2018, 9:30 AM

## Online Meetup: Deploy your bot to Slack and other social...



Hosted by Max K.

\*\*\* Please register at <https://www.crowdcast.io/e/deploy-your-bot-to-slack> Now that you have a functioning bot, let's deploy it to slack ! We will explore using the built in Watson Connector as well as the botkit middleware. Additionally, we will see how some of the features of Watson Assistant surface in slack and how you can use features...



Online Meetup  
Deploy your bot to Slack and other social channels  
Learn the fundamental concepts behind creating a chatbot  
Wednesday, October 31, 9:30-10:00am PT  
4-part online meetup series (meetup #2)

Attend



Needs a location

25  
OCT

Thursday, October 25, 2018, 9:30 AM

## Online Meetup: Empower your chatbot and add a personality



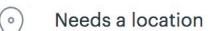
Hosted by Max K.

\*\*\* Please register at <https://www.crowdcast.io/e/empower-your-chatbot-and> We built a basic chatbot in part I. We continue the journey by adding more digressions and handlers to our bot thereby giving it a personality. Additionally, we will explore the more advanced features in Watson Assistant using the JSON editor. Final...



Online Meetup  
Empower Your Chatbot and Add a Personality  
IBM Developer  
Thursday, October 25, 2018 at 9:30 AM - 10:00 PM PT  
4-Part Online Meetup Series (Meetup #2)

Attend



Needs a location

6  
NOV

Tuesday, November 6, 2018, 9:30 AM

## Online Meetup: Continuously improve your Watson Bot using...



Hosted by Max K.

\*\*\* Please register at <https://www.crowdcast.io/e/continuously-improve> Now that you have a bot live and deployed to your favorite social media, how can you continue to gather user feedback and improve your conversation ? How can the bot start to learn new terminology and content using your help ? We will look at the vario...



Online Meetup  
Continuously improve your Watson Bot using analytics and metrics  
IBM Developer  
Learn the fundamental concepts behind creating a chatbot.  
With guest speaker Justina Nguyen from Dashbot  
Tuesday, November 6, 9:30-10:00am PT  
4-part online meetup series (meetup #4)

Attend



Needs a location

# THANK YOU

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