Microsoft AI

Intelligent Customer Care - Insurance

with Bot Framework, Cognitive Services, Big Data, Machine Learning, and Dynamics

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# Introduction

The purpose of this demo is to help showcase how Microsoft Business Analytics and AI can help a customer transform their business processes.   
  
The fundamental customer challenge of how you get actionable insights from your data has not changed. However, in the last few years, we’ve seen significant trends impact our ability to leverage data to accelerate business.   
  
The Cloud now enables elastic compute and storage at low cost. The availability of new types of data from sensors, devices, social platforms and third party sources allows us to better predict outcomes. The sudden growth and popularity of AI that is enabling new scenarios is a direct outcome of the availability of large volumes of data and the ability to store and process them at low cost.   
  
The convergence of these trends - Cloud, Big Data and AI - is accelerating the pace at which companies can transform their business processes. They’re finding new ways to engage customers, empower employees, optimize operations and transform products.

In this demo, we will show you how an insurance company can leverage business analytics and AI to fundamentally transform the way they do customer service and reduce customer churn.

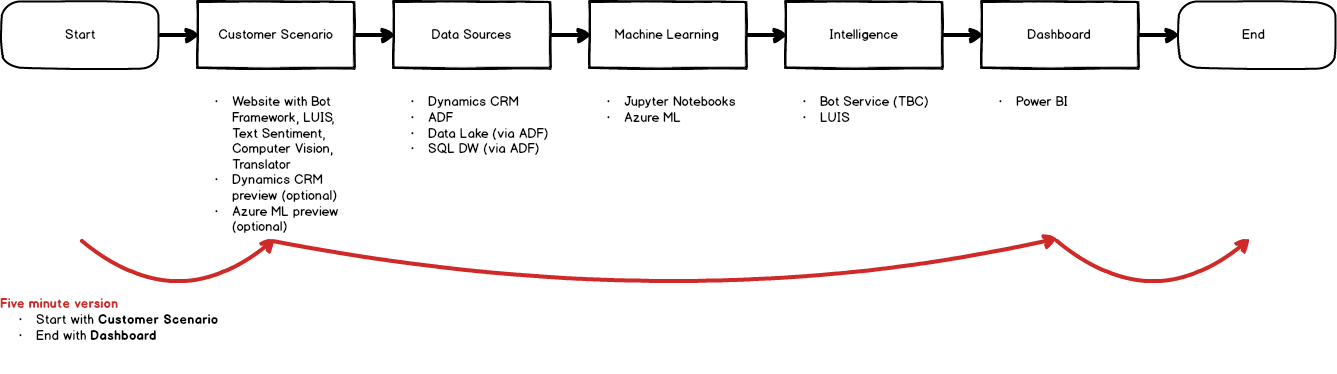
We’re going to walkthrough 3 scenarios:

* The first is how customers can interact with the solution via personalized conversations automated with Bots
* The second is how the customer service support agent gets benefits from Machine Learning and Analytics to predict and minimize churn
* The third is how the VP of operations can monitor global activity via real-time dashboards and take action

The demo has two sections; business demo and an extended technical demo.

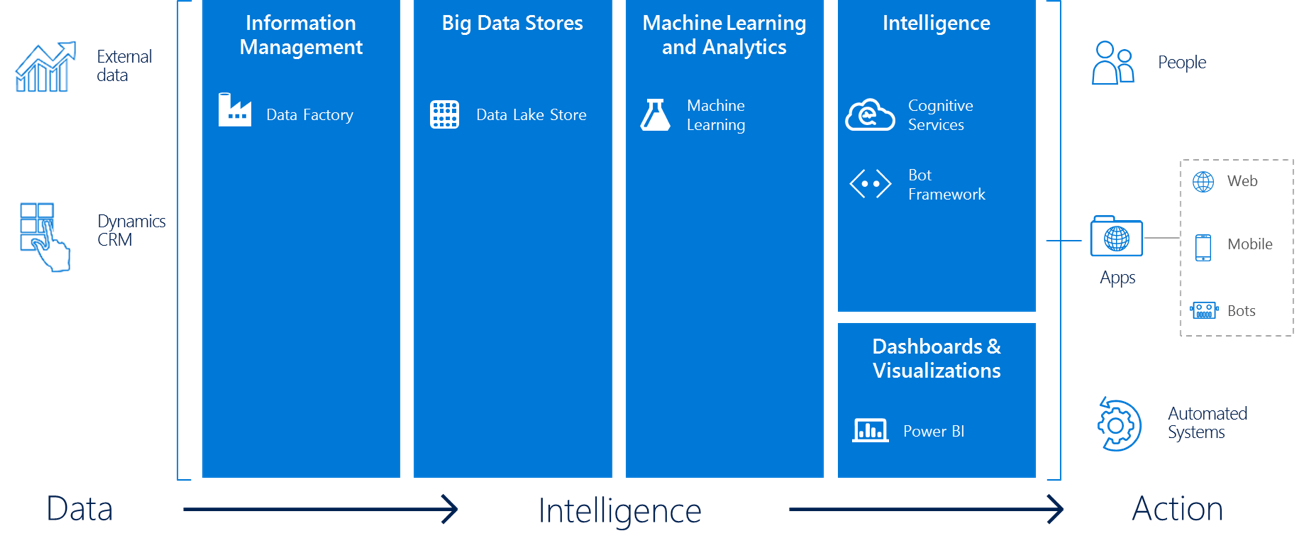
**Scenario walkthrough:**

1. The customer just purchased a new car and needs an insurance quote.
2. The customer goes to their insurance provider’s website for support via a “Get Started” link.
3. The customer service bot requests verification information.
4. After verification, the bot asks for information about the new car including a picture.
5. The bot also accesses customer’s profile in Dynamics CRM.
6. The bot recognizes that the customer’s dependent is going to turn 16 and up-sells to add the dependent to the policy.
7. Based on the CRM data + regional demographic data, the insurance provider uses machine learning to accurately assess the customer’s risk of churn and provides a quote.
8. The customer declines at which point the bot hands over to an agent.
9. Alternatively if the customer accepts the quote, the bot can directly transact on behalf of the customer showing integration and automation into the insurance company’s business process.



**Components:**

1. Insurance scenario: present the customer/bot interaction from initial contact through to agent handoff
2. Data: show CRM and Big Data sources powering the interaction
3. Machine Learning: show how the underlying model was built to support policy selection
4. Intelligence: show recommendations, translation, LUIS, Bot Framework offerings powering the interaction
5. Dashboard: show sentiment analysis output



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# Setup Instructions

Once the above steps have been completed, open Microsoft Edge with the following tabs:

1. [Insurance website](https://insurance.litwaredemos.com/) (ensure AdBlock, Privacy Badger, and similar tools are disabled for the site)The login details are: Bot / Azure (note: you may also be prompted for these creds in CRM)
2. *[In Private Browsing Window]* [Dynamics 365](https://iccprod.crm.dynamics.com) - My Open Opportunities view (from home, click ‘Sales → Opportunities’); note Safari is not supported  
   The login details are: gregw@pmgdemo.onmicrosoft.com / Dyn@mics365!
3. [Power BI](https://app.powerbi.com/) dashboard (under Workspaces > CisBotDemo)  
   The login details are: your microsoft.com credentials. If this is your first time accessing the dashboard, click [here](https://outlook.office.com/owa/cisbotdemo@service.microsoft.com/groupsubscription.ashx?action=join&guid=abbbb200-b927-b7d3-cfa7-98f3cf9ccb57) to join the Office 365 group to get access.

## Setup for Smart Authentication [optional]

By default, the bot will authenticate the customer using their name & PIN. In this release, the bot can also authenticate the user using face & voice. To set this up:

1. Click on the key icon in the title bar of the chat window *before* running the demo
2. Complete the voice training (i.e. record phrase 4 times)
3. Complete the face training (i.e. record face 2 times)

**Important:** to support multiple presenters using the same customer (i.e. Lance Olson) with smart authentication, we store a cookie in your browser to track your profile. This means if you switch browsers, machines, use in private browsing, or clear your cache, smart authentication will no longer work and you’ll need to go through the training process again.

## Setup for non-English demos [optional]

The bot uses the Translator Cognitive Service to translate non-English text into English (before passing it to LUIS for processing, if applicable) and then uses it again to translate the English result back into the user’s language. Please see the [documentation](https://www.microsoft.com/en-us/translator/languages.aspx) for the supported languages. This is an entirely automated process so please test ahead of time to ensure translations are suitable.

## Setup for speech demos [optional]

The bot uses the Bing Speech Cognitive Service for speech-to-text and text-to-speech. Please see the [documentation](https://www.microsoft.com/cognitive-services/en-us/Speech-api/documentation/overview) for supported languages (keep in mind that you’ll need your preferred language to be supported by **both** speech-to-text and text-to-speech).

If you plan to demonstrate speech-to-text, there are a few things to keep in mind:

* Speech is processed using the language last used by the bot to send a message. By default, the bot will start in English so if you’d like to demonstrate speech-to-text in French, you’ll need to type “Bonjour” first. Similarly, if you type “Bonjour” to illustrate automatic text translation, you’ll need to type “Hello” before you can speak to it again in English.
* Speech-to-text works better with phrases than individual works. The script points out good places to illustrate speech functionality. Using it to respond to questions like the user’s name or car brand may produce inaccurate results. In a production system, the Custom Speech Service could be used to build a domain-aware model to improve accuracy.
* Plan to test ahead of time. Accents, poor quality microphones, and noisy rooms can all cause unpredictable results.

# 

# Script

## Business Demo (15 minutes)

|  |  |  |
| --- | --- | --- |
| **Screenshot** | **Steps** | **Notes** |
| **Get Started** | | |
| cisbot-test.azurewebsites.net-.png | Switch to the Insurance website in Microsoft Edge.  Click ‘Get Started’. | *Lance just bought a new car yesterday.*  *As he cannot drive without insurance, he goes to the website of his insurance company.*  *Lance browses to the website looking to get a new automotive policy for his new car.* |
| **Introduction to the Bot** | | |
| cisbot-dev.azurewebsites.net-.png | Type “Bonjour” *OR* “Hola” *OR* any greeting in a supported language  **Important: if you want to show speech to text in the next step, you must *type* ‘Hello’ in the language you want to speak. The bot uses the last typed language when processing speech.** | [COMMENT] This section is optional. You can skip directly to getting a policy if time is limited (next sub-section).  *Bots can support many different patterns of interactions with your customers.*  *They represent an opportunity to empower customers to interact with your business in personal, natural ways.*  *For example, Bots are multilingual, I can say Bonjour, and see the response in my language of choice. No more dialing 1 for English, 2 for Spanish, 3 for French.* |
| cisbot-dev.azurewebsites.net-.png | Type “What can you do?”  *OR* click and hold the mic button and say “What can you do?” *OR* press the up arrow key to auto-type.  Type “Where is the company based?” *OR* click and hold the mic button and say “Where is the company based?”  *OR* press the up arrow key to auto-type.  Other supported phrases include:   * “Can I get a discount?” * “What types of payment do you accept?” | *Here we can ask the bot simple questions and get immediate responses. It’s able to identify the intent of the question regardless of how it’s phrased by the user. We can type these questions or even leverage speech-to-text for an even more natural pattern of interaction.*    *The next interaction flow is more complex. Here, the bot maintains state as it leads the user through a series of steps to achieve a shared goal.* |
| **Engaging on the quote** | | |
| cisbot-dev.azurewebsites.net- (1).png | Type “I need insurance”  *OR* click and hold the mic button and say “I need insurance” *OR* press the up arrow key to auto-type.  Click “Auto”. | *As Lance is looking for a new insurance, let’s type (or say): “I need insurance”.*    *The bot starts a conversation flow with Lance to help his with his purchase.*    *The bot will understand the intent and ask me for which type of insurance I'm looking for. It uses LUIS to determine how to handle his inquiry. For example, if I typed “I need auto insurance”, it wouldn’t ask me what type of insurance I was wanting.*  *As you can see, it’s not only text based but rich content can be embedded in the chat window.* |
| **Authenticating the user: option 1 (smart authentication)** | | |
| cisbot-dev.azurewebsites.net-(Projector).png | Type “Lance Olson” *OR* press the up arrow key to auto-type.  Click “Yes” to use smart auth.  Click and hold the microphone and say “My voice is my passport. Verify me.”.  Click the camera button and take a photo of yourself. | *Smart authentication leverages face and voice recognition to identify the customer in a much more natural way, just as people identify each other. Alternatively, we could use the bot to authenticate the customer using a PIN or other personal detail, much like a call center.*  *We can use the user’s photo for more than just authentication. In this case, the bot customizes it’s greeting based on the emotion we detect in the user’s photo.* |
| **Authenticating the user: option 2 (PIN)** | | |
| cisbot-dev.azurewebsites.net-(Projector).png | Type “Lance Olson” *OR* press the up arrow key to auto-type.  Click “No” to skip smart auth.  Type “\*\*\*\*” *OR* press the up arrow key to auto-type. | *It then authenticates the customer using an experience more comparable to a traditional call center. Alternatively, we could leverage the power of face and voice recognition to recognize and automatically authenticate the customer without burdening them with another secret to remember.* |
| **Infuse intelligence within business process** | | |
| cisbot-dev.azurewebsites.net- (2).png | Click “Yes”. | *Thanks to Dynamics 365, the bot is able to connect to business processes and retrieve his customer information.*    *Using this information, the bot has been able to identify that I’ve got a daughter registered in the system who just turned 16 and can suggest adding her to the policy, which I accept. You can see there how you can take action through solutions that infuse intelligence within business process.* |
| **Services** | | |
| cisbot-dev.azurewebsites.net- (3).png | Click “Sedan”.  Type “Ford” *OR* press the up arrow key to auto-type.  Type “Fusion” *OR* press the up arrow key to auto-type.  Click “2015”.  *Feel free to type any car or model to personalize this part of the demo. Your selection will appear in the CRM view in the next section of the demo.* | *Next I need to provide additional information related to the car I just bought.*    *Not only can you provide the information by typing but you can also see beautiful cards, designed with buttons for common answers help accelerate the process.* |
| cisbot-dev.azurewebsites.net- (4).png | Click “Yes”.  Click on the picture icon and upload dog.jpg. Feel free to use any image you like to personalize this part of the demo.  Click on the picture icon and upload harry.jpg.  Click on the picture icon and upload suv.jpg.  Click on the picture icon and upload ford\_fusion.jpg. You can download any image of the car from the internet for use. | *Here, Lance is asked to upload the picture of his car for the record. A baseline picture is critical for insurance companies, especially if you have an accident. However, he uploads the wrong picture.*  *Thanks to the Computer Vision API and deep learning, it is now possible to understand what is inside an image, and verify if the content is appropriate.*  *We’ve also trained a custom vision model to ensure that the type of vehicle uploaded matches the user’s previous selection.*  *In the future, thanks to deep learning techniques, you’d be able to upload a picture of your car and have the system automatically recognize the brand and model.* |
| **Smart Insights** | | |
| cisbot-dev.azurewebsites.net- (4).png |  | *Now, in the background, the bot is pulling together all the information Lance has provided, plus past purchase history, driving records, and other relevant data to generates a quote.*    *This includes inputs from traditional risk assessment systems, as well as more modern sources like our Azure Machine Learning churn model.*  *We can truly capitalize on insights hidden within – and beyond – your unique data.* |
| cisbot-dev.azurewebsites.net- (5).png | Type: “No, that’s way too expensive!”  *OR* press the up arrow key to auto-type. | *The bot presents a quote and asks what we think.*    *At this point, if the customer likes the quote, we can take them to a payment processing screen or even use a payment method already on file.*    *But let’s see what happens though if we respond negatively to the bot.* |
| cisbot-dev.azurewebsites.net- (6).png |  | *The bot can even detect the negative sentiment of the customer’s response thanks to Cognitive Services with the use of the Text Analytics API, or even leveraging an Azure ML churn model to measure if the threshold for continued interaction is too big.*    *In this scenario, the bot can reach out to a human agent to help finalizing the sale.* |
| **Behind the scenes** | | |
| litwareinsurancebotdemo.crm.dynamics.com-main.aspx.png | Switch to Dynamics 365:   * Show existing customer information including family details (left pane) * Show bot activity in activity feed (center pane) * Show inline chat window (right pane) | *From Dynamics 365, we can see the opportunity the bot has built for the agent. It pulls in existing customer history, including their dependents, and then appends information captured in the chat, like car details & chat history.*  *This ensures the opportunity is ready for a human agent to pick up and successfully close the deal.* |
| litwareinsurancebotdemo.crm.dynamics.com-main.aspx.png | Read second message from the bot in the activity feed (center pane). | *In addition, the bot is also helping me, the agent, by giving me specific suggestions on how to best deal with this opportunity.*  *For example, in this message, it leverages machine learning to identify customer churn risk for the agent to consider when pricing the deal.* |
| litwareinsurancebotdemo1.crm.dynamics.com-main.aspx(Projector).png | Scroll down to the products list.  Click on ‘Suggestions’ next to the ‘Auto Insurance’ product line (you may need to scroll right and mouse over the line before seeing the link). | *It can also make smart suggestions regarding other products the customer may wish to purchase.* |
| app.powerbi.com-.png | Switch to the Power BI Dashboard. | *From a customer profile perspective, we gathered a considerable amount of valuable data during this interaction. All of the information captured by the bot and shared by Lance has been added to CRM.*  *Contact centers will have a complete view of each person’s interaction in the CRM, but also all the customer requests aggregated in order to find smart insights, thanks to powerful visualization tools such as Power BI.*  *As a VP of operations, I have access to real-time dashboards of all my events happening globally. For example, I can see the number of real-time chats, escalations, and business generated. I can also see the funnel of engagement and even the cost to serve report.* |
| app.powerbi.com- (1).png | Click on the map.  Click on the right red circle in Australia. | *By using technology such as sentiment analysis and topic extraction, we can identify and respond to trends in near real-time through custom visuals like the word cloud.*  *Let’s look at what’s happening on the map. We can see our performance in Australia is unusual. If we drill in, we can quickly see why: our major competitor, Contoso Insurance, and the word expensive emerge. If we call the local representative to ask what’s going on, we learn that Contoso Insurance has lowered their prices and can then take immediate action to be price competitive in that market.* |

End of business demo. The below section dives deeper into the technical details of the services on the back end.

**N.B. Concluding remarks are available after the technical demo section.**

## 

## Smart Authentication Demo - Optional (5 minutes)

The voice & face authentication functionality can be illustrated separately to the bot. However, if you train face & voice profiles here, they will be available as part of the bot auth flow (just select ‘Yes’ when prompted for smart auth). There are two demo options:

* Train & verify: in this scenario, you’ll train your voice & face and then verify. If you completed the training steps during a previous demo runthrough, you can reset your profile by clicking on the red reset icon in the dialog. Note this only resets voice or face (depending on which step you’re on).
* Verify only: in this scenario, complete the smart auth setup steps in the introduction and skip the training sections.

|  |  |  |
| --- | --- | --- |
| **Screenshot** | **Steps** | **Notes** |
| **Voice (if you only want to show face, click on the right arrow button to advance)** | | |
| chrome-extension---bhloflhklmhfpedakmangadcdofhnnoh-index.html(HD Projector).png | 1. Click on the key icon in the title bar of the chat dialog box | *Let’s take a look at face & voice verification in more detail. Both services operate similarly: after an initial training phase, they are ready to verify the user in future interactions. This technology is in use today with companies like Uber who use it to periodically verify their drivers when they start work.* |
| chrome-extension---bhloflhklmhfpedakmangadcdofhnnoh-index.html(HD Projector) (1).png | For training only:   1. Click and hold while you record your authentication phrase 2. Repeat two more times   For both training & verification:   1. Click and hold while you record the wrong phrase (or get another person to record it) 2. Click and hold while you record your authentication phrase | *Voice authentication, or more specifically speaker verification, requires the user to record a training phrase. There are a number of different options but we’ve selected “My voice is my passport. Verify me.”*  *After recording the phrase three times to train the model, it can then verify my voice. If I use another person’s voice or the wrong phrase, it fails to confirm my identity.* |
| chrome-extension---bhloflhklmhfpedakmangadcdofhnnoh-index.html(HD Projector) (2).png | 1. Click on the green icon |  |
| **Face** | | |
| chrome-extension---bhloflhklmhfpedakmangadcdofhnnoh-index.html(HD Projector) (3).png | For training only:   1. Click on the camera to take photo 2. Click on the green icon to confirm   For both training & verification:   1. Click on the camera to take photo of another/obscured face (or upload an image with a **face** present by clicking the image button) 2. Click on the camera to take photo 3. Click on the green icon to confirm | *Face authentication, or more specifically face verification, requires a single photo of the user to train the model.*  *After our training image is submitted, it can then verify my photo. If I take a photo of another person (or obscure my face), it fails to confirm my identity.* |
| chrome-extension---bhloflhklmhfpedakmangadcdofhnnoh-index.html(HD Projector) (4).png | 1. Click on the green icon | *As you can see, the confidence level is also returned (in lower portion of the screen).*  *Like LUIS, Bot Framework, Vision, and other cognitive services, the Face & Speech APIs further advance modern customer service interactions by making them more ‘human’ than ever before.* |

## 

## Technical Deep Dive Demo - Optional (15 minutes)

|  |  |  |
| --- | --- | --- |
| **Screenshot** | **Steps** | **Notes** |
| Open the browser with the following tabs. To complete these steps, you will need to deploy the application yourself or request access to the demo tenant.   * [Azure Portal](https://portal.azure.com) with demo resource group blade open * Azure Data Factory Monitoring Portal (from cisbotadf\* in Azure, click ‘Monitor and Manage’) * [Azure Machine Learning workspace](https://studio.azureml.net) named cisbotml\* * IDEAR Jupyter Notebook (from the AML workspace); make sure to trust it (File > Trust Notebook) * Azure Machine Learning Web Service portal for the CisBot\* service * [LUIS Portal](https://www.luis.ai)(if you are using the demo tenant, you’ll need to deploy LUIS yourself based on the model [here](https://cisbotstore.blob.core.windows.net/resources/cisBot.json?st=2017-04-03T01%3A28%3A00Z&se=2018-04-04T01%3A28%3A00Z&sp=r&sv=2015-12-11&sr=b&sig=00lVruQA8OVvRb2x9vjv960hiU3jG9Zk8R1peHQ0O6I%3D))   The value of ‘\*’ will be dependent on the environment you are access (demo vs. personal). | | |
| **Azure Portal** | | |
| ms.portal.azure.com-(Projector).png | Switch to the Azure Portal in Microsoft Edge. | *Let’s take a quick look behind the scenes at the services that power the bot. We’ll start with how the customer churn model is built and then examine how the bot is hosted and how it gets its ability to interpret natural language.*  *All of these capabilities are enabled via Azure. This benefits us by ensuring we have a consistent model for authorizing access, alerting, monitoring, auditing, billing, and more. It also means a consistent set of tools including the portal, PowerShell, and a cross-platform CLI.*  *Here’s a quick look at the various services that underpin this application. We can reliably deploy this complex app in just minutes through JSON-based templates and the Azure Resource Manager.* |
| **Azure Data Factory** | | |
| datafactory.azure.com--datafactory-edit-subscription-8d5f12c8-5826-4caf-be5b-b386b2daf671-resourceGroup-cisbot-dataFactory-cisbotadf--tenantId=72f988bf-86f1-41af-91ab-2d7cd011db47.png | Switch to the Azure Data Factory monitoring portal in Microsoft Edge. | *Building machine learning models to predict customer preferences or risk is no longer limited to historical business transactional data. It also includes data sets like census, clickstream, credit history, driving records, weather, demographics, crime stats, etc.*  *Azure Data Factory enables us to pull together data from multiple sources in preparation for use in our big data and machine learning services.* |
| datafactory.azure.com--datafactory-edit-subscription-8d5f12c8-5826-4caf-be5b-b386b2daf671-resourceGroup-cisbot-dataFactory-cisbotadf--tenantId=72f988bf-86f1-41af-91ab-2d7cd011db47 (1).png | Highlight the CrmDataset, ClaimsDataset, and AzureBlobCensusDataset.  Scroll right and select the HDInsightHive AggregationPipeline.  Scroll right and select the CopyToDataLakeStorePipeline. | *Here we’re capturing data from three different sources to build our ML model:*   * *CRM data from Dynamics 365.* * *Claims data from our on premises SQL Server.* * *Census data from a large CSV file in Azure Storage.*   *We then use HDInsight to process it. We provide a Hive script and ADF spins up a cluster on demand for execution.*  *Now we have a single data set that contains all of the information we have about a customer. We then store it in Azure Data Lake.*  *Next we’ll use Jupyter to explore and understand the data and then we’ll use Machine Learning to build predictive models.* |
| **Machine Learning** | | |
| notebooks.azureml.net-n-uEhKGYdl2Ms-notebooks-IDEAR.ipynb.png | Switch to the Jupyter Notebook in Microsoft Edge.  Run the notebook (Cell menu > Run All). | *Let’s look at how we built the customer churn model. The process of building a good model starts with exploratory data analysis. Jupyter is an open platform for interactive data science and supports a range of language and options for collaboration. It’s also built into Azure ML.*  *This particular notebooks is based on the IDEAR process, a publicly available methodology for understanding new data sets. As you can see, it’s not just a static report: it uses Python models to build an interactive canvas to help us explore individual variables and the relationships.* |
| studio.azureml.net-Home-ViewWorkspaceCached-5b439a0de13a4a76bca213be8d702cfd.png | Click on the Experiments tab.  Click on “CustomerChurnTraining”. | *Once we understand the data, we can build an experiment. Azure Machine Learning provides a visual interface to import, refine, & explore data and then train, refine, and score models. This churn model pulls data from our data sources in Azure and evaluates a range of algorithms to find the best choice for our data.*  *This model has several stages:*   * *Ingest data: supports many different sources incl. SQL, Hive, and plain flat files* * *Prepare data: add metadata, clean missing values, remove duplicates, and run inline R scripts* * *Build data sets: split training vs. test, as well as things like synthetic minority oversampling (i.e. increase incidence of low incidence examples before model building)* * *Build models: an experiment can consist of one or models, using out of the box algorithms or R* * *Evaluate: use an extensive array of statistical functions to analyze the performance of your models*   *Once we’ve found the best model, we can turn it into a predictive web service with just a couple of clicks.* |
| services.azureml.net-subscriptions-8d5f12c8-5826-4caf-be5b-b386b2daf671-resourceGroups-cisbot-providers-Microsoft.MachineLearning-webServices-CisBot.2017.1.8.22.9.35.758-dashboard.png | Switch to the Azure ML Web Service portal in Microsoft Edge. | *After the service is deployed, we can work with it from a dedicated management portal. It provides not only usage information, but also code samples (under Consume tab), an interactive test page (under Test tab), and detailed API definitions (under Swagger API tab).* |
| **Intelligence** | | |
| portal.azure.com-.png | Switch back to Azure Portal in Microsoft Edge.  Click on the Azure Bot Service named “cisbot-prod-demo-svc” (for the demo tenant) or “cisbot-svc-\*” (for a personal tenant).  [Optional] Type “I need insurance” in the chat client. | *The Azure Bot Service combines all of the features of the Microsoft Bot Framework with the limitless scale of Azure.*  *It leverages Azure Functions, Microsoft’s serverless compute service, to allow your bot to be hosted without having to provision a dedicated host. You’re simply charged for the compute time you use so when you’re bot isn’t being called, you don’t incur any cost. And when your bot gets busy, Azure scales up seamlessly to handle the load.*  *As you can see, we even get a chat control to allow us to easily get started.* |
| www.luis.ai-(Projector).png | Switch to LUIS Portal in Microsoft Edge.  Select the ‘cisBot’ bot.  Click on ‘Train & Test’.  Type “I need auto insurance” into the utterance box and press enter. | *LUIS lets our app understand natural language. Through the portal, we can build and/or re-use models to understand the user’s intent and then easily integrate with our application.*  *From here, we can edit our application to add new intents and monitor the state of our LUIS model.*  *If we enter a sample phrase, we can see how LUIS interprets it. It identifies the most relevant intent and also correctly detects ‘auto’ as the insurance type.* |
| www.luis.ai-(Projector) (1).png | Click on ‘Dashboard’. | *From the dashboard, we can monitor the model’s performance, including which intents are being hit and the model usage. Through this portal we can also quickly add new intents or improve the training data for existing ones to increase accuracy.* |

## Conclusion

To summarize, in this solution, Business Analytics and AI helped me deepen my customer engagement, predict outcomes, and helped reduce churn and automate actions by allowing my VP of operations to make real time adjustments to competitive price pressures.

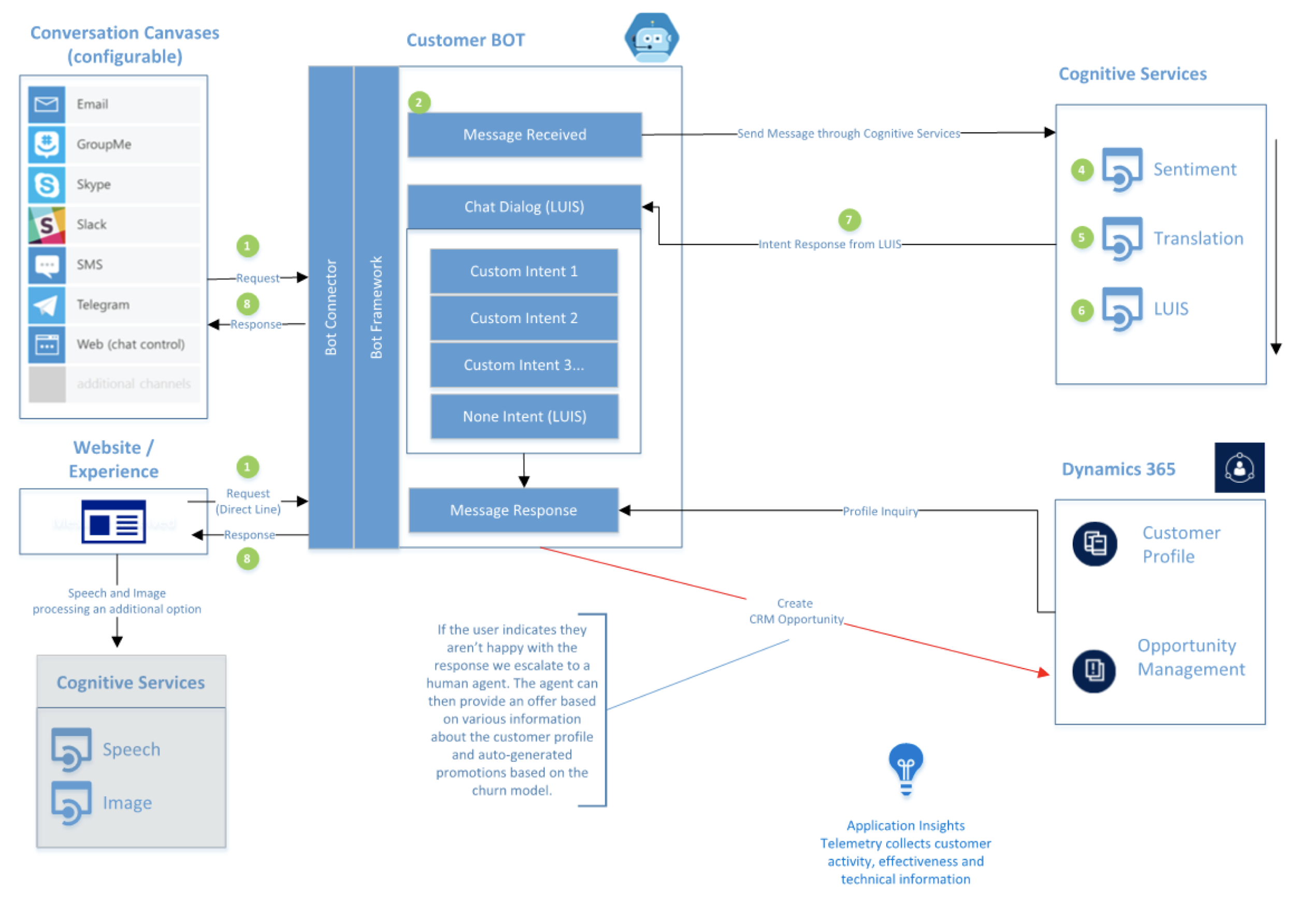
Everything you saw here was built by 2 developers in a month, using our BA and AI capabilities on the Cloud. All of this was build using Cortana Intelligence services and Dynamics 365.

This is just one example of how Business Analytics and AI can help transform the business process for an organization. We have customers across every industry with similar stories for transformation:

* For example, Rockwell, a global industrial automation company, who cut develop time by 80% and costs up to 90% by providing full time pipeline visibility; or
* QuarterSpot, a start up in the financial sector, who lowered loan defaults by 50%, leading to increased profitability.

With that, we’d like to conclude today’s demo. Thanks!

# Appendix 1: Demo Architecture



# Appendix 2: Technical Implementation

Litware Insurance is a demo and thus the code base is not designed to be ‘production ready’; however, much of the demo uses out of the box features and may serve as a useful getting started example:

* Website: uses the Direct Line API to communicate with the Bot Framework. The site is built in Angular 2 and uses bespoke components to render the chat surface.
* Dynamics CRM: uses the Organization Service to retrieve customer account information including dependents (i.e. related contacts) based on name/SSN and adds opportunity/product line items as the chat progresses. The ML recommendations model used for product suggestions is based on generated data in CRM.
* Translator service: all incoming client messages are passed to this service to detect the language. This is then used by the ‘Hello’ intent to determine the appropriate language to respond in. It could be used by other intents as well.
* LUIS service: all incoming client messages are passed to this service to map a user message to an intent/code for response.
* Computer Vision service: used to recognize images with vehicles in them. It’s also used to generate a vehicle thumbnail.
* Jupyter notebook: this is based on [IDEAR](https://github.com/Azure/Azure-TDSP-Utilities/tree/master/DataScienceUtilities/DataReport-Utils/Python2) project from Microsoft and uses the dataset from the ML model.
* Azure ML model: the churn model is based on existing Azure ML gallery sample and customized for this scenario. It is invoked via a web service and the results posted to the CRM opportunity activity feed.
* Text Sentiment service: used to interpret the final user response and, if negative, invite an agent to the chat.
* Speaker Recognition service: used to verify an audio sample from the user.

The following portions may require custom development:

* Website: authentication is partially implemented. The bot service authenticates the user based on the information provided in the chat via a CRM query - and optionally a voice recognition check - but this isn’t passed through to the Angular 2 client components as they are hard coded to the ‘Lance Olson’ persona. One option would be to share this information back to the client components via the [channelData](https://docs.botframework.com/en-us/csharp/builder/sdkreference/channels.html) field. Also, the agent/multi-user chat is faked for demo purposes. Instead of [sending](https://docs.botframework.com/en-us/restapi/directline3/#!/Conversations/Conversations_PostActivity) the message as a new user in the conversation, it sends the message as the bot but updates the image on the front end. After the new user was added to the conversation, the bot would need to ignore messages between the customer and agent.
* Dynamics CRM: information regarding the opportunity - e.g. payment history & car value - is generated rather than being fetched from an API. Once a suitable API had been identified, adding it to flow would be straightforward as CRM connectivity is already in place. Also, while the bot can post to the opportunity activity feed, it isn’t configured to listen to any responses. To add this, the server could either poll CRM or potentially use a CRM plugin to detect the change.
* Dynamics CRM website embed: this IFRAME shows the chat history by querying the Bot Framework. To operationalize this control, the implementer would need to: a) store the data in a durable store rather than querying from the Bot Framework (i.e. once the chat is complete, call the Direct Line API and store the messages in Azure Storage); b) implement corporate identity (i.e. wrap the page hosted in the IFRAME with [Azure AD](https://docs.microsoft.com/en-us/azure/app-service-web/web-sites-dotnet-lob-application-azure-ad)); c) enable auto-refresh to allow updates in real-time (i.e. update TypeScript to poll the Direct Line API in the same way the full website does); and d) allow the agent to respond (i.e. send messages like the full website but use the logged in user’s identity in the from field).
* Azure Data Factory: the pipeline is real and will pull data from CRM, on premises, & blob before aggregating in Hive and writing to Data Lake; however, the resulting data set is not comprehensive enough for Machine Learning model generation so a pre-generated data set is used instead.
* Power BI: this dashboard uses a static, generated dataset.