

ORACLE®

Oracle Digital Assistant

The Complete Training

Adaptive Bot Design

Safe Harbor Statement

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Topic Agenda

- 1 ➤ Messengers
- 2 ➤ Adaptive bot design
- 3 ➤ Adaptive design in BotML
- 4 ➤ Adaptive design in custom components
- 5 ➤ Channel simulator

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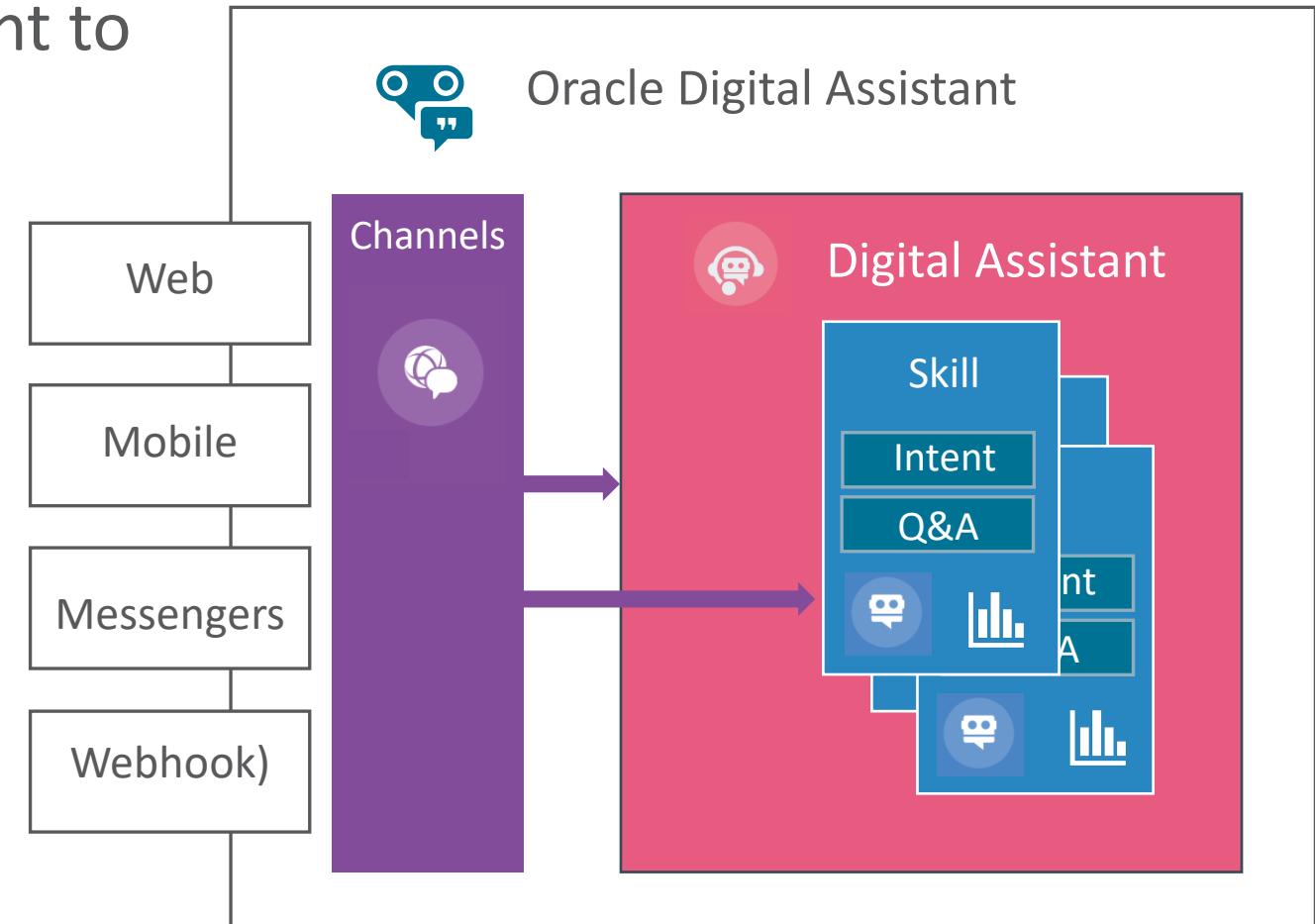
The role of messengers in conversational AI

- Endpoint to interact with users
 - Queue and deliver messages
- Render the user interface
 - Bot responses
 - User input
- Handle file upload / download
- Available on different devices and platforms

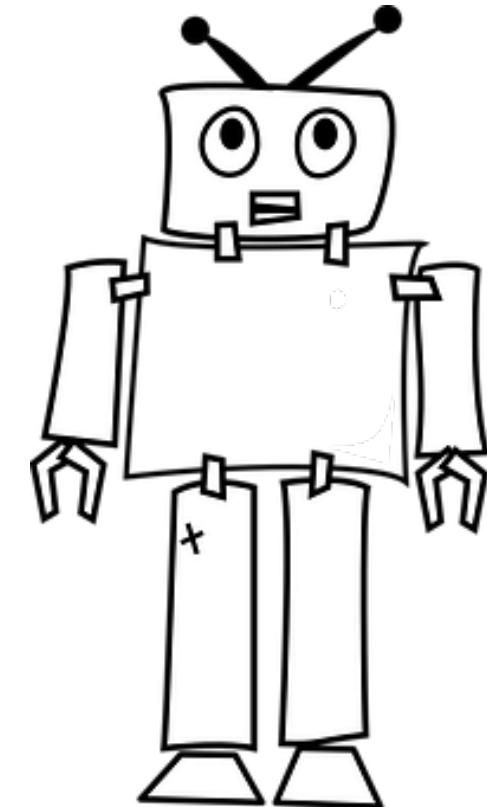


Channels in Oracle Digital Assistant

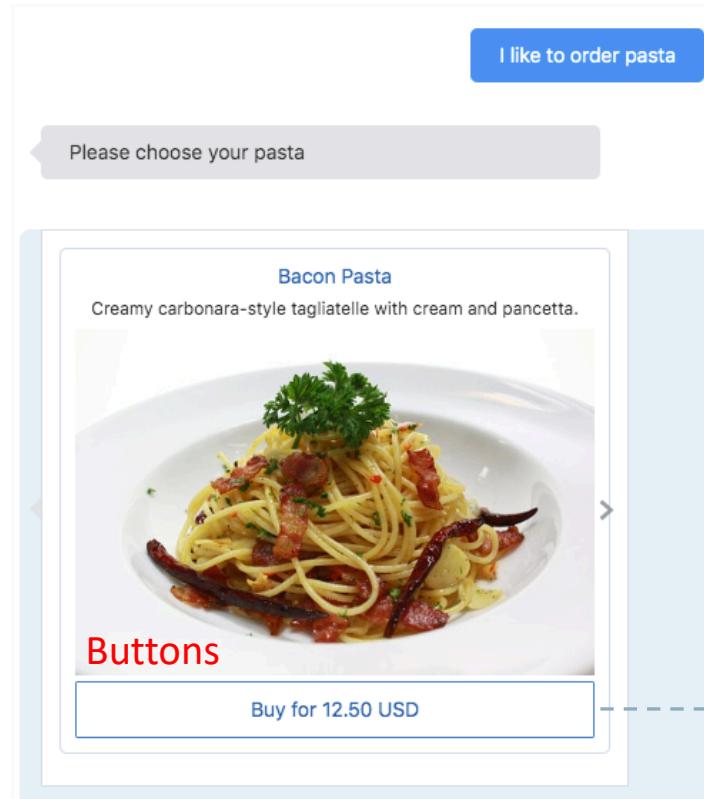
- Connect skills and digital assistant to messengers
 - 3rd party
 - Oracle SDK for JS, iOS, Android
 - Custom: Webhook
 - Text
 - Voice (Alexa etc.)
- Channels translate message payloads from and to digital assistant metadata format



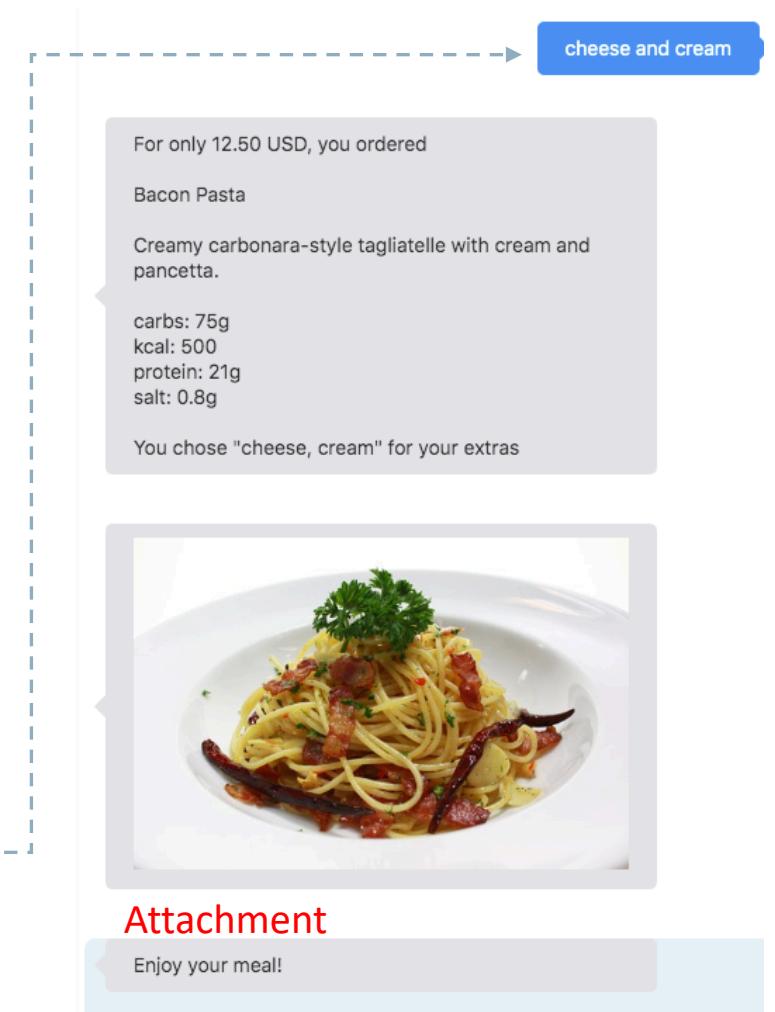
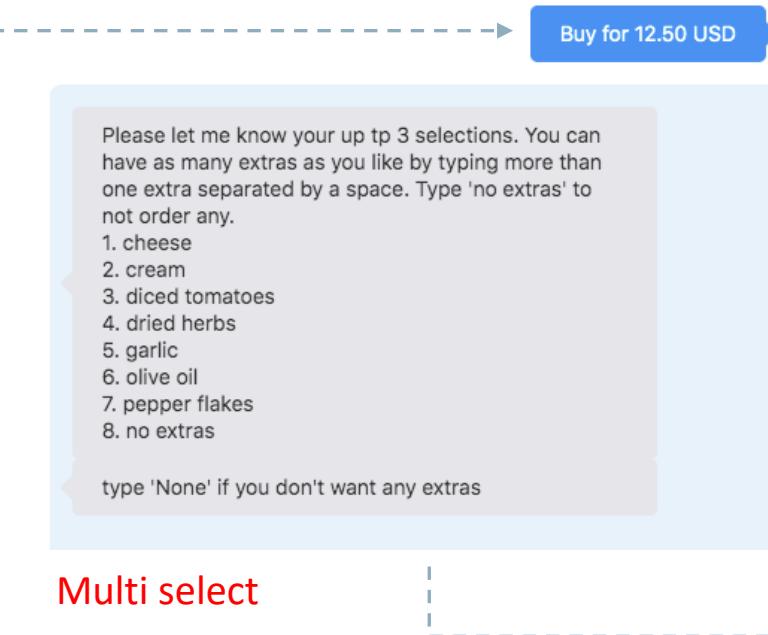
To look the same does not mean to be the same. In this regard, messengers are similar to operating systems.



Example: messenger supporting a rich layout



Card layout



Attachment

Example: messenger supporting text

The screenshot shows a messenger conversation between a user and a bot. The user's messages are on the left, and the bot's responses are on the right. A dashed blue arrow indicates the flow from the user's message to the bot's response.

User Message: I like to order pasta

Bot Response: Please choose your pasta

User Message:

- Bacon Pasta
Creamy carbonara-style tagliatelle with cream and pancetta.
https://cdn.pixabay.com/photo/2015/08/18/13/18/spaghetti-894077_340.jpg
Buy for 12.50 USD
- Beef ragout
classic bolognese with our exquisite beef ragout.
https://cdn.pixabay.com/photo/2016/12/31/09/17/food-1942403_340.jpg
Buy for 11.00 USD
- Chestnut mushroom fusilli
Store cupboard ingredients, spices and seasonal veg.
https://cdn.pixabay.com/photo/2017/11/10/03/pasta-2936529_340.jpg
Buy for 9.50 USD
- Fettuccine Alfredo
Our surprise-of-the-day seafood pasta in creamy sauce.
https://cdn.pixabay.com/photo/2015/03/07/17/20/seafood-fettuccine-663257_340.jpg
Buy for 8.50 USD
- Macaroni Cheese
A perfect macaroni dish with creamy cheese.
https://cdn.pixabay.com/photo/2017/05/31/02/56/food-photography-2358902_340.jpg
Buy for 8.00 USD
- Spaghetti Bolognese
The ultimate pasta dish with fresh tomatoe sauce.
https://cdn.pixabay.com/photo/2018/02/23/17/12/spaghetti-3176060_340.jpg
Buy for 5.00 USD

User Message:

Bot Response: I like to order pasta

User Message:

Bot Response: Please let me know up to 3 selections. You can have as many extras as you like by typing more than one extra separated by a space. Type 'no extras' to not order any.

Bot Response:

- 1. cheese
- 2. cream
- 3. diced tomatoes
- 4. dried herbs
- 5. garlic
- 6. olive oil
- 7. pepper flakes
- 8. no extras

Bot Response: type 'None' if you don't want any extras

User Message:

Bot Response: Classic Lasagne

User Message:

Bot Response: cream and garlic

Bot Response: For only 7.00 USD, you ordered

Bot Response: Classic Lasagne

Bot Response: Classic Italian lasagne with meat sauce.

Bot Response: carbs: 32g
kcal: 595
protein: 44g
salt: 0.8g

Bot Response: You chose "cream, garlic" for your extras

Bot Response: https://cdn.pixabay.com/photo/2016/02/04/03/22/lasagne-1178514_340.jpg

Bot Response: Attachment

Bot Response: Enjoy your meal!

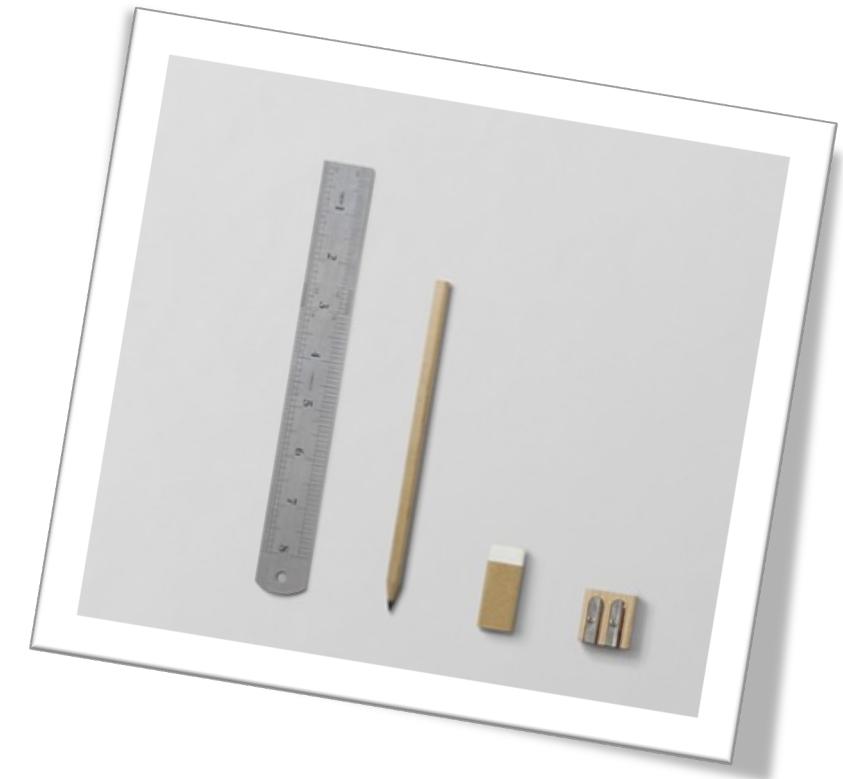
Text message: Multi select

Topic Agenda

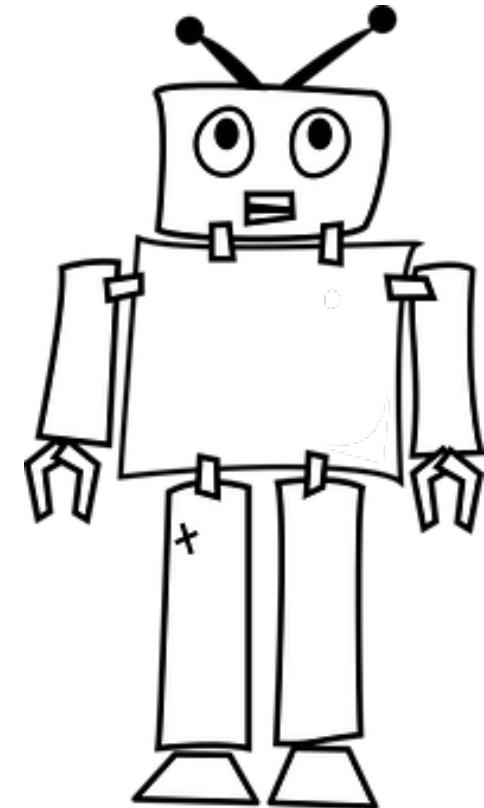
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About adaptive bot design

- Detects channel types and -names
 - Dialog flow
 - System.CommonResponse
 - Custom component
- Optimizes bot responses for a given channel
 - Use channel specific features
 - Custom properties
 - Channel templates (raw messages)
 - Deal with limitations
 - E.g. the number of cards that can be displayed in a card layout
 - E.g. text message length restrictions



**Adaptive bot design is all about
optimizing the user experience**



Adaptive design built in to Oracle Digital Assistant

- Native channels in Oracle Digital Assistant render the best possible layout for a bot response and messenger type
- Action items can be automatically provided with an index number
- Cards displayed vertically if horizontal layout is not supported (Slack)
- Ability to detect channel-type and –name in dialog flow, entities, configuration panels and custom components

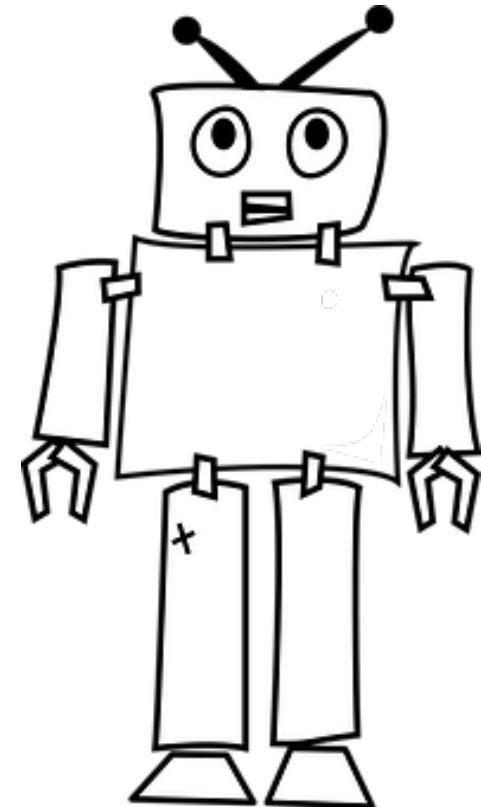
ODA conversation message model (CMM)

- Metadata language used by built-in components and custom components
- Creates channel agnostic message payloads
- Allow bots to run on any supported channel
 - Connectors translate CMM to messenger payload format and vice versa
 - Connectors are available for channels ODA has native support for
 - ODA renders best UI possible for a skill on a given messenger channel
- When building webhook channels, you need to perform the CMM to channel payload transformation
 - Oracle Bots Node SDK provides utility functions to assist you

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Build your bot **channel-independent**.
Then apply optimizations for specific
channels.



Detecting the channel type

- Apache FreeMarker expression
 - \${system.channelType}
 - Detects channel type in dialog flow and entity configuration
 - Returns 'facebook', 'web', 'test', 'msteams' etc.
- Channel type information can be used e.g. in System.Switch component to change dialog flow transitioning
- Channel type information accessible in skill configuration and entities
 - Use e.g. to change system messages and labels, data range sizes etc.

System.CommonResponse component

- "visible" property
 - Shows or hides response items
 - Allows optimization of bot responses for channels
 - Built-in support for detecting channels
 - May also use Apache FreeMarker expressions

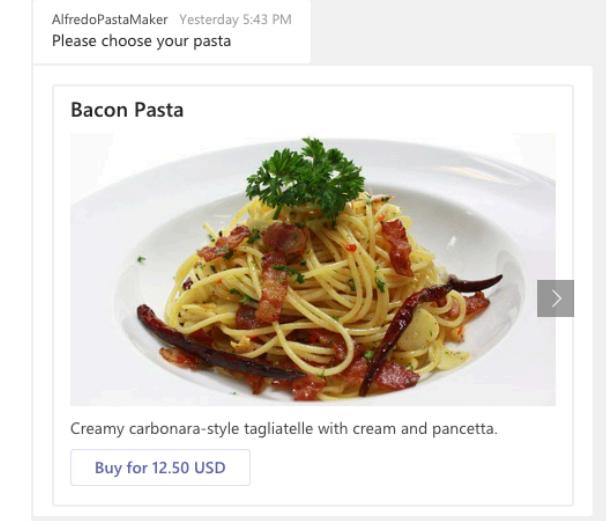
```
313   displaySelectedProduct:  
314     component: "System.CommonResponse"  
315     properties:  
316       processUserMessage: false  
317       metadata:  
318         responseItems:  
319           - type: "attachment"  
320             visible:  
321               expression: "${system.channelType != 'twilio'}"  
322             attachmentType: "image"
```

```
313   displaySelectedProduct:  
314     component: "System.CommonResponse"  
315     properties:  
316       processUserMessage: false  
317       metadata:  
318         responseItems:  
319           - type: "attachment"  
320             visible:  
321               channels:  
322                 include: "msteams,facebook,web"  
323                 exclude: "twilio"  
324             attachmentType: "image"
```

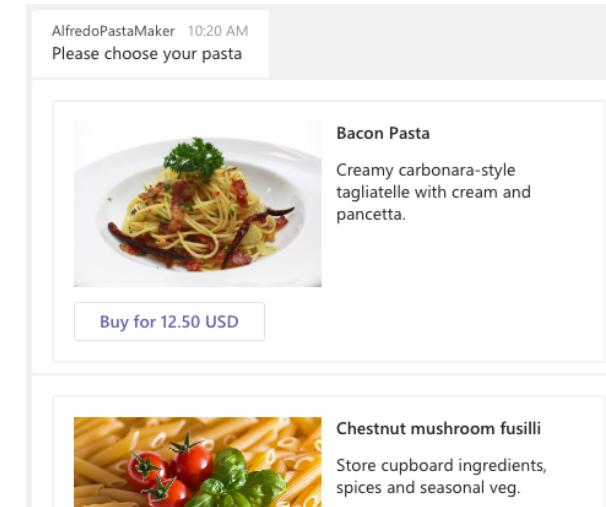
System.CommonResponse component

- channelCustomProperties
 - Property only available for common response component
 - Allows bot developers to apply channel specific layouts and properties to a bot response
 - Content replaces default UI at runtime
- UI extensions are messenger specific
 - Decide in your bot design whether you want to optimize for each messenger or apply a design that represents the lowest common denominator of all messengers to support

Default card layout



Adaptive card layout in MS teams



Auto numbering of postback actions

- Auto numbering prefixes list and card items with numbers
 - Users can type the number to select an option or a button
- Options to enable auto numbering
 - System.CommonResponse
 - Setting autoNumberPostbackActions property to true
 - Digital assistant's "Enable Auto Numbering on Postback Actions" configuration
 - Creating a dialog flow variable "autoNumberPostbackActions" of type boolean in a skill and setting its value to true
- Useful expression: \${((system.channelType=='twilio')?then(true,false))}

Example

Facebook

Bacon Pasta
Creamy carbonara-style tagliatelle with cream and pancetta.



Buy for 12.50 USD

Twilio SMS

Bacon Pasta
Creamy carbonara-style tagliatelle with cream and pancetta.
https://cdn.pixabay.com/photo/2015/08/18/13/18/spaghetti-894077_340.jpg

1. Buy for 12.50 USD

Chestnut mushroom fusilli
Store cupboard ingredients, spices and seasonal veg.
https://cdn.pixabay.com/photo/2017/11/10/03/pasta-2936529_340.jpg

2. Buy for 9.50 USD

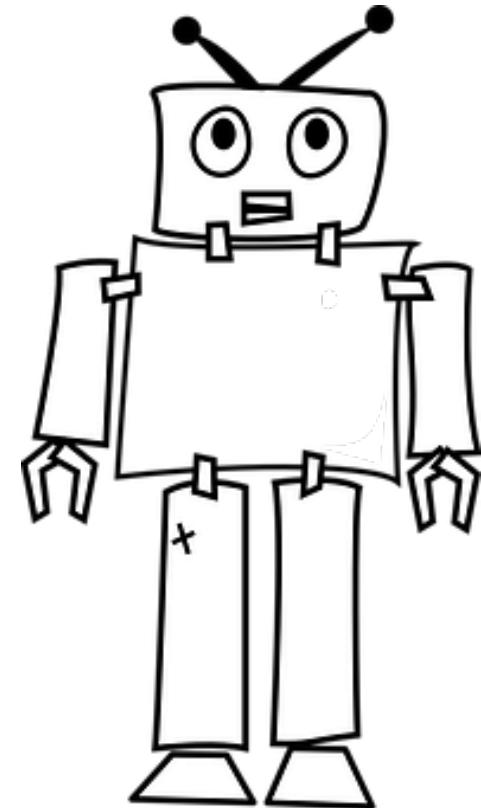
Fettuccine Alfredo
Our surprise-of-the-day seafood pasta in creamy sauce.
https://cdn.pixabay.com/photo/2015/03/07/17/20/seafood-fettuccine-663257_340.jpg

3. Buy for 8.50 USD

Macaroni Cheese
A perfect macaroni dish with creamy cheese.
https://cdn.pixabay.com/photo/2017/05/31/02/56/food-photography-2358902_340.jpg

4. Buy for 8.00 USD

Adaptive design is **not about layouts** only. You can also optimize labels and messages



Message length restrictions

- Messengers support different message sizes
 - You need to shorten messages if you don't like the default rendering behavior

Oracle web channel

purus fermentum risus, vulputate semper diam tellus ut elit. Curabitur magna enim, hendrerit sit amet magna et, ornare aliquam risus. Nullam fringilla elit quis pulvinar congue. Vivamus gravida volutpat hendrerit. Duis pellentesque, risus a commodo ullamcorper, enim odio vehicula purus, sed efficitur massa leo pulvinar mi. Phasellus varius metus erat, ut posuere nunc ornare id. Etiam hendrerit felis condimentum leo blandit pretium. Ut sed massa in est vulputate pulvinar vitae at nisi. Donec elementum leo eros, eu imperdiet diam semper eu. Donec auctor nisl urna, eget bibendum dui suscipit id. Phasellus sed bibendum ex, quis vulputate ex. Vestibulum vel enim bibendum, suscipit tortor eu, viverra nisl. Ut ac justo quis mauris aliquam commodo sit amet ac odio.

Proin non maximus velit. Nulla facilisi. Orci varius natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Aliquam eu scelerisque orci, id egestas lorem. Mauris ullamcorper dolor interdum tellus congue faucibus. Nulla facilisi. Maecenas volutpat euismod sem ut tempor. Vivamus ut malesuada ante. Curabitur tellus magna, efficitur ut consectetur ac, dapibus et mauris. In efficitur dui vitae diam dapibus dignissim. Suspendisse ut hendrerit elit. Aliquam eu lectus vulputate, bibendum arcu vel, posuere felis.

Phasellus leo ex, porta vel sapien eu, molestie luctus purus. Vivamus magna enim, rhoncus id sodales ac, euismod vel turpis. Cras pellentesque dui lacus, vitae lacinia quam hendrerit a. Duis ac eros diam. Donec bibendum at orci vel faucibus. Etiam malesuada vel dolor sit amet pulvinar. Orci varius natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Suspendisse potenti. Proin at eleifend lectus. Aliquam vel suscipit ex. Maecenas at erat cursus, scelerisque ex id, ultrices risus. Quisque aliquet ornare lorem eu commodo. Aliquam sit amet tellus tristique, blandit orci a, sodales nisi. Vivamus gravida massa et urna cursus finibus.

Curabitur scelerisque odio risus, eu ornare arcu molestie non. Donec in elementum purus, a scelerisque mi. Phasellus vitae metus ut justo fringilla maximus. Proin nibh est, sagittis ut nunc vitae, volutpat sagittis tortor. Donec fringilla orci ac ex sagittis fringilla. Quisque semper, eros in suscipit iaculis, urna lacus vestibulum felis, ut blandit dolor nulla id nisi. Donec efficitur accumsan tempus. Integer id sodales ex.

Facebook channel

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Pellentesque sodales ipsum metus. Phasellus et nulla nisi. Vivamus pharetra, erat vel vestibulum lobortis, nisl purus fermentum risus, vulputate semper diam tellus ut elit. Curabitur magna enim, hendrerit sit amet magna et, ornare aliquam risus. Nullam fringilla elit quis pulvinar congue. Vivamus gravida volutpat hendrerit. Duis pellentesque, risus a commodo ullamcorper, enim odio vehicula purus, sed efficitur massa leo pulvinar mi. Phasellus varius metus erat, ut posuere nunc ornare id. Etiam hendrerit felis condimentum leo blandit pretium. Ut sed massa in est vulputate

pulvinar vitae at nisi. Donec elementum leo eros, eu imperdiet diam semper eu. Donec auctor nisl urna, eget bibendum dui suscipit id. Phasellus sed bibendum ex, quis vulputate

Channel Limitations

- Message exceeds maximum text length of 640,

magna, efficitur ut consectetur ac, dapibus et mauris. In efficitur dui vitae diam dapibus dignissim. Suspendisse ut hendrerit elit. Aliquam eu lectus vulputate, bibendum arcu vel, posuere felis.

Phasellus leo ex, porta vel sapien eu, molestie luctus purus. Vivamus magna enim, rhoncus id sodales ac, euismod vel turpis. Cras pellentesque dui lacus, vitae lacinia

Twilio SMS channel

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Pellentesque sodales ipsum metus. Phasellus et nulla nisi. Vivamus pharetra, erat vel vestibulum lobortis, nisl purus fermentum risus, vulputate semper diam tellus ut elit. Curabitur magna enim, hendrerit sit amet magna et, ornare aliquam risus. Nullam fringilla elit quis pulvinar congue. Vivamus gravida volutpat hendrerit. Duis pellentesque, risus a commodo ullamcorper, enim odio vehicula purus, sed efficitur massa leo pulvinar mi. Phasellus varius metus erat, ut posuere nunc ornare id. Etiam hendrerit felis condimentum leo blandit pretium. Ut sed massa in est vulputate

Channel Limitations

- Message exceeds maximum text length of 1,600

sit amet ac odio.

Proin non maximus velit. Nulla facilisi. Orci varius natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Aliquam eu scelerisque orci, id egestas lorem. Mauris ullamcorper dolor interdum tellus congue faucibus. Nulla facilisi. Maecenas volutpat euismod sem ut tempor. Vivamus ut malesuada ante. Curabitur tellus magna, efficitur ut consectetur ac, dapibus et mauris. In efficitur dui vitae diam dapibus dignissim. Suspendisse ut hendrerit elit. Aliquam eu lectus vulputate, bibendum arcu vel, posuere felis.

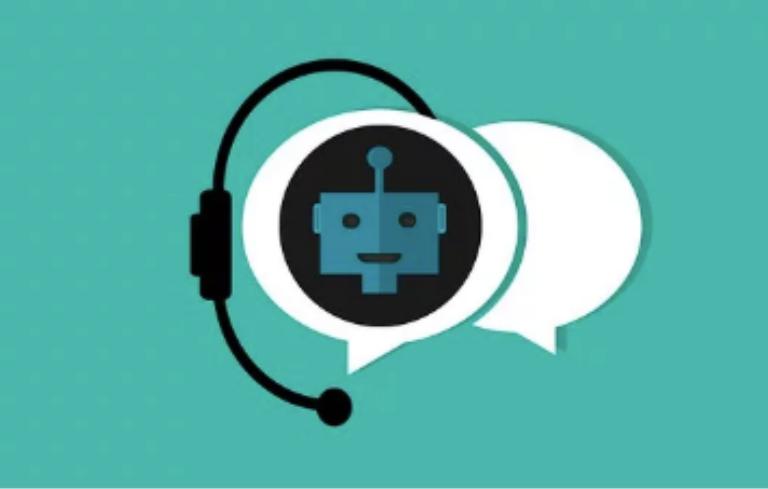
Phasellus leo ex, porta vel sapien eu, molestie luctus purus. Vivamus magna enim, rhoncus id sodales ac, euismod vel turpis. Cras pellentesque dui lacus, vitae lacinia

pellentesque dui lacus, vitae lacinia quam hendrerit a. Duis ac eros diam. Donec bibendum at orci vel faucibus. Etiam malesuada vel dolor sit amet pulvinar. Orci varius natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Suspendisse potenti. Proin at eleifend lectus. Aliquam vel suscipit ex. Maecenas at erat cursus, scelerisque ex id, ultrices risus. Quisque aliquet ornare lorem eu commodo. Aliquam sit amet tellus tristique, blandit orci a, sodales nisi. Vivamus gravida massa et urna cursus finibus.

Label Restrictions

- Messengers support different label sizes

Oracle Web channel

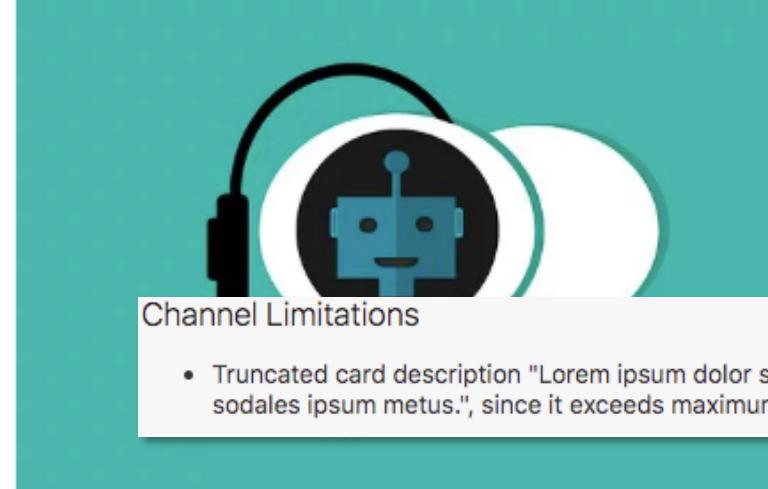


Oracle Web channel

Card description: Lorem ipsum dolor sit amet, consectetur adipiscing elit.
Lorem ipsum dolor sit amet, consectetur adipiscing elit.
Pellentesque sodales ipsum metus.

<https://www.oracle.com>

Facebook channel



Facebook channel

Card description: Lorem ipsum dolor sit amet, consectetur adipiscing elit.
Lorem ipsum dolor sit amet, consectetur adipiscing elit.
Pellentesque sodales ip...

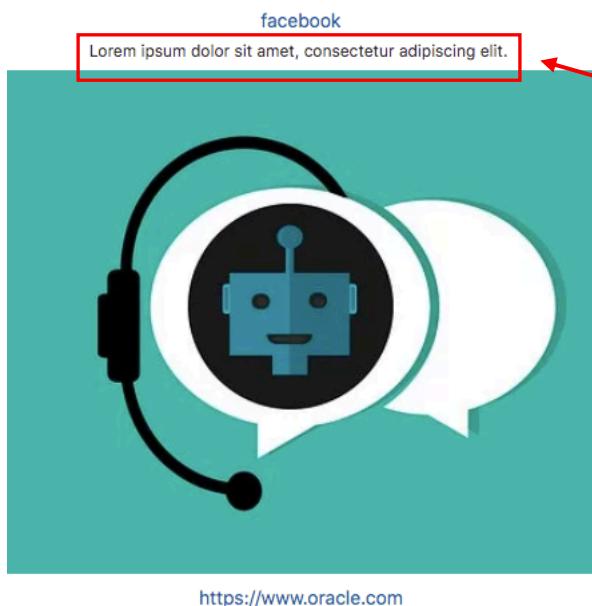
Channel Limitations

- Truncated card description "Lorem ipsum dolor sit amet, consectetur adipiscing elit. Pellentesque sodales ipsum metus.", since it exceeds maximum length of 80.

<https://www.oracle.com>

Handling message and label length restrictions

- Use of resource bundles
 - Provide shorter labels and messages if channel has known restrictions

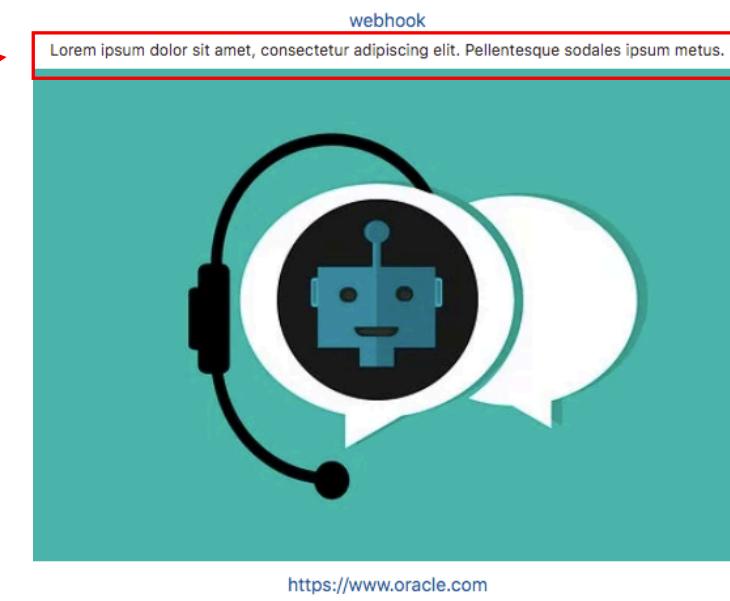


A screenshot of the Oracle Service Console under the "User-Defined" tab. It shows a list of resource bundle keys:

- + Key
- description_webhook
- description_facebook
- title_facebook
- title_webhook

Below the list, there is some JSON code:

```
responseItems:  
- type: "cards"  
  cardLayout: "vertical"  
  cards:  
  - title: "${system.channelType}"  
    description: "${rb('description_${system.channelType}')}"
```



Topic Agenda

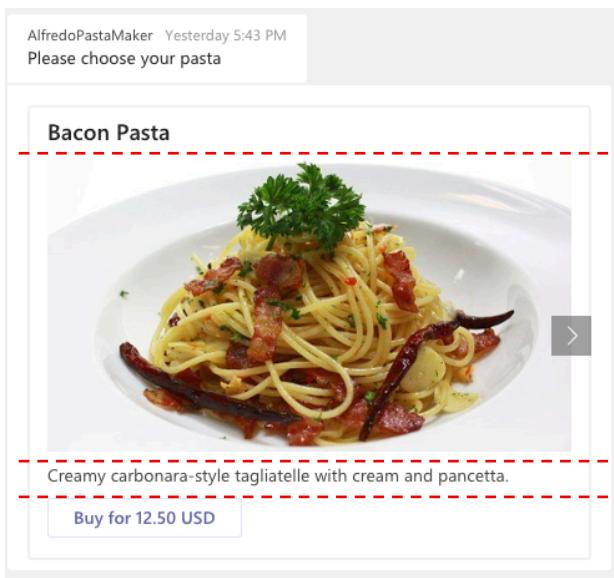
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Detecting the channel type

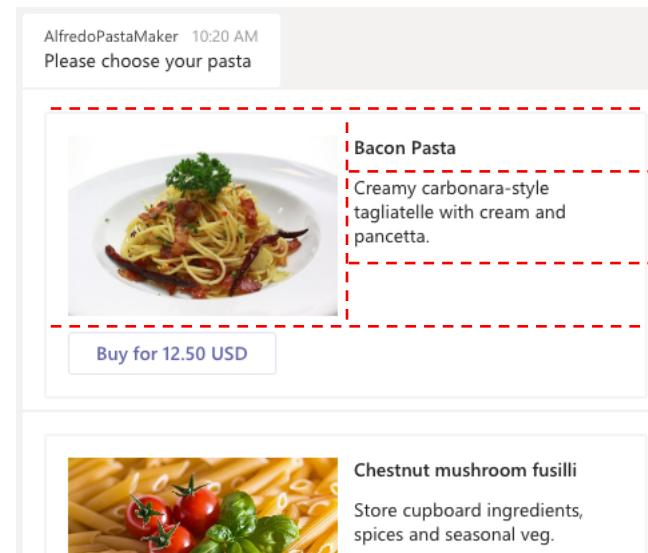
- Custom components
 - `conversation.channelType()`
 - `channelType()` function exposed on custom component SDK
 - Returns 'facebook', 'web', 'test', 'msteams' etc.
- Custom components can render layouts specific for a channel if needed
 - Change in behavior
 - Change in rendered UI

Using raw payloads

- Raw payloads are messages that don't use the CMM metadata format
 - Payload content is sent to messenger "as-is"
 - No format transformation applied by the connectors
 - Allows custom components to make layouts available only for a specific channel



vs.



Adaptive card in Microsoft Teams

Microsoft | Adaptive Cards Documentation Schema Explorer

Open Sample Select host app: Bot Framework WebChat Host App Docs Templates

Card Elements

- Containers
 - Container
 - ImageSet
 - FactSet
 - ColumnSet
- Elements
 - TextBlock
 - RichTextBlock
 - Image
 - Media
 - ActionSet
- Inputs
 - Input.Text
 - Input.Date
 - Input.Time
 - Input.Number
 - Input.ChoiceSet
 - Input.Toggle

For only 5.00 USD you bought
Spaghetti Bolognese



The ultimate pasta dish with fresh tomato sauce.

carbs: 75g	salt: 0.3g
kcal: 500	protein: 11g

Card Payload Editor

```
42           "text": "protein: 11g"
43         }]
44       }
45     },
46   ],
47   {
48     "type": "TextBlock",
49     "text": "As extras, you chose: cream"
50   }
}
```

Source code in JSON format

Rendered by custom component

AlfredoPastaMaker 12:51 PM

For only 12.50 USD you bought

Bacon Pasta



Creamy carbonara-style tagliatelle with cream and pancetta.

carbs: 75g	salt: 0.8g
kcal: 500	protein: 21g

As extras, you chose: cream, garlic

<https://adaptivecards.io/designer/>

Oracle Digital Assistant in MS Teams

Custom component source

```
31  if (conversation.channelType() == 'msteams') {  
32  
33    let adaptiveCardPayload = {  
34      "type": "message",  
35      "attachments": [  
36        {"contentType": "application/vnd.microsoft.card.adaptive",  
37        "content": {  
38          "type": "AdaptiveCard",  
39          "$schema": "http://adaptivecards.io/schemas/adaptive-card.json",  
40          "version": "1.0",  
41          "body": [  
42            {  
43              "type": "TextBlock",  
44              "text": "For only " + price + " you bought"  
45            },  
46            {  
47              "type": "TextBlock",  
48              "text": title,  
49              "size": "Medium",  
50              "weight": "Bolder",  
51              "wrap": true  
52            }  
53          ]  
54        }  
55      }  
56    }  
57  
58    let rawMessage = conversation.MessageModel().rawConversationMessage(adaptiveCardPayload);  
59    conversation.transition();  
60    conversation.reply(rawMessage);  
61    //no need for user input, thus setting keepTurn to true  
62    conversation.keepTurn(true);  
63    done();  
64  }
```

Adaptive card
JSON format

referenced in

```
108  let rawMessage = conversation.MessageModel().rawConversationMessage(adaptiveCardPayload);  
109  conversation.transition();  
110  conversation.reply(rawMessage);  
111  //no need for user input, thus setting keepTurn to true  
112  conversation.keepTurn(true);  
113  done();
```

MessageModel() is part of custom
component SDK

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Embedded conversation tester with channel simulator

Bot Tester Test Cases Test Run Results

Save as Test Case Reset Channel

Facebook Messenger

Facebook Messenger
Microsoft Teams
Skype For Business
Slack
Twilio SMS
Twilio SMS/MMS
Web

For only 12.50 USD, you ordered
Bacon Pasta
Creamy carbonara-style tagliatelle with cream and pancetta.
carbs: 75g
kcal: 500
protein: 21g
salt: 0.8g
You chose "cream, garlic" for your extras



For only 12.50 USD, you ordered
Bacon Pasta
Creamy carbonara-style tagliatelle with cream and pancetta.
carbs: 75g
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https://cdn.pixabay.com/photo/2015/08/18/13/18/spaghetti-894077_340.jpg

Bacon Pasta
Creamy carbonara-style tagliatelle with cream and pancetta.
1. Buy for 12.50 USD



Chestnut mushroom fusilli
Store cupboard ingredients, spices and seasonal veg.
2. Buy for 9.50 USD



Channel simulator

- With the embedded tester, you can test skills on different channels without deploying them on those channels
- Skill tester applies channel limitations to conversation
 - Renders bot response as if conversation executed in specified channel
 - Alerts users about channel specific restrictions
- Simulator is not a 1 – 1 copy of the channels with all their features
 - Simulator is not meant to behave exactly like a channel
 - E.g. Microsoft Teams adaptive cards don't render
- \${system.channelType} returns simulated channel name

Embedded conversation tester with channel simulator

Slack

Bot Tester Test Cases Test Run Results

Save as Test Case Reset Channel: Slack

Buy for 12.50 USD

Chestnut mushroom fusilli
Store cupboard ingredients, spices and seasonal veg.

Conversation Intent/Q&A View JSON

Channel Limitations

- Card layout horizontal is not supported. Changing to vertical layout.

States

```
graph TD; Start(( )) --> setAutoNumbering[setAutoNumbering]; setAutoNumbering --> setPastas[setPastas]; setPastas --> intent[intent]; intent --> showMenu[showMenu]
```

JaptiveAlfredoPasta Skill

Embedded conversation tester with channel simulator

Twilio SMS

The screenshot shows the Bot Tester interface for the Twilio SMS channel. The left pane displays a conversation transcript:

- User: Please choose your pasta
- Bot: Bacon Pasta
Creamy carbonara-style tagliatelle with cream and pancetta.
https://cdn.pixabay.com/photo/2015/08/18/13/18/spaghetti-894077_340.jpg
1. Buy for 12.50 USD
- Bot: Chestnut mushroom fusilli
Store cupboard ingredients, spices and seasonal veg.
https://cdn.pixabay.com/photo/2017/11/10/15/03/pasta-2936529_340.jpg
2. Buy for 9.50 USD
- Bot: Fettuccine Alfredo
Our surprise-of-the-day seafood pasta in creamy sauce.
https://cdn.pixabay.com/photo/2015/10/07/17/00/fettuccine-1004510_340.jpg

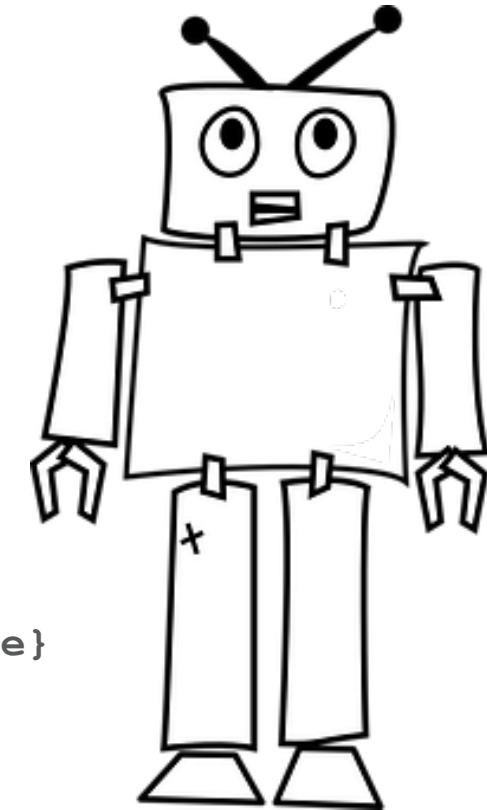
The right pane shows the Conversation tab with the following content:

- Channel Limitations**
 - Cards are not supported, so converting to text.
 - You can optimize text rendering of cards by setting the channel custom property 'optimizeCardRendering' to 'true'.
 - Action buttons are not supported, so converting to text. Entering the label triggers the action.
- States**
 - A state diagram for the `/FettuccineAlfredoPasta Skill` with a single state labeled `setAutoNumbering`.

A red arrow points from the "Cards are not supported" limitation in the Channel Limitations section to the card representation in the conversation transcript.

If needed, use the expression below to tell if a skill executes in the tester.

```
 ${system.message.channelConversation.properties.channelToSimulate}
```



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