

GeneXus™
The power of doing

Conversational UI: Chats / Chatbots

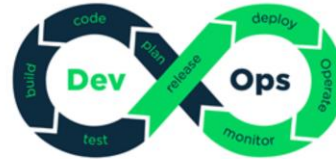
GeneXus™ 16

Mobile & Web



Multi-experience & Omnichannel

- Design Systems
- Streams of information
- **Conversational UI: Chats / Chatbots**

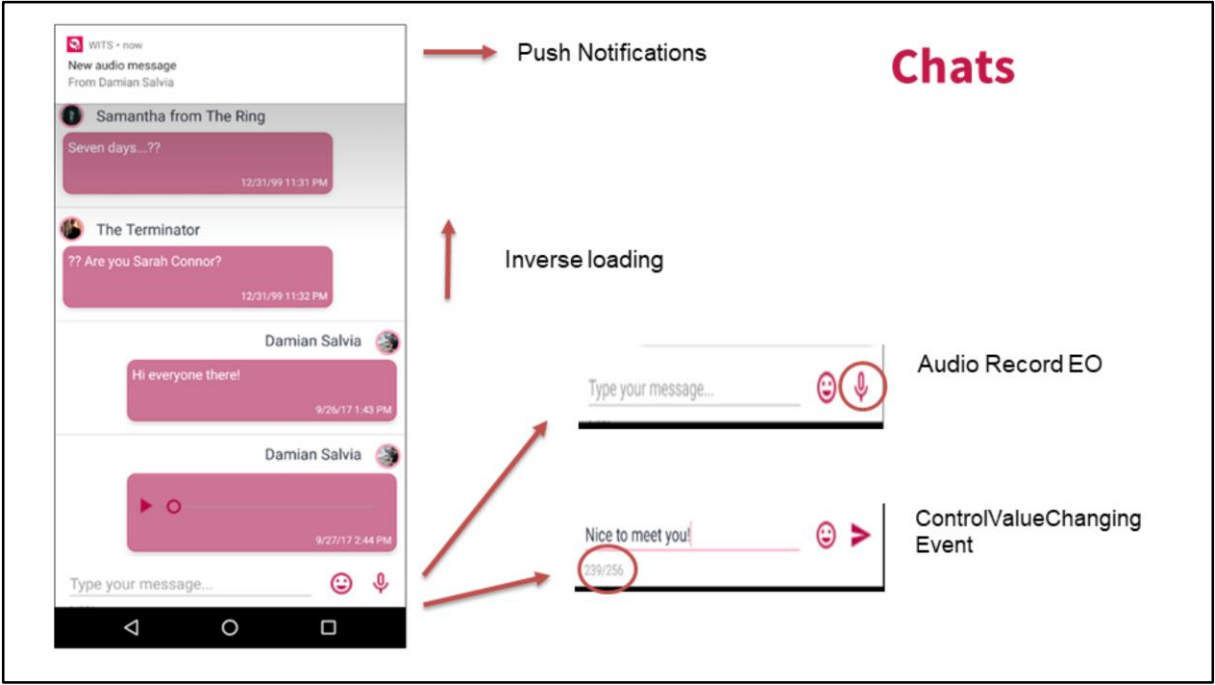


Web/ Web mobile

Native mobile

Chatbots

Wearables/TV/AR



Push Notification Demo

Subscribing

Citizen

Featured Activities



Gastronomy



Art

Subscribe ☐

All Activities



Botanical Garden

Nature



Activities



Formalities



Com-

Inserting
from
Backend
Web

Citizen Service















by GeneXus

RecentCultural Activity — Cultural Activities

Cultural Activities

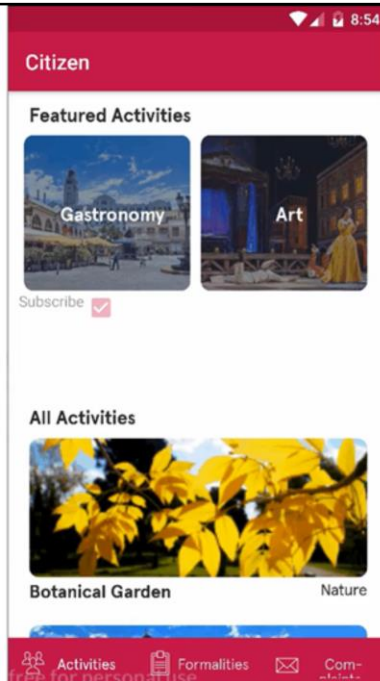
Activity Name

+ Import

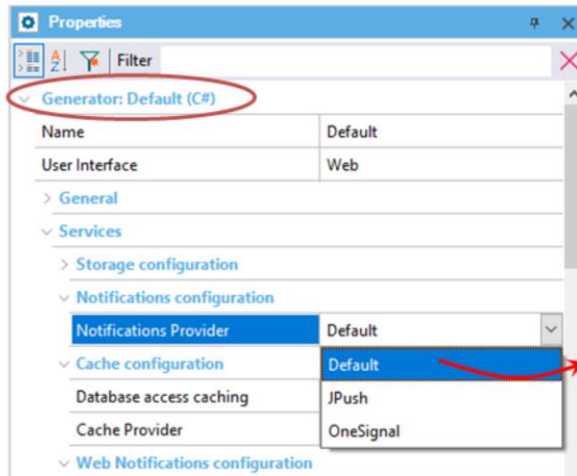
Name	Category	Photo	Featured	Static Map		
Botanical Garden	Nature		<input type="checkbox"/>		UPDATE	DELETE
Carnaval Museum	Culture		<input type="checkbox"/>		UPDATE	DELETE
Centenario Stadium	Sports		<input checked="" type="checkbox"/>		UPDATE	DELETE
Dámaso Antonio Larrañaga Zoological Museum	Culture		<input type="checkbox"/>		UPDATE	DELETE
Japanese Garden	Nature		<input type="checkbox"/>		UPDATE	DELETE
Juan Manuel Bienes Museum	Art		<input type="checkbox"/>		UPDATE	DELETE
Mercado del Puerto	Gastronomy		<input checked="" type="checkbox"/>		UPDATE	DELETE

Receiving the Push Notification

How..?



Notifications Provider property



OneSignal (since GX15 u4)

JPush (since GX15 u8)

GeneXus Notifications by using RemoteNotification external object.

JPush Notifications

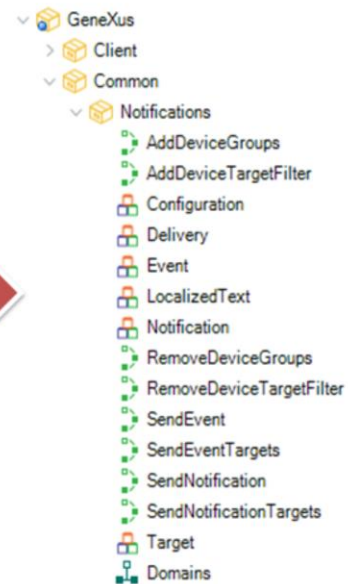
OneSignal Notifications

Notification Provider API

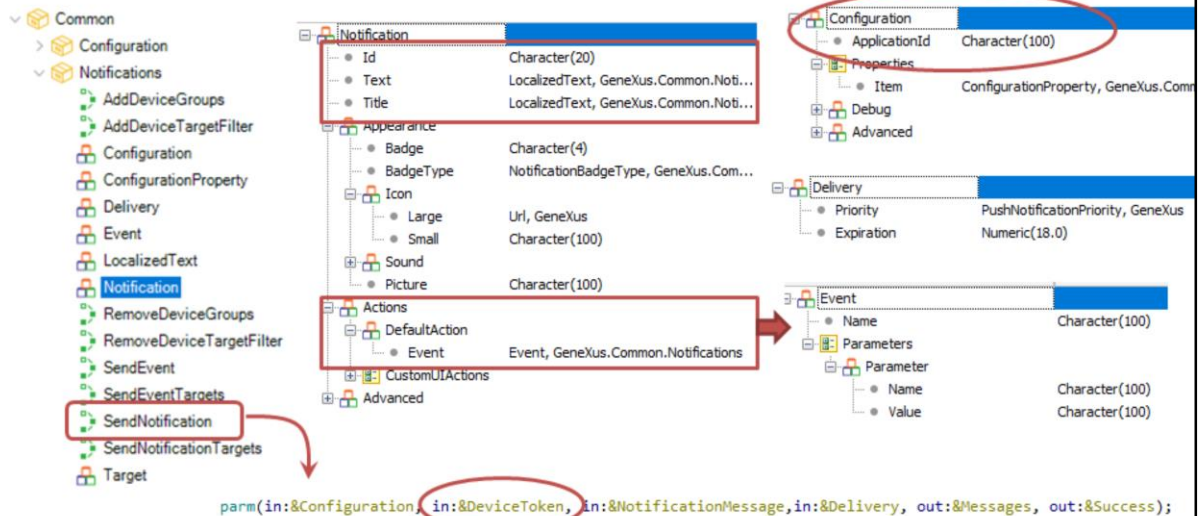
Notification parameter
Remote notification
Notification configuration
Remote notification result



(Since GeneXus 15 Upgrade 3)



Somewhere in the web backend



Configuring the Notification

```
&TheNotification.Title.DefaultText = "Citizen there is a new activity for you"
```

```
&TheNotification.Text.DefaultText = &activityName
```

```
&TheNotification.Actions.DefaultAction.Event.Name = "Subscribe"
```

```
// Declared in the SD Main object
```

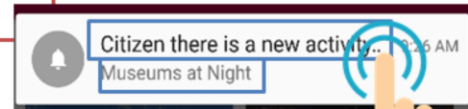
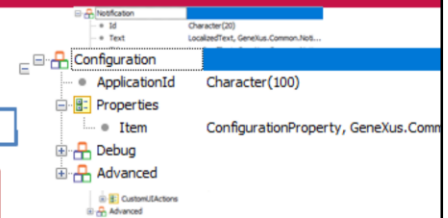
```
&TheNotification.Actions.DefaultAction.Event.Parameters.FromJson  
(('{{"Name": "ActivityID", "Value": "' + &activityID.ToString() + '"}}'))
```

```
&TheNotificationDelivery.Expiration = 3000
```

```
&TheNotificationDelivery.Priority = PushNotificationPriority.High
```

```
&TheNotificationConfiguration.ApplicationId = !"CitizenMenu"  
// Name Main Object SD
```

&TheNotification is based in Notification SDT
&TheNotificationDelivery is based in Delivery SDT
&TheNotificationConfiguration is based Configuration SDT



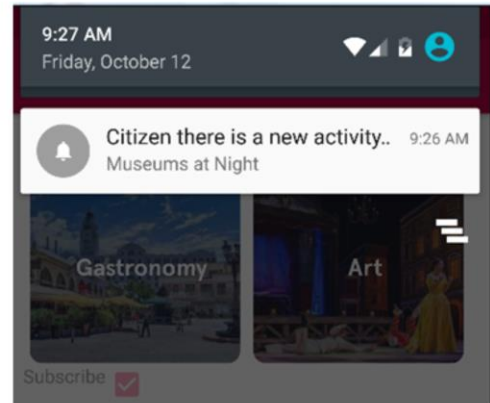
Event in Main Object SD

```
Event 'Subscribe'  
ActivityDetail(&ActivityID)  
endevent
```

Sending the Notification

```
For each Device
  Where DeviceSubscribe= true

  GeneXus.Common.Notifications.SendNotification
  (
    &TheNotificationConfiguration,
    DeviceToken, // Target device token
    &TheNotification,
    &TheNotificationDelivery,
    &OutMessages,
    &IsSuccessful
  )
endfor
```



Socket API



Client



Web Socket



Server

Chat Assistant

Citizen Service

Recents

Assistant Web

Support Assistant say:

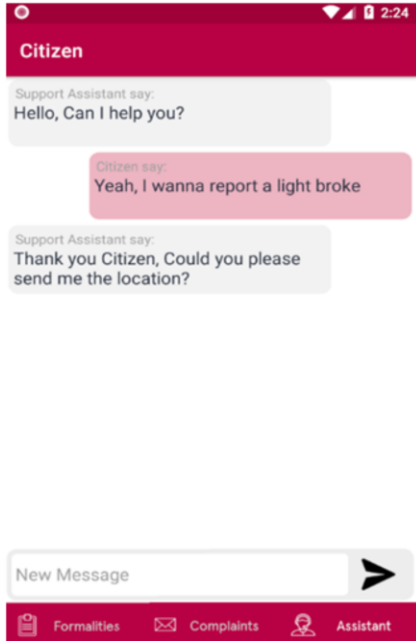
Hello, Can I help you?

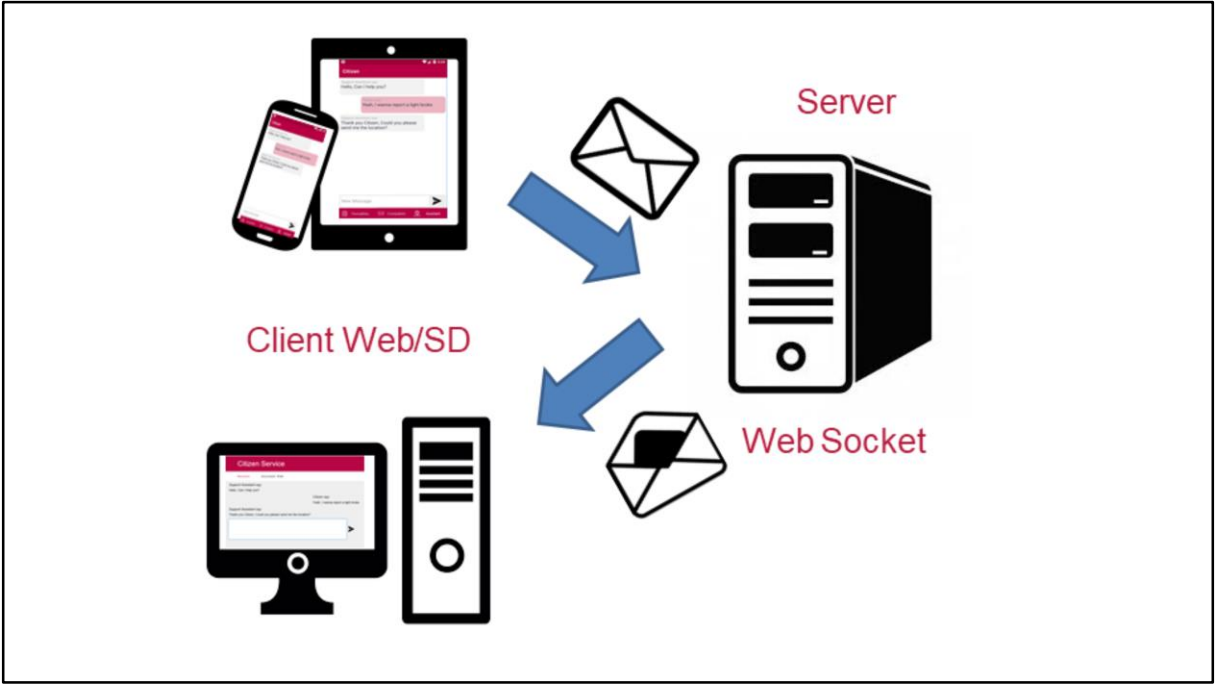
Citizen say:

Yeah, I wanna report a light broke

Support Assistant say:

Thank you Citizen, Could you please send me the location?





Server Socket

References

GeneXus

Client

Common

SD

Server

NotificationInfo

Socket

NotificationInfo

• Id	Character(100)
• Object	Character(100)
• Message	LongVarChar(2M)

Structure	Type
Socket	
Properties	
ClientId	Character(100)
ErrCode	Numeric(4.0)
ErrDescription	Character(100)
Methods	
Notify	Numeric(4.0)
@ sdtNotification	NotificationInfo, GeneXus.Server
NotifyClient	Numeric(4.0)
@ clientId	Character(100)
@ sdtNotification	NotificationInfo, GeneXus.Server
Broadcast	None
@ sdtNotification	NotificationInfo, GeneXus.Server
NotifyClientText	Numeric(4.0)
@ clientId	Character(100)
@ message	VarChar(200)
Events	

Sending Message from Web


Citizen Service

Recents Assistant Web

Support Assistant say:
Hello, Can I help you?

Citizen say:
Yeah, I wanna report a light broke

Support Assistant say:
Thank you Citizen, Could you please send me the location?



Event 'Send'

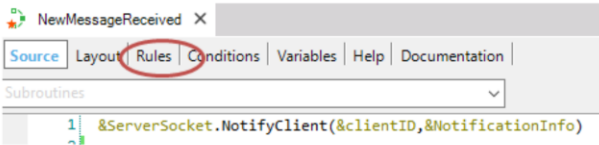
```
&commentNotificationInfo.PostId= random()  
&commentNotificationInfo.PostCommentContent= &NewMessage  
&NotificationInfo.Message= &commentNotificationInfo.ToJson()  
&ServerSocket.NotifyClient(&clientID,&NotificationInfo)  
Endevent
```

CommentNotificationInfo X	
Structure Documentation	
Name	Type
CommentNotificationInfo	Id
PostID	Id
PostCommentContent	Character(256)

Receiving Message in Web

Web Notifications configuration

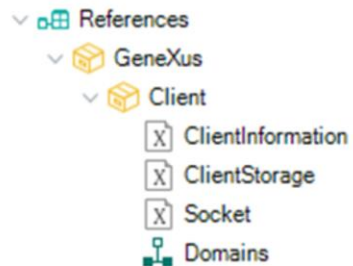
Web Notifications Provider	InProcess
Received Handler	NewMessageReceived
Open Handler	NewConnection
Close Handler	LostConnection
Error Handler	WSocketError



Event OnMessage(&NotificationInfo)
//code
refresh
Endevent

parm(in:&clientid, in:&NotificationInfo);

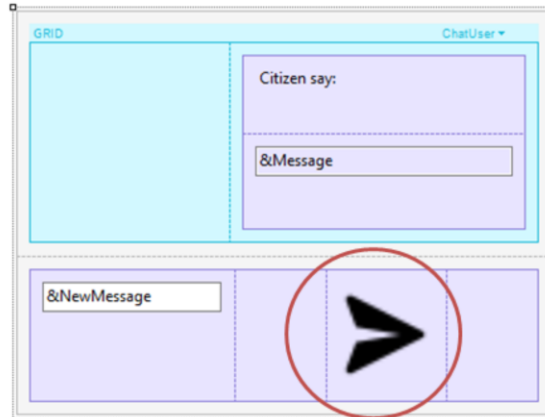
Client Socket



(Only for Smart Devices now)

Structure	Type
Socket	
Properties	
Status	SocketStatus, GeneXus.Client
Methods	
Open	None
@ url	Character(100)
Close	None
Send	None
@ msg	Character(100)
Events	
Connected	None
ConnectionFailed	None
MessageReceived	None
@ msg	Character(100)

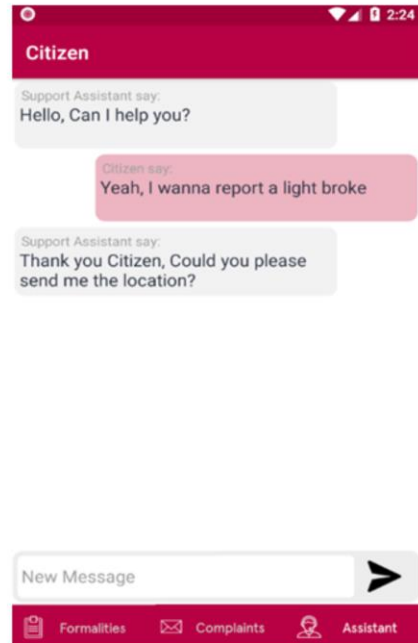
Sending Message from SD



```
| Event ImageSend.Tap  
    GeneXus.Client.Socket.Send(&NewMessage)  
· Endevent
```

Receiving Message in SD

```
Event Client.Socket.MessageReceived(&MessageReceived)
  Composite
    &NotificationInfo.FromJson(&MessageReceived)
    //code
    refresh
  EndComposite
EndEvent
```



Chatbot

CONVERSATIONAL USER INTERFACES



GeneXus

CHATBOT GENERATOR

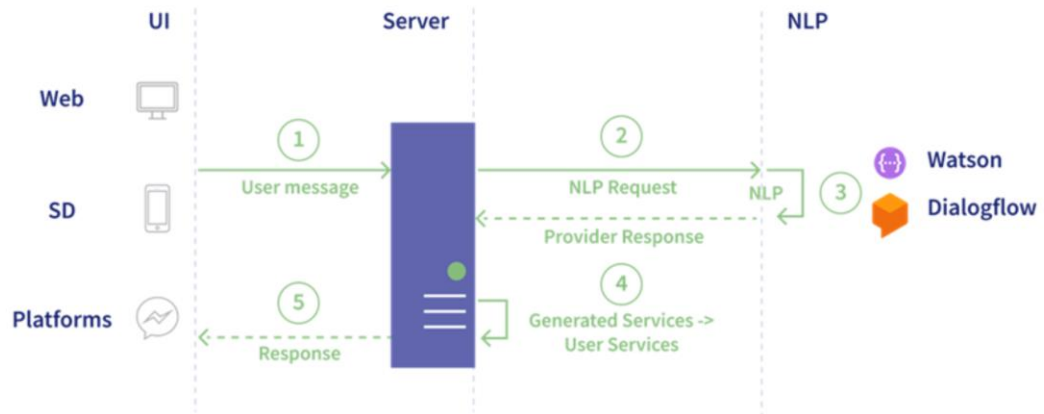
Cross-platform

Integrated to the solution

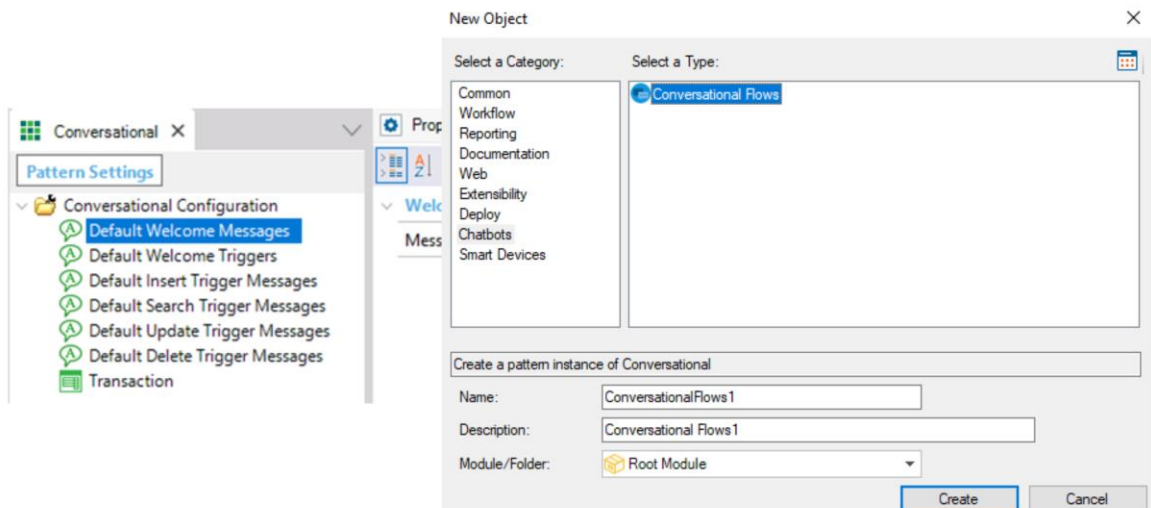
Hybrid UI

GeneXus

CHATBOT GENERATOR ARCHITECTURE



Chatbot Generator



CHATBOT GENERATOR OVERVIEW

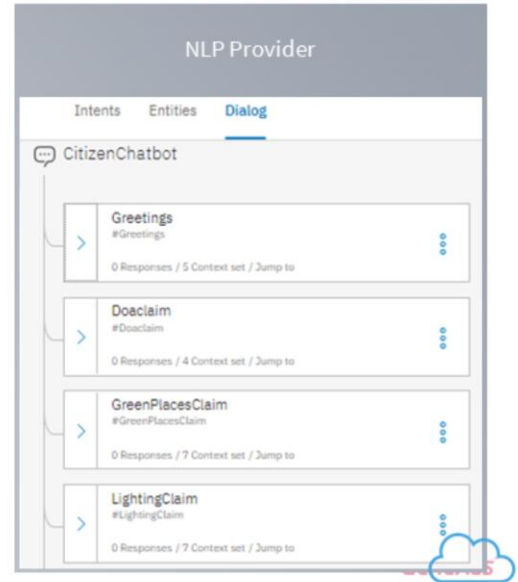


Conversational Flows

Chatbot
Generator



GeneXus objects generated



Resources update

CommonChatbots module update

Conversational Flows

An update is available for the Conversational Flows Resources. This action will modify the 'CommonChatbots' module and the Conversational Flows theme classes. Do you agree?

Yes

No

Help

Conversational X

Properties

Pattern Settings

Conversational Configuration

Default Welcome Messages

Default Welcome Triggers

Default Insert Trigger Messages

Default Search Trigger Messages

Default Update Trigger Messages

Default Delete Trigger Messages

Transaction

Filter

Config: Conversational Configuration

Keep Resources Updated

Prompt

- CommonChatbots
 - Context
 - DeserializeContext
 - GenericContext
 - Data
 - GetChatContextByld
 - GetChatMeta
 - GetUserDevice
 - GetUserId
 - GetWebComponentByld
 - Gx00N0
 - Gx00O0
 - GXChatMessage
 - GXChatUser
 - NewMessage
 - PanelChatSDOfflineDatabase
- Synchronization
 - Notifier
- UI
 - SD
 - PanelChatSD
 - PanelShowImage
 - Web
 - PanelChatWeb

Chatbot Generator Resources

GXChatMessage, GXChatUser

Carmine, CarmineSD

PanelChatWeb, PanelChatSD

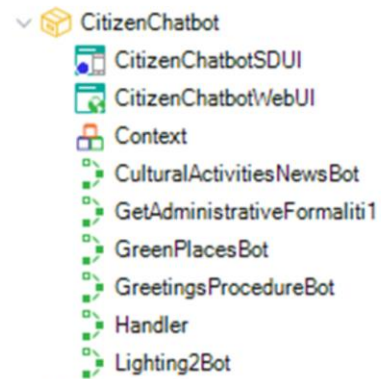
The image shows a chatbot interface with a light blue background. At the top, there is a header bar with the text "GRID" in a small font. Below the header, there is a list of messages, each in a light blue box with a thin border. The messages are: "GXChatMessageMessage", "< Component>", "GXChatMessageDate", "GXChatMessageType", "GXChatUserId", and "GXChatMessageInstance". At the bottom of the interface, there is a white input field with the placeholder text "&Send". To the right of the input field is a red circular button with a white right-pointing arrow.

Generated Objects

Module containing generated objects

CitizenChatbotWebUI:

```
Event Start
├── CommonChatbots.PanelChatWeb(Chatbot.Conversational.Watson, !"Citizen")
└── Endevent
```

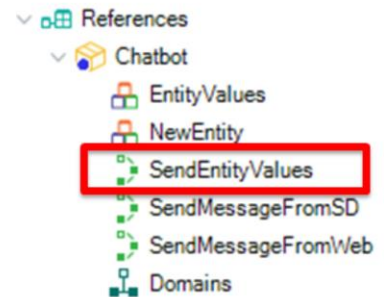


<https://wiki.genexus.com/commwiki/servlet/wiki?37102,Chatbot+generator,#+2+Generated+objects+of+the+Pattern>

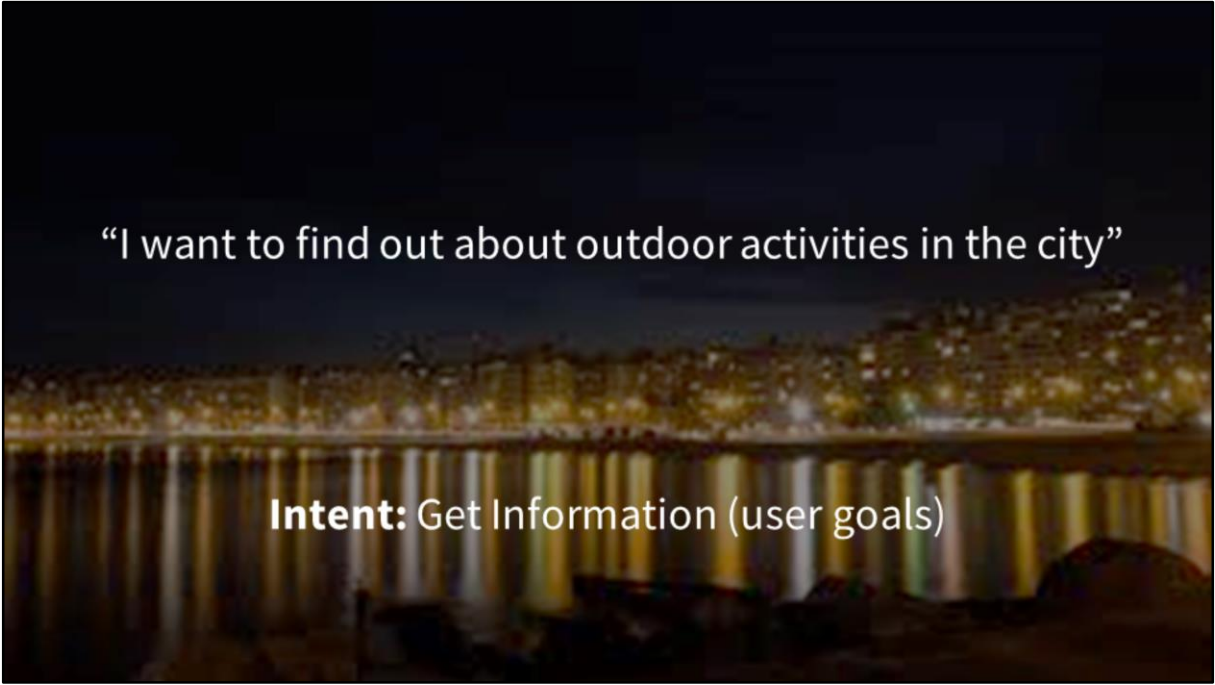
Chatbot External module

Communication with the NLP Providers

```
Chatbot.SendEntityValues(&Provider,&SDTEntityValues,  
!"UserIdentification",&InstanceName,&messages)
```




How to create a Chatbot using GeneXus

A night photograph of a city skyline reflected in water. The city lights are visible in the background, and their reflection is clearly seen in the water in the foreground. The text is overlaid on the image.

“I want to find out about outdoor activities in the city”

Intent: Get Information (user goals)

<https://www.youtube.com/watch?v=wyWgsF9eYc8>

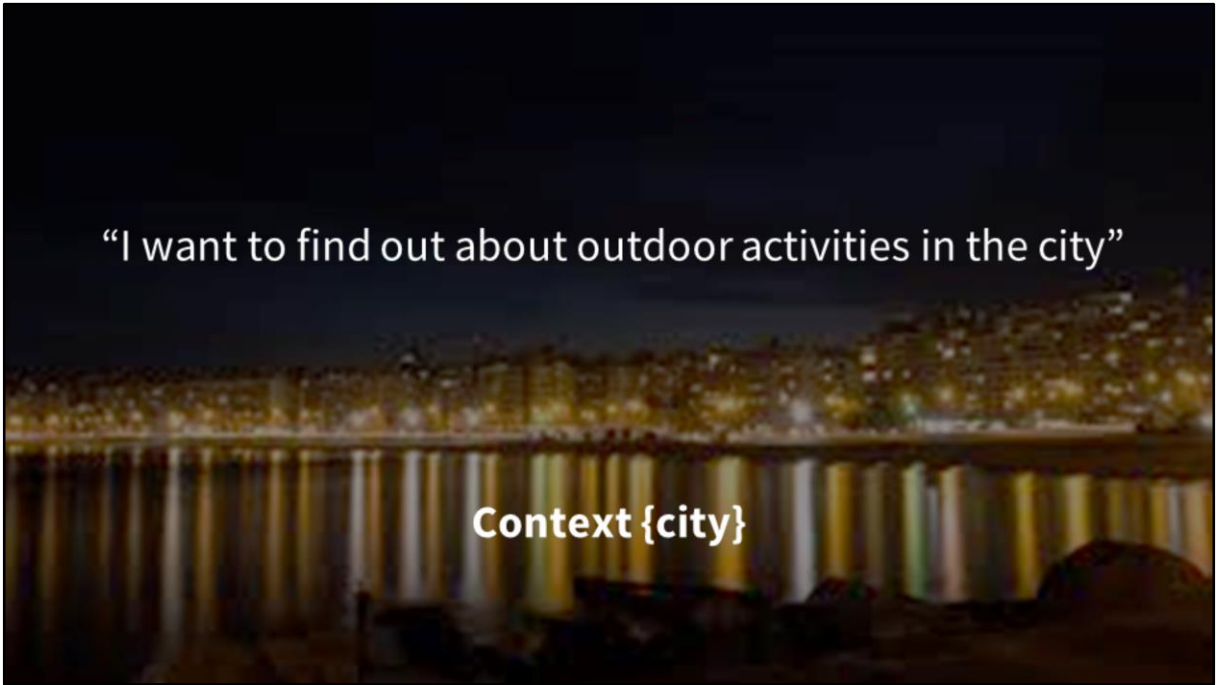


“I want to find out about outdoor activities in the city”

Entity : Activities {artistic, outdoors, cultural}
Values & synonyms

“I want to find out about outdoor activities in the city”

Context {city}



Citizen service chatbot

Do a traffic claim

Find out about activities

Get debt refinancing info

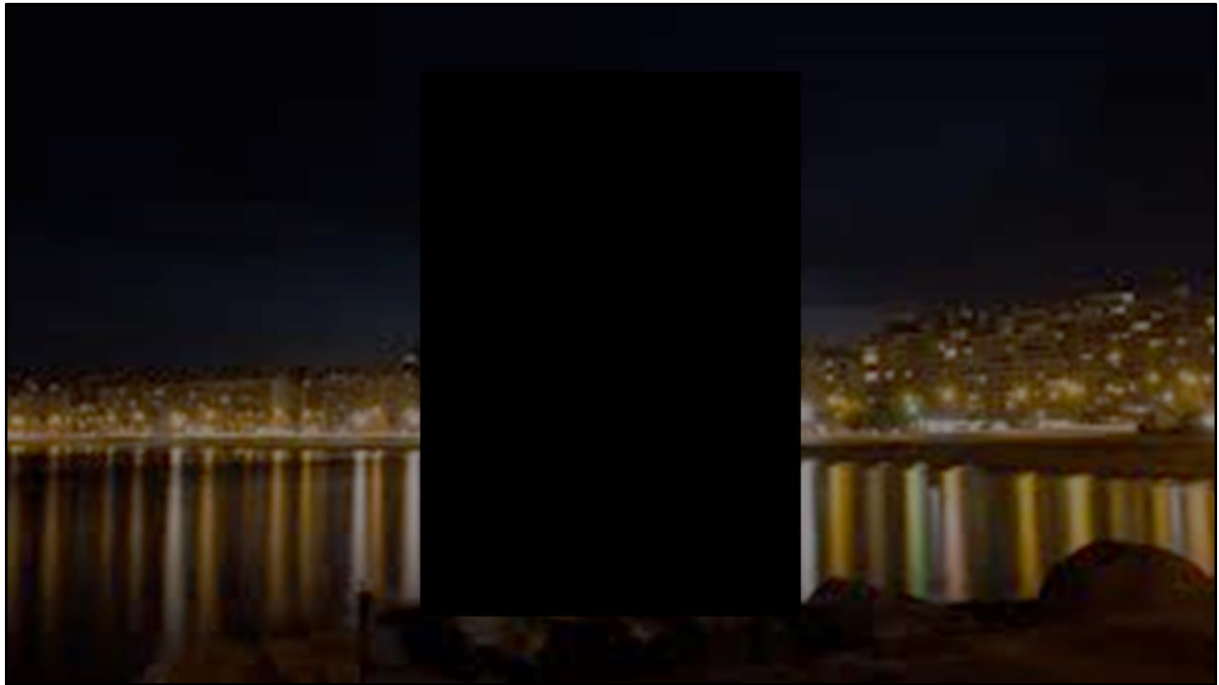
Setup an appointment

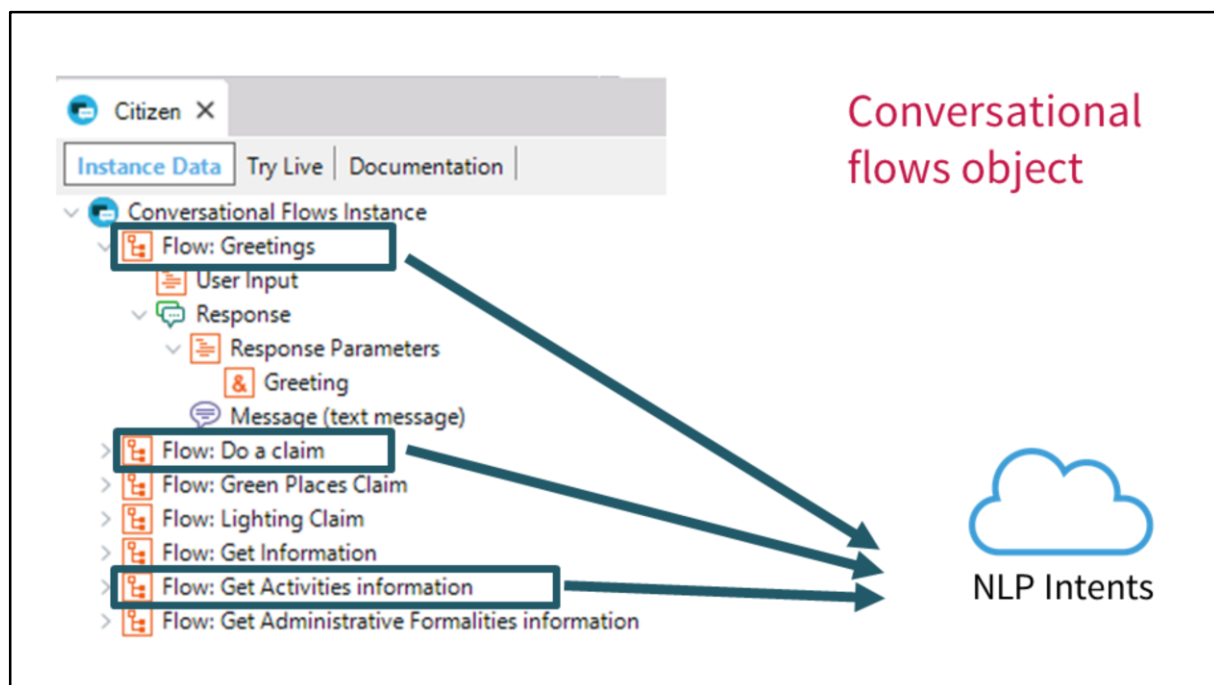


NLP response






```
{  
  "intents": [  
    {  
      "intent": "Do a claim",  
      "confidence": 1.0  
    }  
  ],  
  "entities": [],  
  "input": {  
    "text": "do a claim"  
  }  
}
```







Trigger messages

- ✓  Flow: Get Activities information
 - >  User Input
 - ✓  Response
 - >  Response Parameters
 -  Message (component view)



NLP Messages

Properties	
Filter	
flow: Flow: Get Activities information	
Conversational Object	CulturalActivitiesNews
Name	Get Activities information
Trigger Messages	Social events;info social events;activities

Know about activities

Find out about leisure

Social events information

--

User input

"I want to find out about activities in the city"



I'm very glad to help you! What type of activities are you interested in? It can be Culture, Art, or Nature.

NLP Entity



Activities

{artistic (art, music, theatre),
outdoors (nature, fresh air),
culture (cultural, museum)}

SendEntityValues(in:&Provider,
in:&EntityValues, in:&Entity,
in:&ChatbotInstance,
out:&Messages);

User input



"Outdoors activities! Thanks!"

- Flow: Get Activities information
 - User Input
 - CulturalActivitiesCategory
 - Response

"outdoors"

Properties	
Filter	
variable: CulturalActivitiesCategory	
Name	CulturalActivitiesCategory
Description	CulturalActivitiesCategory
Data Type	CulturalActivitiesCategory
Match With Entity	True
Entity	Activities
Ask again	True
Try Limit	2
Collection	False
Ask Messages	I'm very glad to help you! What type of activities are you interested in? It can be Culture, Art, or Natu...
On Error Messages	&UserName I don't know about &GXUserInput yet, sorry. Please, enter Culture, Art, or Nature,;
Clean Context Value	True

Response

- Flow: Get Activities information
 - User Input
 - Response
- Flow: Get Activities information
 - User Input
 - CulturalActivitiesCategory
 - Response
 - Response Parameters
 - CulturalActivitiesId
 - CulturalActivitiesName
 - CulturalActivitiesDescription
 - CulturalActivitiesCategory
 - CulturalActivitiesPhoto
 - Message (component view)

Properties

Flow: Get Activities Information

Conversational Object CulturalActivitiesNews

```
parm(in:&CulturalActivitiesCategory);
```

```
1 CulturalActivitiesNews
2 where CulturalActivitiesCategory = &CulturalActivitiesCategory
3 {
4     CulturalActivitiesId = CulturalActivitiesId
5     CulturalActivitiesName = CulturalActivitiesName
6     CulturalActivitiesDescription = CulturalActivitiesDescription
7     CulturalActivitiesCategory = CulturalActivitiesCategory
8     CulturalActivitiesPhoto = CulturalActivitiesPhoto
9 }
```

Response

- Flow: Get Activities information
 - User Input
 - CulturalActivitiesCategory
 - Response
 - Response Parameters
 - CulturalActivitiesId
 - CulturalActivitiesName
 - CulturalActivitiesDescription
 - CulturalActivitiesCategory
 - CulturalActivitiesPhoto
 - Message (component view)

Properties	
Filter	
messages: Message (component view)	
Condition	
Action	component view
Messages	Activities to do in our City
Component view properties for Smart Devices	
Show Response As	Component
Component references	
SD Component	(none)
Generated SD Component	CitizenServiceChatbot.CulturalActivitiesNewsComponentSD
Web Component	(none)
Generated Web Component	

```
parm(in:&CulturalActivitiesCategory);
```

```
Event Start
    &CulturalActivitiesNew = CulturalActivitiesNews(&CulturalActivitiesCategory)
Endevent
```

Response

Layout * Rules Events Conditions Variables Documentation

Application Bar

<

>

&CulturalActivitiesCategory


GRID

&CulturalActivitiesNew.item(0).CulturalActivitiesId

&CulturalActivitiesNew.item(0).CulturalActivitiesCategory

&CulturalActivitiesNew.item(0).CulturalActivitiesName

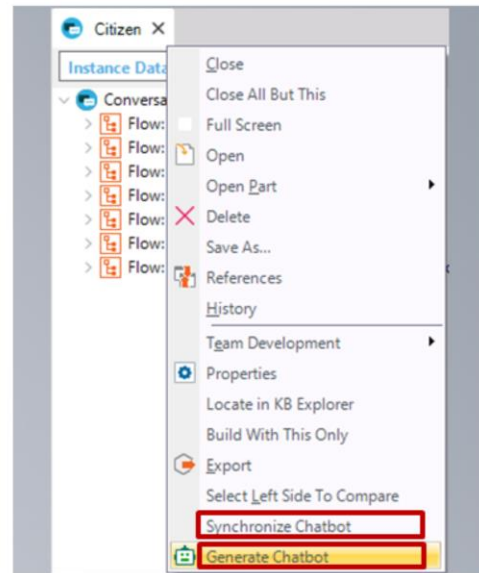
&CulturalActivitiesNew.item(0).CulturalActivitiesDescription



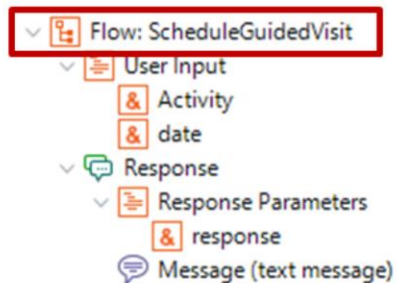


Impacting model changes

Synchronize Chatbot
Generate Chatbot



Another example: scheduling



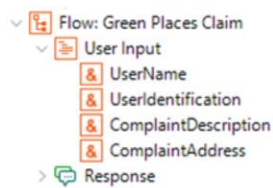
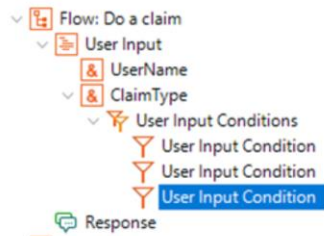
Properties	
Flow: ScheduleGuidedVisit	
Conversational Object	ScheduleGuidedVisit

Context: Activity

System Entity: date



Redirect to another flow









Properties	
Filter	
InputCondition: User Input Condition	
Condition	&ClaimType='Sanitation'
Action	Redirect
Redirect to Flow	Green Places Claim

Entity inference from the query

"I'm John Smith and I want to do a claim about a sanitation problem"



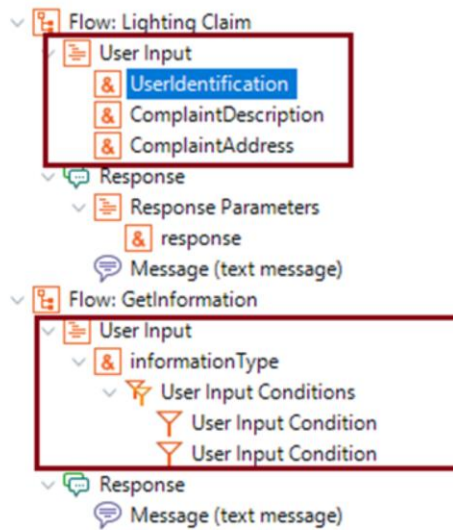
Match With Identity
Clean Context Value = FALSE

- ✓  Flow: Green Places Claim
 - ✓  User Input
 -  UserIdentification
 -  ComplaintDescription
 -  ComplaintAddress
 - >  Response

Context

- &GXUserInput
- User Inputs

Clean Context Value = TRUE/FALSE



Try live

Citizen X

Instance DataTry LiveDocumentation

what's new about activities in the city?
18:59

I'm very glad to help you! What type of activities are you interested in? It can be Culture, Art, or Nature.
18:59

I'm not sure
19:00

I don't know about I'm not sure yet, sorry. Please, enter Culture, Art, or Nature.
19:00

SEND

Status: 200

[Clear context](#)

Provider Response

```
{
  "input": {
    "text": "what's new about activities in the city?"
  },
  "output": {
    "text": null,
    "nodes_visited": null,
    "log_messages": null
  },
  "context": null
}
```



More about SD

GeneXus™ 16

Control Value Changed

Web and SD

Service

Citizen Web — Formality Reservat...

Make a Reservation

User
Identification

Formality
Description

Apply for debt refinancing

Formality
Requirements

Present the current account number or identification, according to the tax in question.

Formality Price

\$ 200

Formality
Address

18 de Julio Av 1360, Montevideo Department

From 01:00 PM

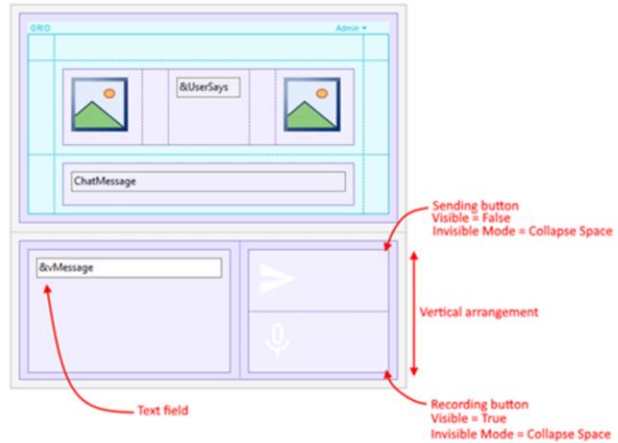
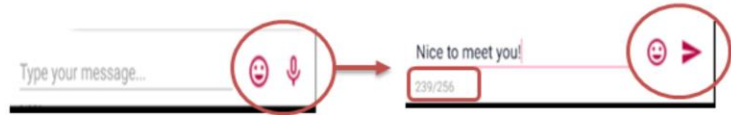
To: 05:00 PM

Formality Date
Time

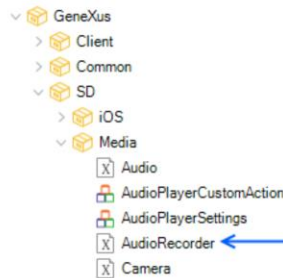
Confirm

ControlValue Changing

```
Event &vMessage.ControlValueChanging(&vMessageNew)
Composite
    &MessageLen = &vMessageNew.Length()
    SendButton.Visible = &MessageLen > 0
    RecButton.Visible = &MessageLen = 0
EndComposite
Endevent
```



Audio Recorder



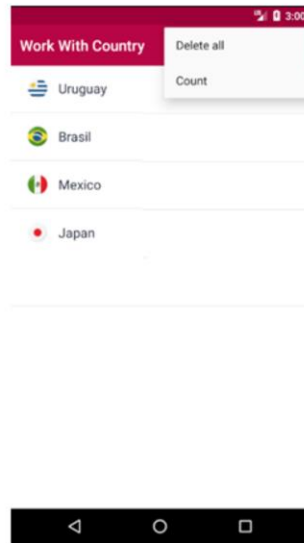
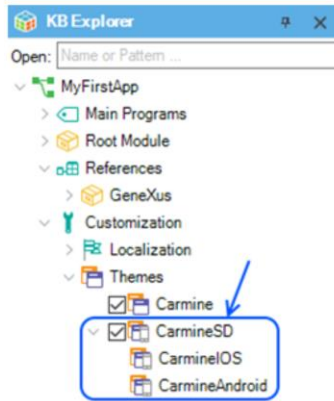
Structure	Type
AudioRecorder	
Properties	
IsRecording	Boolean
Methods	
Start	Boolean
Stop	Url, GeneXus
Events	



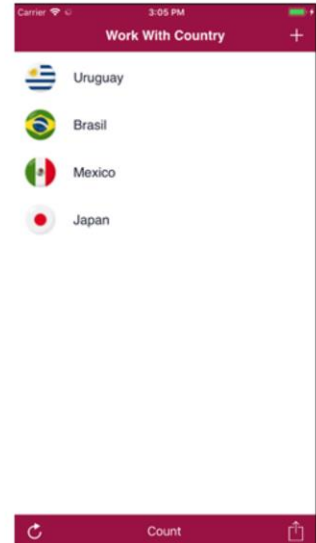
```
Event 'StartRecording'
  &HasSuccess = AudioRecorder.Start()
EndEvent

Event 'StopRecording'
  Composite
    &IsRecording = AudioRecorder.IsRecording
    If &IsRecording
      &FilePath = AudioRecorder.Stop()
      &Audio.AudioURI = &FilePath
      SendAudioMessage(&Audio,&Username)
      Refresh
    EndIf
  EndComposite
EndEvent
```


Theme Carmine SD



Android



iOS

WebBrowser

- GeneXus
 - Client
 - Common
 - SD
 - iOS
 - Media
 - Notifications
 - Store
 - Synchronization
 - Actions
 - BeaconInfo
 - ...
 - Search
 - SearchScope
 - WebBrowser
 - Domains

Structure	Type
WebBrowser	
Properties	
Methods	
Events	
BeforeNavigate	None
@ url	Url, GeneXus
@ handled	Boolean

Web app Embedded in SD app

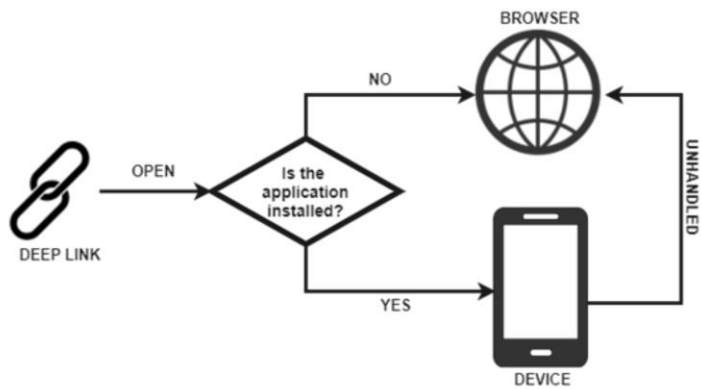
Sample: WebBrowser

Before Navigate to URL or Web app Embedded

```
Event GeneXus.SD.WebBrowser.BeforeNavigate(&Url, &Handled)
  composite
    if &Url = //something
      //<your_code>
      &Handled = true
      return
    endif
  endcomposite
EndEvent
```



Deep Link



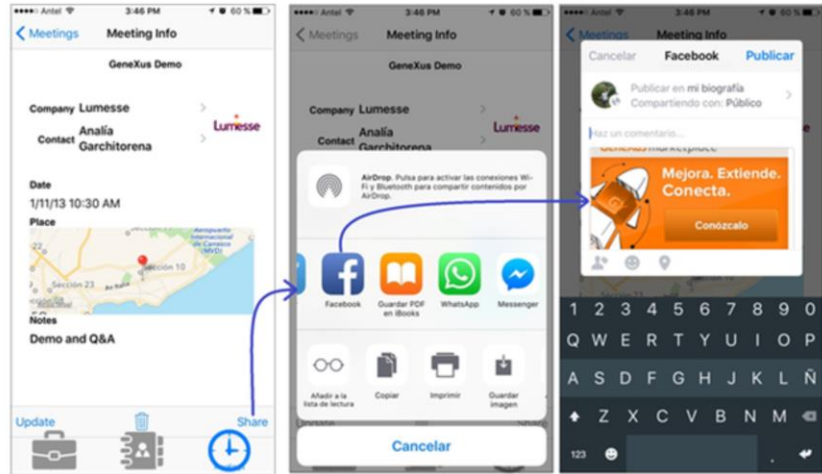
Properties

Main Object SD
Deep Link Base URL property

Object Web/SD
Deep Link Name property

Share

Structure	Type
Share	
Properties	
Methods	
ShareText	None
@ text	VarChar(200)
@ url	Url, GeneXus
@ title	VarChar(200)
ShareImage	None
@ image	Image
@ text	VarChar(200)
@ url	Url, GeneXus
@ title	VarChar(200)
Events	

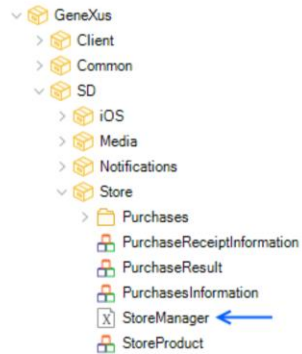


Event 'Share'

Share.ShareImage(CompanyLogo, MeetingTitle,!"http://www.genexus.com",MeetingNote)

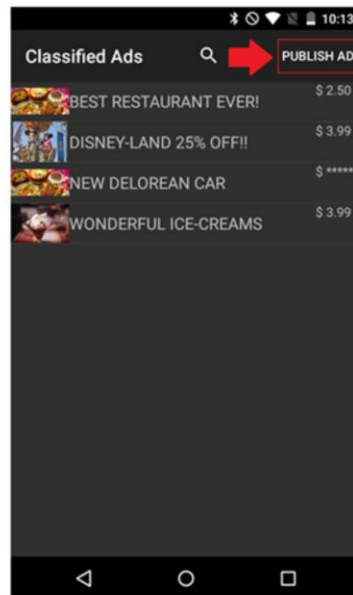
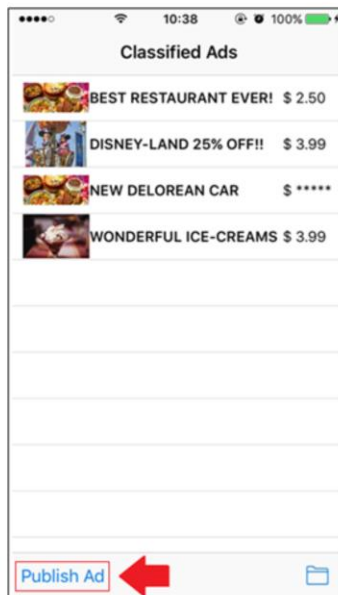
EndEvent

Store Manager



Structure	Type
StoreManager	
Properties	
CanMakePurchases	Boolean
Methods	
GetProducts	StoreProduct, GeneXus.SD.Store
ProductIdentifiers	VarChar(100)
PurchaseProduct	PurchaseResult, GeneXus.SD.Store
ProductIdentifier	VarChar(100)
Quantity	Numeric(8.0)
PurchaseProduct	PurchaseResult, GeneXus.SD.Store
ProductIdentifier	VarChar(100)
GetPurchases	PurchasesInformation, GeneXus.SD.Store
ConsumeProduct	Boolean
ProductIdentifier	VarChar(100)
RestorePurchases	PurchasesInformation, GeneXus.SD.Store
Events	
PurchaseStateChanged	None
Purchase	PurchaseResult, GeneXus.SD.Store
PurchaseState	StorePurchaseState, GeneXus.SD.Store
Handled	Boolean

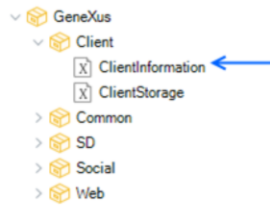
Sample: Store Manager



```
Event 'Publish Ad'  
Composite  
    &ProductId = 'publish_my_ad_id'  
    &PurchaseResult =  
        StoreManager.PurchaseProduct(&ProductId)  
    //Code  
EndComposite  
Endevent
```

Client Information

Main Object SD property
Include Network Id in Client Information = TRUE



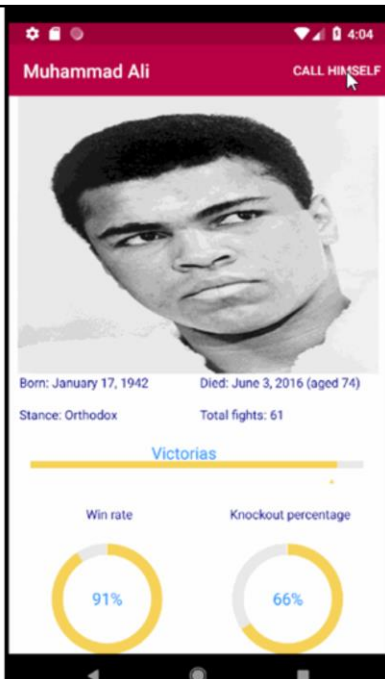
Structure	Type
ClientInformation	
Properties	
Id	VarChar(128)
OSName	VarChar(40)
OSVersion	VarChar(40)
NetworkID	VarChar(128)
Language	Character(20)
DeviceType	SmartDeviceType, GeneXus
PlatformName	VarChar(128)
AppVersionCode	VarChar(40)
AppVersionName	VarChar(40)
ApplicationId	VarChar(128)
Methods	
Events	

IMEI
MEID
ESN



Only Android

SDGauge



HttpClient

```
Event 'GetInfo'  
composite  
  &httpClient.Host = //your host  
  &httpClient.Secure = //Secure  
  &httpClient.Port = //Port  
  &httpClient.BaseUrl = //Base Url  
  &httpClient.Execute("GET", "<something>")  
endcomposite  
Endevent
```



Share session to Webview property

SD object property

✓ Security

Share session to Webview

True

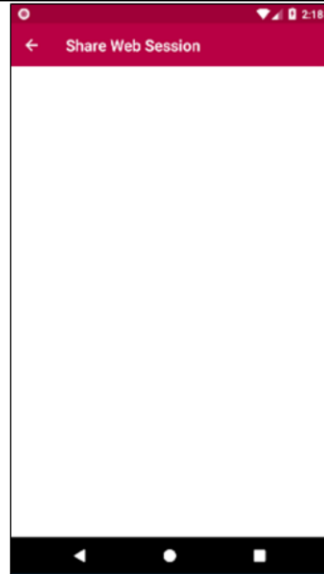
Mobile app



Web Part in Webview



Sample: Share session to Webview



```
Event Start
  &WebSession.Set('Test', "Hello world!!")
  &WebView = WebPanel.Link()
Endevent
```

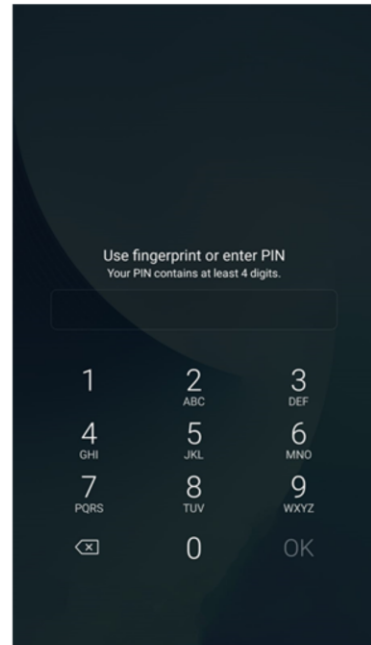
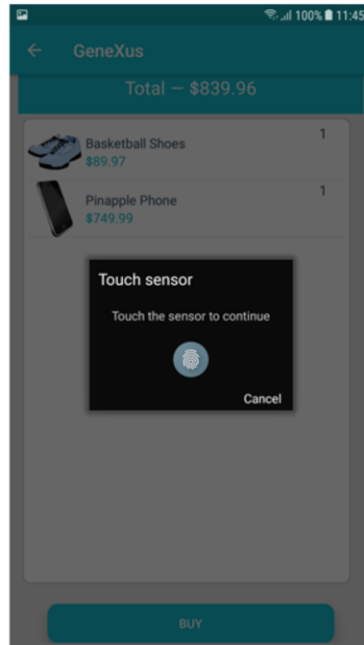


WebPanel1 object

```
Event Start
  &WebVarchar = &WebSession.Get('Test')
Endevent
```

Device Authentication

Structure	Documentation
Structure	Type
DeviceAuthentication	
Properties	
BiometricDescription	VarChar(40)
AllowableReuseDuration	Numeric(8,0)
Methods	
IsAvailable	Boolean
Authenticate	Boolean
method	DeviceAuthenticationPolicy, GeneXus...
title	VarChar(40)
usageDescription	VarChar(40)
Events	



Mobile & Web



Multi-experience & Omnichannel

- Design Systems
- Streams of information
- **Conversational UI: Chats / Chatbots**



Web/ Web mobile

Native mobile

Chatbots

Wearables/TV/AR

SOLUTION

Multi-experience & Omnichannel

SD

- Menu for Smart Devices
- UI SD
- Components
- Offline Apps

Integration

Web / SD

- Multi-layer Maps
- Cloud External Storage

PLATFORM

GeneXus IDE / Modeling / Language

Miscellaneous



GeneXus™
The power of doing