

ORACLE®

# Oracle Digital Assistant

## The Complete Training

Entities

# Safe Harbor Statement

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# Topic agenda

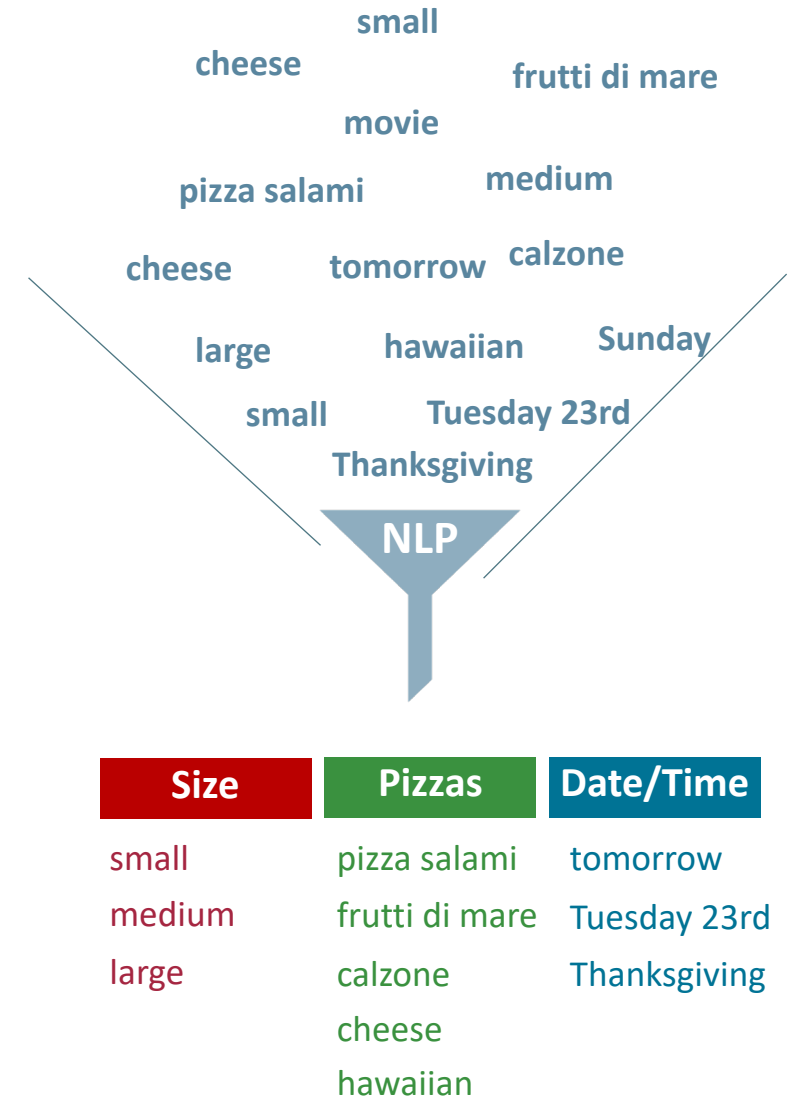
- 1 ➤ Introduction to entities
- 2 ➤ Built-in entities
- 3 ➤ Custom entities
- 4 ➤ Entity properties

# Topic agenda

- 1 Introduction to entities
- 2 Built-in entities
- 3 Custom entities
- 4 Entity properties

# Introduction to entities

- A variable piece of information of an intent
  - Helps add relevance to the intent
  - Associated with an intent
  - Extracted from user message through NLP
- Types
  - Regular entities
    - System entities, custom entities
  - Composite bag entities
    - Business domain objects
  - Dynamic entities
    - Data created, modified and deleted through API



# Introduction to entities

- I want a small pepperoni pizza delivered today 8pm
- Can I order a large veggie pizza for Thanksgiving
- Order me a cheese pizza for 8pm and make it large

Order Pizza  
Entity: Pizza Size

Small

Medium

Large

Order Pizza  
Entity: Pizza Type

Cheese

Pepperoni

Veggie

Order Pizza  
Entity: DATE

# Introduction to entities

- I want a **small** **pepperoni** pizza delivered **today 8pm**
- Can I order a large veggie pizza for Thanksgiving
- Order me a cheese pizza for 8pm and make it

Order Pizza  
Entity: Pizza Size

Small

Medium

Large

Order Pizza  
Entity: Pizza Type

Cheese

Pepperoni

Veggie

Order Pizza  
Entity: DATE



# Introduction to entities

- I want a **small** **pepperoni** pizza delivered **today 8pm**
- Can I order a **large** **veggie** pizza for **Thanksgiving**
- Order me a cheese pizza for 8pm and make it large

Order Pizza  
Entity: Pizza Size

Small

Medium

Large

Order Pizza  
Entity: Pizza Type

Cheese

Pepperoni

Veggie

Order Pizza  
Entity: DATE

# Introduction to entities

- I want a **small** **pepperoni** pizza delivered **today 8pm**
- Can I order a **large** **veggie** pizza for **Thanksgiving**
- Order me a **cheese** pizza for **8pm** and make it **large**

Order Pizza  
Entity: Pizza Size

Small

Medium

Large

Order Pizza  
Entity: Pizza Type

Cheese

Pepperoni

Veggie

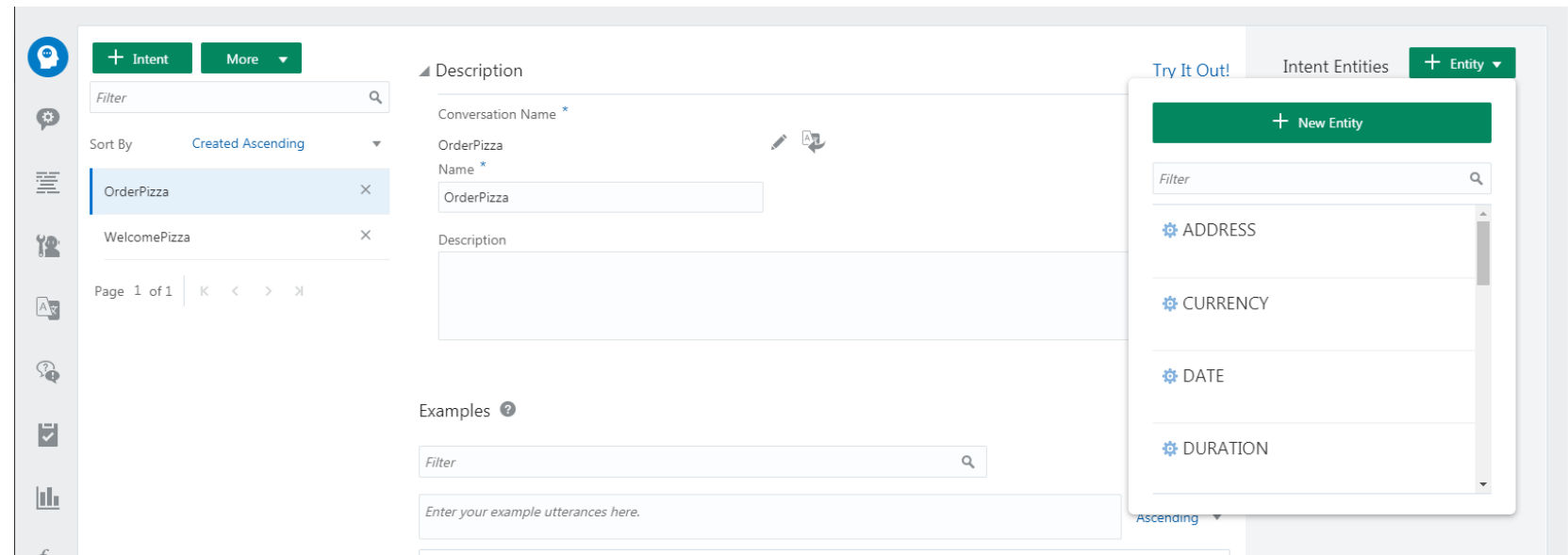
Order Pizza  
Entity: DATE

# Topic agenda

- 1 Introduction to entities
- 2 Built-in entities**
- 3 Custom entities
- 4 Entity properties

# Built-in entities

- Implicitly exist
- You must add to the intent
- Only parsed for if added to intent
- Entity can resolve to many values
- Add multiple entities



# Built-in entities

- Address
  - Currency
  - Date
  - Duration
  - Email
  - Number
- Person
  - Phone number
  - Set
  - Time
  - URL
  - Yes\_No
  - Location

# Some built in entity examples

- Number

I loved the movie so much I saw it 20 times

```
{
  "appId": "1E4BABB4-050F-4263-B99A-1041974E50FC",
  "entityMatches": {
    "NUMBER": [
      20
    ]
  },
  "intentMatches": {
    "Negative": 3.5524978160858156,
    "Positive": 3.896050727367401
  },
}
```

# Some built in entity examples

- Number

I loved the movie so much I saw it **ten** times

```
{
  "appId": "1E4BABB4-050F-4263-B99A-1041974E50FC",
  "entityMatches": {
    "NUMBER": [
      10
    ]
  },
  "intentMatches": {
    "Negative": 3.5524978160858156,
    "Positive": 3.896050727367401
  },
}
```

# Some built in entity examples

- Number

I loved the movie so much the **second**  
time

```
{
  "appId": "1E4BABB4-050F-4263-B99A-1041974E50FC",
  "entityMatches": {
    "NUMBER": [
      2
    ]
  },
  "intentMatches": {
    "Negative": 3.5643956780433657,
    "Positive": 3.922125017642975
  },
}
```



# Some built in entity examples

- Time

I went to the 2:30 screening and I loved the movie

```
{
  "appId": "1E4BABB4-050F-4263-B99A-1041974E50FC",
  "entityMatches": {
    "DATE": [
      1488249000000
    ],
    "TIME": [
      {
        "hrs": 2,
        "mins": 30,
        "secs": 0,
        "entityName": "TIME"
      }
    ]
  }
},
```

# Some built in entity examples

- Date

I saw the movie yesterday and I loved the movie

```
{
  "appId": "1E4BABB4-050F-4263-B99A-1041974E50FC",
  "entityMatches": {
    "DATE": [
      1488193208798
    ]
  },
  "intentMatches": {
    "Negative": 3.637948226928711,
    "Positive": 4.032271480560302
  },
}
```

# Some built in entity examples

- Date

I saw the movie on the 1st March 2017  
and I loved the movie

```
{
  "appId": "1E4BABB4-050F-4263-B99A-1041974E50FC",
  "entityMatches": {
    "DATE": [
      1488367629720
    ]
  },
  "intentMatches": {
    "Negative": 3.6396953582763674,
    "Positive": 4.031814193725586
  },
  "intentMatch": {
    "stage-1": [
      {

```

# Some built in entity examples

- Duration

how much did I spend **last month**

```
{
  "appId": "BB3445D3-38C4-4903-B18F-DE8A67CC6618",
  "entityMatches": {
    "DURATION": [
      {
        "startDate": "Sun Jan 01 2017 00:00:00 GMT+0000 (GMT Standard Time)",
        "endDate": "Tue Jan 31 2017 23:59:59 GMT+0000 (GMT Standard Time)",
        "entityName": "DURATION"
      }
    ]
  },
  "intentMatches": {
    "Send Money": 0,
    "Balances": 1.6222682118415832,
    "Track Spending": 2.97281813621521
  }
}
```

# Some built in entity examples

- Person

i want to order a pizza for John Smith

```
[
  {
    "appId": "8CC6DA2B-7404-45D6-A2F5-3A98349C7FAC",
    "botName": "GR_AutoComplete",
    "entityMatches": {
      "PERSON": [
        {
          "originalString": "John Smith",
          "name": "john smith",
          "entityName": "PERSON"
        }
      ]
    },
    "intentMatches": {
```

# Some built in entity examples

- Location

Find me a pizza place in Foster City

```
[
  {
    "appId": "8CC6DA2B-7404-45D6-A2F5-3A98349C7FAC",
    "botName": "GR_AutoComplete",
    "entityMatches": {
      "LOCATION": [
        {
          "originalString": "Foster City",
          "name": "foster city",
          "entityName": "LOCATION"
        }
      ]
    },
    "intentMatches": {
      ..
    }
  }
]
```

# Topic agenda

- 1 Introduction to entities
- 2 Built-in entities
- 3 Custom entities**
- 4 Entity properties

# Custom entities

- Domain-specific entities
  - ToAccount, PizzaSize, SpendingCategory
- Value list
- Derived
- Entity list
- Regular expression
- Composite bag
- Dynamic entity

The screenshot shows the Oracle Digital Assistant Skills editor. The top bar indicates the skill is 'GR\_CompositeBag\_CODE' in 'DRAFT • 1.0' status. The left sidebar contains navigation icons. The main area is divided into two panels. The left panel, titled '+ Entity', shows a list of entities: PizzaBag, NamedLocation, PizzaDough, PizzaSize (selected), PizzaTopping, ADDRESS, CURRENCY, DATE, DURATION, and EMAIL. The right panel, titled 'Description', shows the configuration for the selected 'PizzaSize' entity. It includes a 'Name' field with 'PizzaSize', a 'Description' text area, and a 'Configuration' section. The 'Configuration' section has a 'Type' dropdown set to 'Value list' and a '+ Value' button. Below this is a table with two columns: 'Value' and 'Synonyms'.

Value	Synonyms
Small	personal, smallest
Medium	middle
Large	big, grande, biggest



# Value list custom entity

- Finite list of values known beforehand
- No need to use values in intent training data
- Synonyms can be defined for each value

## Description

Name \*

PizzaSize

Description

## Configuration

Type \*

Value list

+ Value

Value	Synonyms
Small	personal, smallest
Medium	middle
Large	big, grande, biggest

# Derived custom entity

- Based on a parent entity
- But has an addition rule based on
  - Preceding phrases
  - Following phrases
- Examples
  - ToAccount, FromAccount
  - DestinationAirport,

## ▲ Description

Name \*

ToPerson

Description

## Configuration

Type \*

Derived

Parent

PERSON ▼

Rule

Preceding Phrase ▼

Phrases

to ✕

towards ✕

# Entity list custom entity

- Based on a superset of entities
- Allows an entity to be matched based on multiple superset entities
  - Destination
    - Airport Code
    - AirportName
    - City

## Description

Name \*

Destinations

Description

## Configuration

Type \*

Entity list

Entities

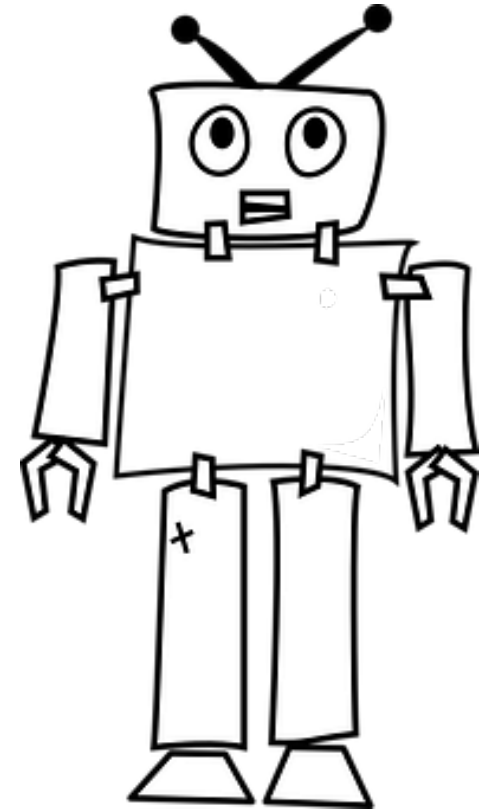
AirportCode ✕

AirportName ✕

City ✕

Enumeration Range Size

**Entities** can be combined into  
**hierarchies** to give powerful entity  
resolution ability.



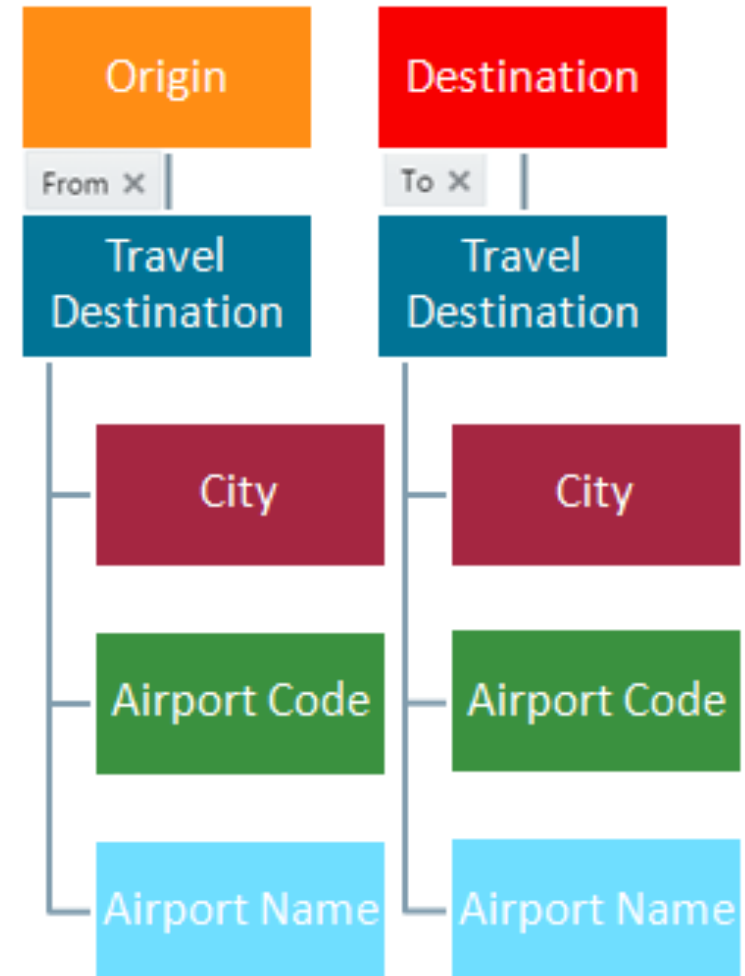
# Combining hierarchies of entities

I want to book a ticket from SFO to Paris

```
{
  "appId": "D80089BA-B75F-4D65-BDF6-9C67A5216695",
  "entityMatches": {
    "TRAVELDESTINATION": [
      "Paris",
      "SFO"
    ],
    "ORIGIN": [
      "SFO"
    ],
    "CITY": [
      "Paris"
    ],
    "AIRPORTCODE": [
      "SFO"
    ],
    "DESTINATION": [
      "Paris"
    ]
  },
}
```

Reserve me a ticket to CDG travelling from Heathrow

```
{
  "appId": "D80089BA-B75F-4D65-BDF6-9C67A5216695",
  "entityMatches": {
    "TRAVELDESTINATION": [
      "Heathrow",
      "CDG"
    ],
    "ORIGIN": [
      "Heathrow"
    ],
    "AIRPORTNAME": [
      "Heathrow"
    ],
    "AIRPORTCODE": [
      "CDG"
    ],
    "DESTINATION": [
      "CDG"
    ]
  },
}
```



# Regular expression custom entity

- Entity values expressed as regular expression patterns
- Common uses cases
  - Order number
  - Tax number
  - UK post code

## ▲ Description

Name \*

UKPostcode

Description

## Configuration

Type \*

Regular Expression

Regular Expression

`(([Gg][Ii][Rr] 0[Aa]{2})|([A-Za-z][0-9]{1,2})|([A-Za-z][A`

# Composite bag custom entity

- Models a business domain object
  - Pizza order, holiday request, expense
- Each composite bag is composed of one to many items
  - Custom entities
  - Built-in entities
  - String, location and attachment
- All contained entities resolved automatically in single dialog flow state

## Description

Name \*

PizzaBag

Description

## Configuration

Type \*

Composite Bag

Bag Items

+ Bag Item

Name	Type	Entity Name
PizzaSize	ENTITY	PizzaSize
PizzaTopping	ENTITY	PizzaTopping
PizzaDough	ENTITY	PizzaDough
DeliveryTime	ENTITY	TIME
DeliveryAddress	ENTITY	ADDRESS
NamedLocation	ENTITY	NamedLocation

# Dynamic custom entity

- Sometimes an entity needs to keep in step with dynamically changing data values
- Based on a value list custom entity
- Can be dynamically updated from an API
  - Add
  - Modify
  - Delete
- Typically triggered from a backend system on data change



# Topic agenda

- 1 Introduction to entities
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# Entity properties

- Enumeration range size
- Error messages
- Multiple values
- Fuzzy match
- Prompt for disambiguation
- Disambiguation prompts
- Prompts
- Validation rules

Enumeration Range Size

Error Message

Multiple Values

☐

Fuzzy Match

☐

Disambiguation Resolution

Prompt for Disambiguation

☒

Disambiguation Prompt

Prompts ?

+ Prompt

Prompt	Sequence Number
Please enter AccountType	

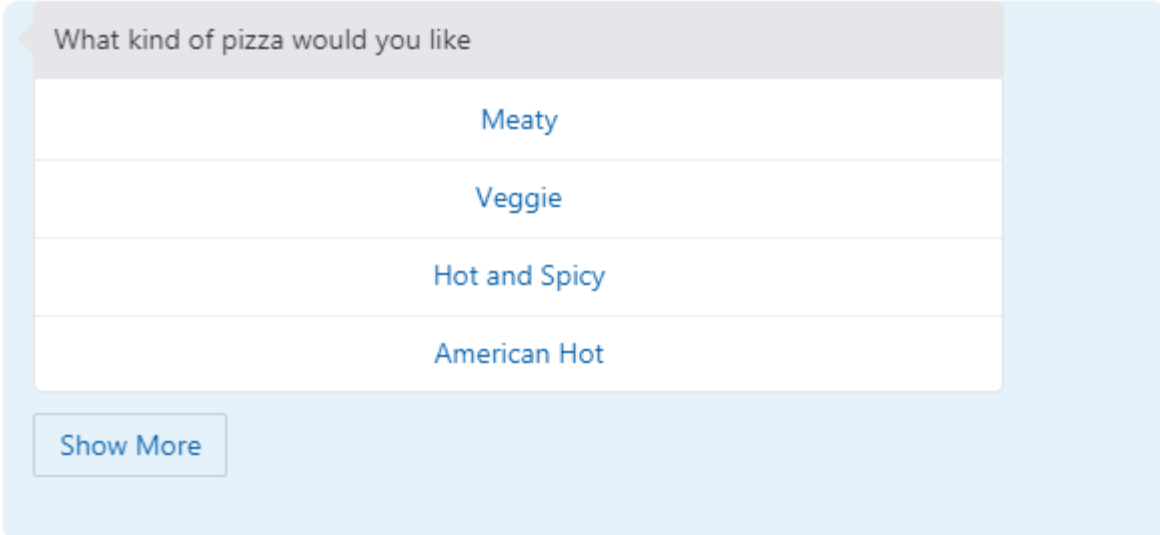
Validation Rules

+ Validation Rule

Expression	Error Message
No data to display.	

# Entity properties

- Enumeration range size
  - Defines the number of entity items displayed
  - Automatically shows “Show More”



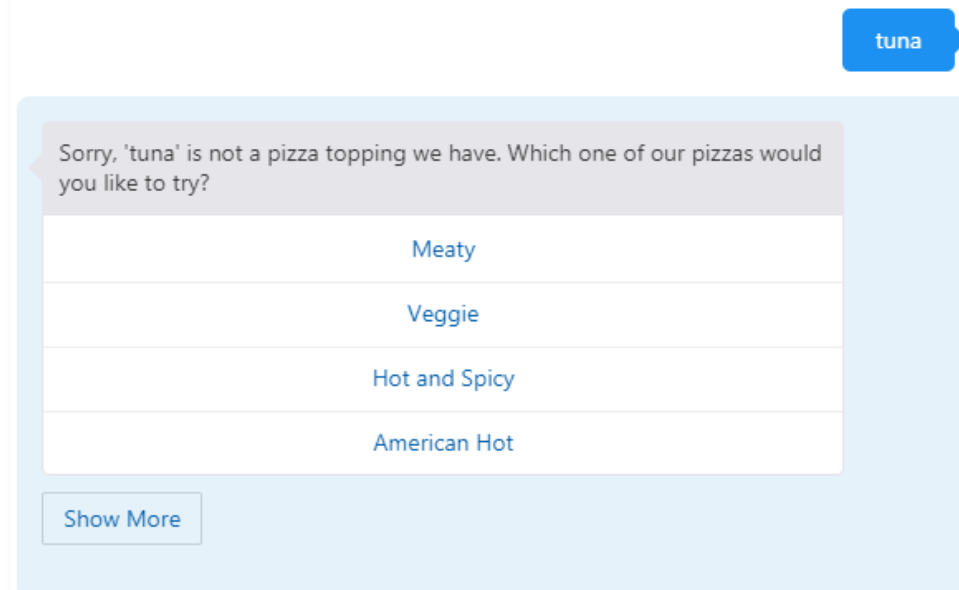
What kind of pizza would you like

Meaty
Veggie
Hot and Spicy
American Hot

Show More

# Entity properties

- Error message
  - Defines the error when an incorrect entity value is entered by the user
  - Can be dynamic
    - Sorry, '`${system.entityToResolve.value.userInput! 'this'}`' is not a pizza topping we have.



# Entity properties

- Multiple values
  - When turned on allows the user to specify multiple values for an entity
  - When turned off the user can still specify multiple values but only the first is assigned
- Can be used in combination with Prompt for Disambiguation
  - If multiple values is set “off” but user inputs multiple values, it will prompt the use to select one value

The screenshot shows a chat interface with two examples of how entity properties are handled. In the first example, a user asks "What kind of pizza would you like" and the system provides a list of four options: 1. Onion, 2. Sausage, 3. Pineapple, and 4. Pepperoni. A "Show More" button is visible below the list. In the second example, a user says "I want to order a small large pizza". The system responds with "ok lets get that order sorted" and then displays a prompt for disambiguation: "You can only choose one value". Below this prompt is a table with two rows: "small" and "large", each with a blue selection arrow to its right.

What kind of pizza would you like

1. Onion
2. Sausage
3. Pineapple
4. Pepperoni

Show More

Pepperoni and onion

I want to order a small large pizza

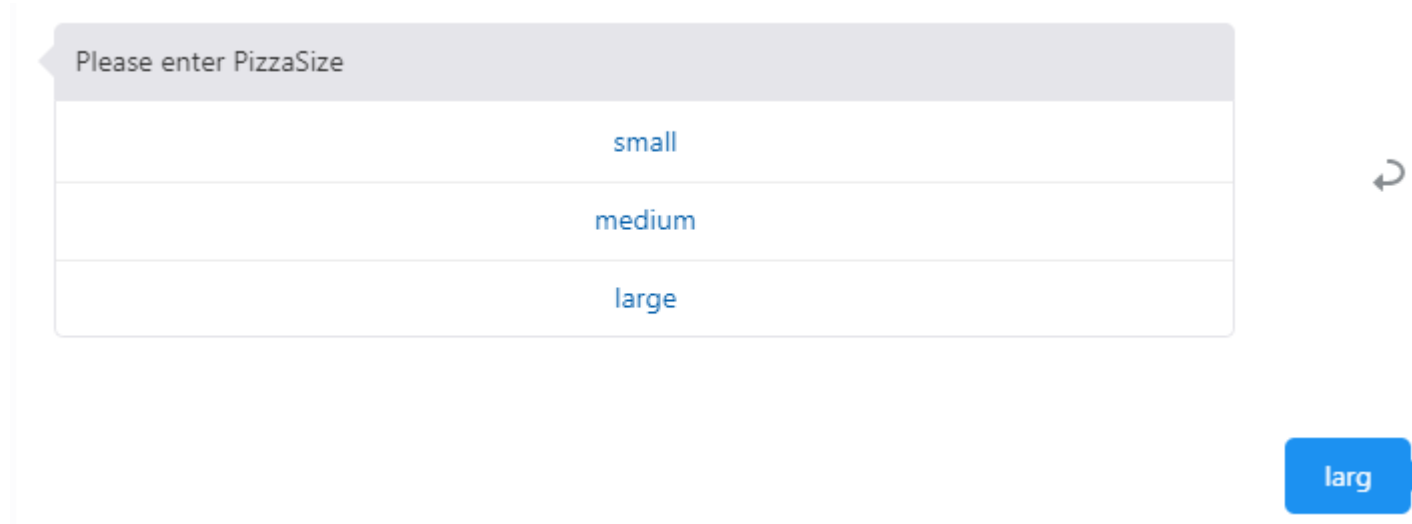
ok lets get that order sorted

You can only choose one value

small	
large	

# Entity properties

- Fuzzy match
  - Allows entity values to be matched even if spelled incorrectly
  - Increases resilience on user input matching entity values



Please enter PizzaSize

small
medium
large

↶

larg

# Entity properties

- Prompts
  - Defines the prompts for an entity
  - You can define sequences of prompts
    - This allows the skill to progressively disclose more information in the case of user error
    - You can also randomize the sequence by removing the sequence number

## Prompts

+ Prompt	
Prompt	Sequence Number
What size of pizza would you like	1
Please choose small, medium or large pizza	2
Ok, lets have one more go at this. I just need you to select a pizza size; we offer small, medium, or large.	3

# Entity properties

- Validation rules
  - Defines a condition against which the entity resolution should be validated
    - Uses ApacheFreemarker expression

## Validation Rules

+ Validation Rule	
Expression	Error Message
<code>\${(pizza.value.DeliveryTime.hrs?number &lt; 10)? then('true','false')}</code>	Sorry we only deliver up to 9:30pm



# Integrated Cloud

## Applications & Platform Services

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## Oracle Digital Assistant Hands-On

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