

# Developing and Deploying Intelligent Chat Bots



Main site: [aka.ms/botedu](http://aka.ms/botedu)  
Chat room: [aka.ms/botedu-discuss](http://aka.ms/botedu-discuss)

This link contains additional resources on the bot framework and related topics.  
mailto: michhar<at>microsoft.com for questions/comments. Show site.

## Today's agenda

- Bot Framework Overview
- Bot Framework Developer Introduction and Deploying an Intelligent Bot
- Deep Dive into the Microsoft Bot Framework

*Be ready for fun labs throughout 😊*

## Prerequisites for the lab parts

GitHub account

Microsoft account

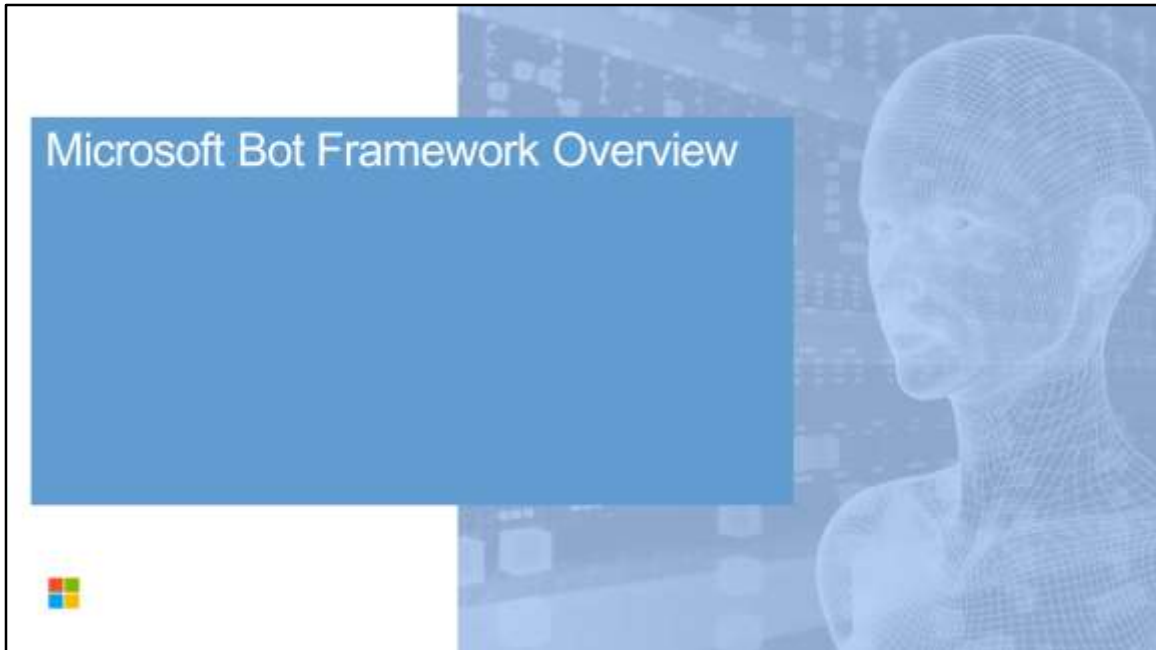
VSCode

Node.js installed locally

Git bash – unix-style command prompt and uploader/downloader for code

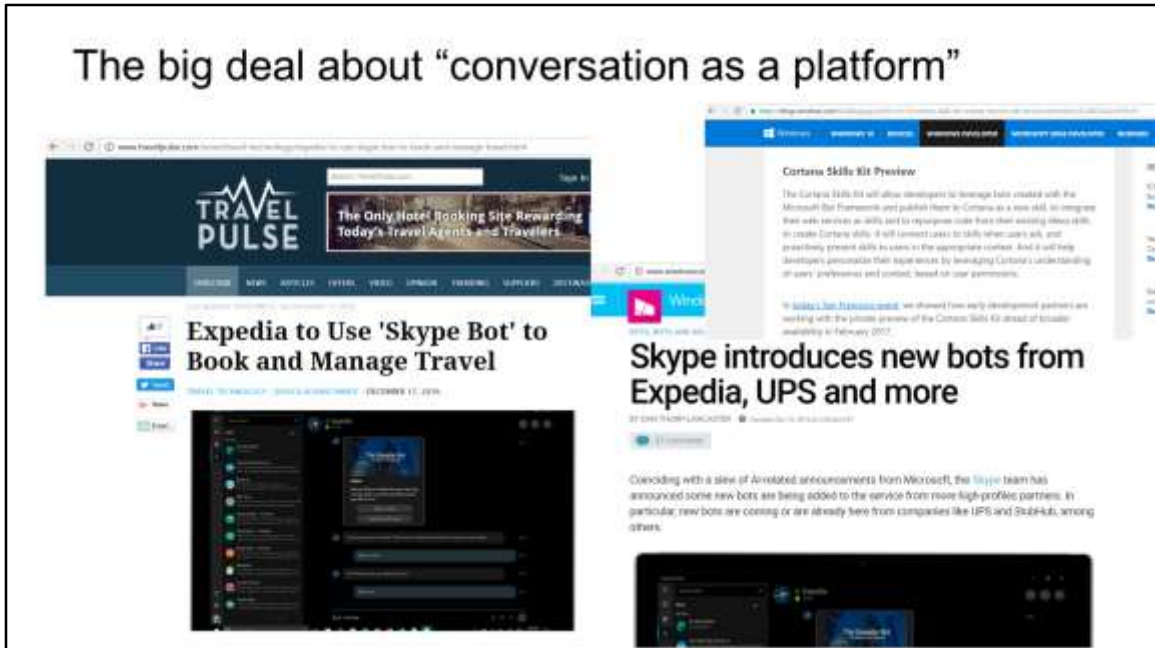
Bot Framework emulator

Azure account[recommended and needed to deploy]



If the links in this deck are broken please let us know (mailto:[michhar@Microsoft.com](mailto:michhar@Microsoft.com)). Thanks in advance and enjoy learning about bots and the Microsoft Bot Framework.

## The big deal about “conversation as a platform”



<http://www.windowscentral.com/skype-introduces-new-bots-expedia-ups-and-more>

<http://www.travelpulse.com/news/travel-technology/expedia-to-use-skype-bot-to-book-and-manage-travel.html>

<https://blogs.windows.com/buildingapps/2016/12/13/cortana-skills-kit-cortana-devices-sdk-announcement>

# Demo

## **The ocrbot (Computer Vision bot)**

Launch the ocrbot from the developer portal using Skype

## Session outline

- What a **bot** is and is not
- The **major components** of the Bot Framework
- Deploying and working with **channels**
- Your **arsenal** or **toolbox**
- *Dev environment lab*



Learning objectives for this overview module on the Bot Framework



What is a bot?



## What a bot is not

It's not AI



It's not natural language processing only



It's not text interfaces only



### Not AI:

- Bots can be simple task automation utilities.
- Example: Password reset bot. There's no AI here. Just ask a couple of security validation questions, then reset the password.
- They may have AI as well, if the scenario applies

### Not only NLP:

- Natural language processing has limitations, still. The more your bot depends on NLP, the worse the experience gets. Hint: Typing isn't always the best option.
- Move away from NLP as quickly as possible
- "Drive" the user as much as you can (menus, choices, etc). Less typing = better

### Not only text interfaces:

- Bot channels are evolving quickly to support richer experiences: Media, buttons, custom controls. These are here or on their way. Text is not known to the best experience for everything.
- Examples:
  - Skype allows audio and 3D bots as well.
  - Slack, Facebook and Skype have buttons/custom UIs

## What is a bot?

Simply put, a bot is an **application** that performs an automated task. That's it.



Siri, Cortana, the old-school MS Clippy and even AOL's SmarterChild are some examples. Essentially, bots perform automated tasks that are generally **REPETITIVE** for humans to do. We want to make life easier for the end user of the bot.

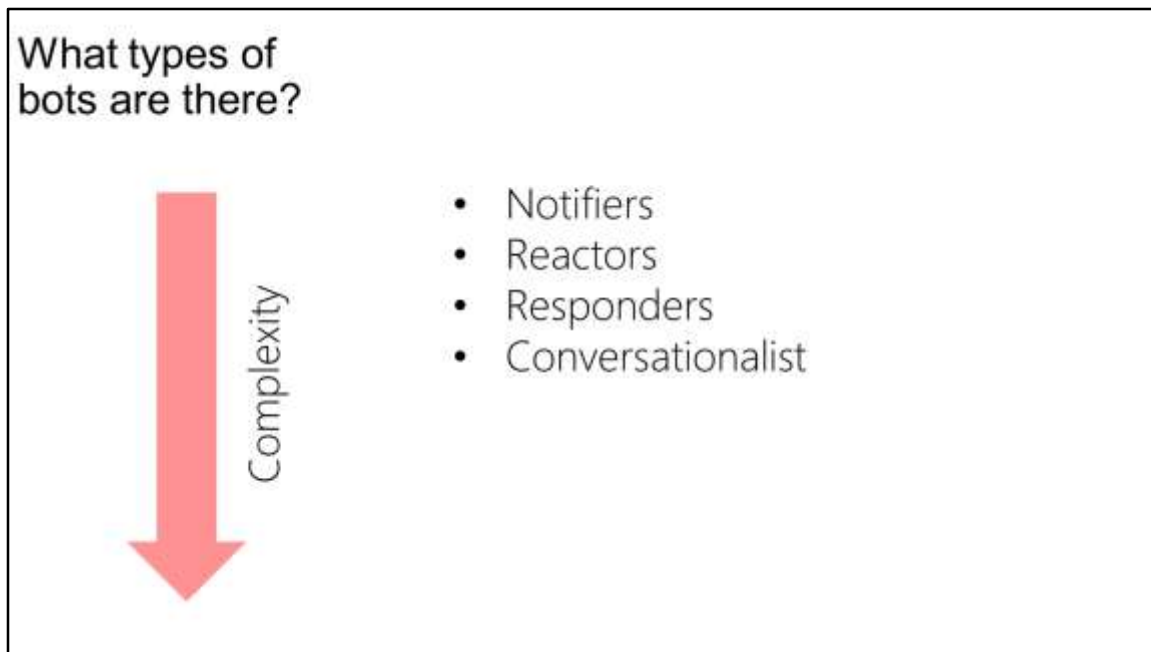
Bots are apps.

They can:

- Exist in different channels and across platforms.
- Do anything from simple task automation like taking food orders to leveraging sophisticated deep learning algos as is used by CaptionBot (<https://www.captionbot.ai/> which describes the contents of an image how a human would) and other AI-esque capabilities.

What a bot can do is only limited to the APIs your bot uses.

Bots don't have to leverage the MS Bot Framework (e.g. MimickerAlarm <https://www.microsoft.com/cognitive-services/en-us/mimickeralarm>, an app for waking you up), but the Framework makes dev and deploy much simpler and faster for.



Based on this blog post: [http://willschenk.com/bot-design-patterns/?imm\\_mid=0e50a2&cmp=em-data-na-na-newsltr\\_20160622](http://willschenk.com/bot-design-patterns/?imm_mid=0e50a2&cmp=em-data-na-na-newsltr_20160622) about different bot types and the definitions of these.

1. Notifier - simply broadcast messages aka push bot e.g. ping me when there's a interesting tweet about Hadley Wickam
2. Reactor - reacts to messages on service, but doesn't persist anything (message, user state, location) e.g. send me the stock price for a stock I specify, but don't remember me or what I say
3. Responder - reacts to messages on service, persists message and knows who I am e.g. send me today's weather forecast for a city, use my user name on this channel, and remember what cities I choose
4. Conversationalist – reacts to messages, persists messages, knows who I am, knows about the “place” I’m at (channel, room,...), knows the state of the conversation e.g. send me today's weather forecast for a city, use my user name on this channel, remember what cities I choose, format it nicely for this channel, and if the conversation is old, archive it and send as email.

From “Bot Design Patterns”: Questions that help us formulate what kind of bot we might want or need:

Do they react to messages?

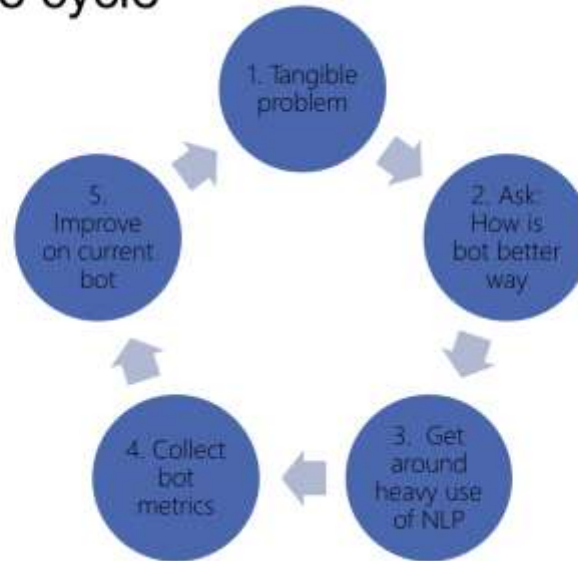
Do they know who they are talking to?

Can they learn from what was said?

Do they know where the conversation is taking place?

Do they remember the overall conversation?

## The bot life cycle



1. Start by asking what problem are we trying to solve. Refine until it looks like a tangible problem and not "magic"
2. Ask how a bot will be a better experience. User experience is EVERYTHING
3. Avoid too much natural language. Careful with unrealistic expectations. Natural language recognition is limited. Menus work great. Commands work great. Buttons, etc.
4. You can only analyze and improve your bot if you're collecting metrics for it
5. Iterate, improve

## Consideration when going the route of a bot

- Provide as much value to the user as you can
- Participate in a productive conversation (minimize complexity)
- Emotion, variety and personality are vital (even if Markov Chain bot)
- Utilize the interaction patterns of the messaging canvas and the mobile OS
- Craft an engaging welcome message
- Be judicious with data and message frequency (avoid "push bots")
- Give feedback (e.g. confirm intent)
- Keep the user in control (e.g. turn on/off updates)
- Be nice and do the right things (e.g. operating with integrity and respectful and considerate of everyone)

From: <https://docs.botframework.com/en-us/directory/best-practices>

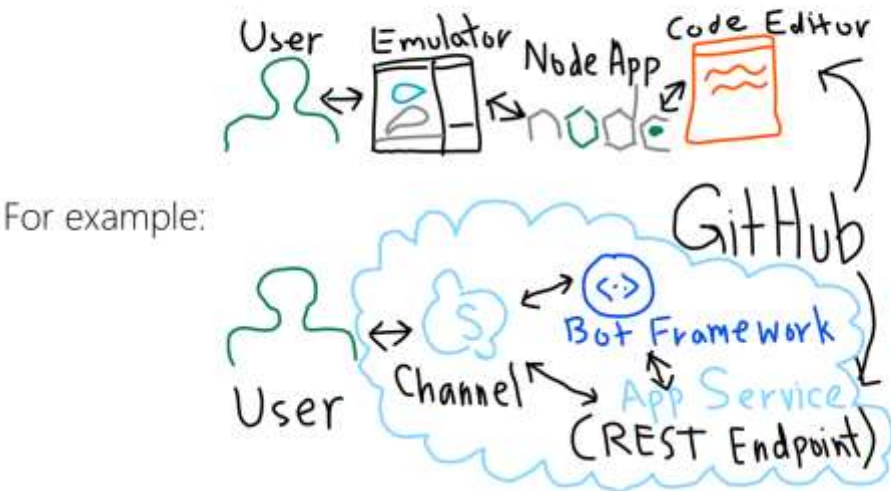
This may have been in your mind before this tutorial. Ethical and societal considerations as well in an article by Satya Nadella:

<https://www.linkedin.com/pulse/partnership-future-how-humans-ai-can-work-together-solve-nadella>

Here enters the Bot  
Framework



Bot Framework: a development tool



## The Benefits of the Bot Framework

### • For developers

- Bots are more capable nowadays so more functions
- Bot Builder SDKs or custom code – you have choices
- Faster testing, dev and deployment
- Easy integration with the cloud
- Growing community

### • For end users

- User choice of channels
- Users have trust and control of their data
- New experiences

### • For businesses

- Broad access to their customers and new experience
- Reduced cost of development
- High quality bots

#### For developers

Bots are more capable because of supporting services i.e. MS Cognitive Services and BF State Service

Bring your own bot or build your own bot with the Bot Builder SDKs

With SDKs and sample code on github

Smooth cloud deployment and integration

Big community (open source community, issues, gitters, stackoverflow – active and responsive)

#### For end users

Users can choose from a variety of conversation channels

Users have trust and control of their data – encrypted and accessible anytime

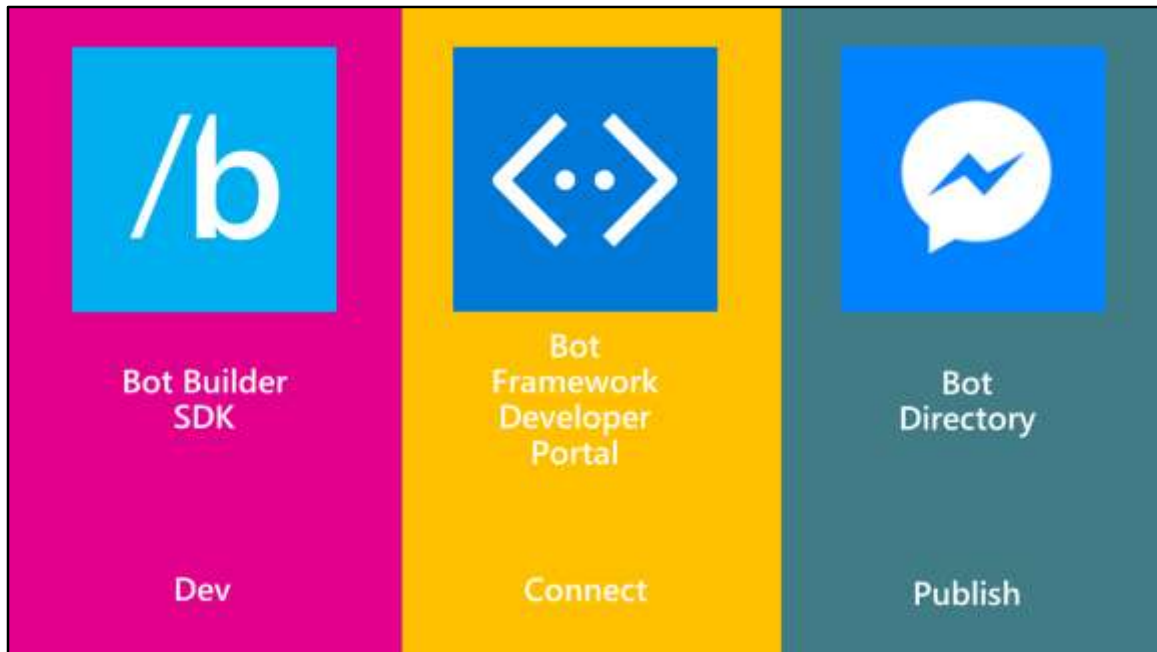
Frictionless fun or at least makes something much easier

#### For businesses

Broad access to their customers where they already are conversing giving them new experiences

Reduced cost of development – just faster with SDKs and builtin functionality like dialog handling and language understanding

High quality bots (big support and dev community) as well as, bots are reviewed after publishing and surfaced on Bot Directory



**Bot Builder is itself a framework for building conversational applications (“Bots”).**

The Bot Builder SDK is [an open source SDK hosted on GitHub](#) that provides everything you need to build great dialogs within your Node.js-, .NET- or REST API-based bot.

The Bot Framework Developer Portal lets you connect your bot(s) seamlessly text/sms to Skype, Slack, Facebook Messenger, Kik, Office 365 mail and other popular services. Register, configure and publish.

The Bot Directory is a public directory of all reviewed bots registered through the Developer Portal.

**NB: Bot builder and bot connector SDK now one in V3 of framework:**  
<http://docs.botframework.com/en-us/support/upgrade-to-v3/#botbuilder-and-connector-are-now-one-sdk>

# Bot Framework



Main page: <https://botframework.com>

## Bot Builder: Development Kits and REST

## Bot Builder SDKs for:

- .NET framework for C#
- Node.js

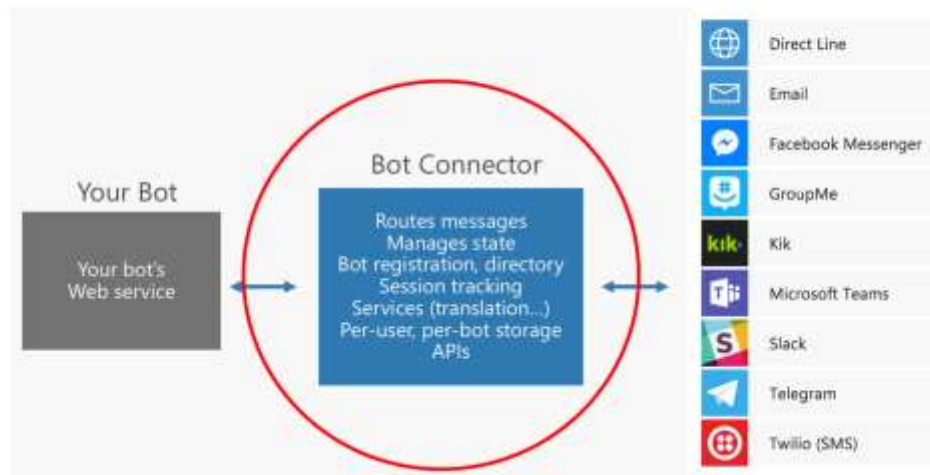
And there's also

- REST and REST State APIs



SDKs infographic: [http://docs.botframework.com/en-us/images/faq-overview/bot\\_builder\\_sdk\\_july.png](http://docs.botframework.com/en-us/images/faq-overview/bot_builder_sdk_july.png)

## Bot Connector (part of Bot Builder)



It's part of the Bot Builder SDK

[http://docs.botframework.com/en-](http://docs.botframework.com/en-us/csharp/builder/sdkreference/gettingstarted.html#channels)

[us/csharp/builder/sdkreference/gettingstarted.html#channels](http://docs.botframework.com/en-us/csharp/builder/sdkreference/gettingstarted.html#channels)

## Developer Portal: what registration does for you

Your bot's web  
service in the  
cloud

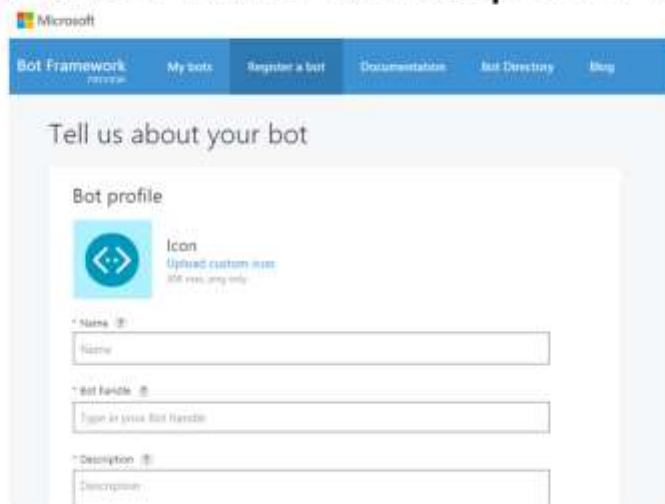


MS Bot  
Framework  
Connector



Expose a Microsoft Bot Framework-compatible API on the Internet, then the Bot Framework Connector service will forward messages from your Bot to a user, and will send user messages back to your Bot.

## Register a Bot in the Developer's Portal



The screenshot shows the Microsoft Bot Framework Developer's Portal registration page. The header includes the Microsoft logo and navigation links: Bot Framework, My bots, Register a bot, Documentation, Bot Directory, and Blog. The main heading is "Tell us about your bot". Below this is the "Bot profile" section, which includes a "Icon" field with a placeholder image and the text "Upload custom icon (50k max, png only)". There are three text input fields: "Name" (with a required asterisk and help icon), "Bot handle" (with a required asterisk, help icon, and placeholder text "Type in your Bot Handle"), and "Description" (with a help icon and placeholder text "Description").

Register on the developer portal by clicking the 'Register a bot' link:  
<https://dev.botframework.com/bots/new>

Name: TemplateBot

Bot Handle: templatebot (for referencing in Bot Directory and name for bot on web chat, NOT the app's URL used as endpoint)

Also, add a description here

### Configuration

Remember the URL endpoint from deploying endpoint step. Should be something like: "https://botwebappname.azurewebsites.net/api/messages"

You'll go through the "Generate App ID and password" wizard, then return to the registration page.

Go back and edit this profile anytime



## State Service: types of bot data stored for us



- This data is currently stored for free for you within the Bot Framework State Service.
- However, you may bring in your own data source (format: key-value store)

User data – globally available for user across all conversations

conversation data – stores globally for a single conversation (many users could be involved)

User-conversation data – stores globally conversation data for a user (But private to just that user)

Dialog data as well – persists for a single dialog (helpful for temp data in a waterfall set of steps)

## Bot Directory

### Public Directory of Bot Framework Bots

- Discover, try, and add bots from here with no added configuration
- Bots are public at developer discretion; must be reviewed
- Searchable here



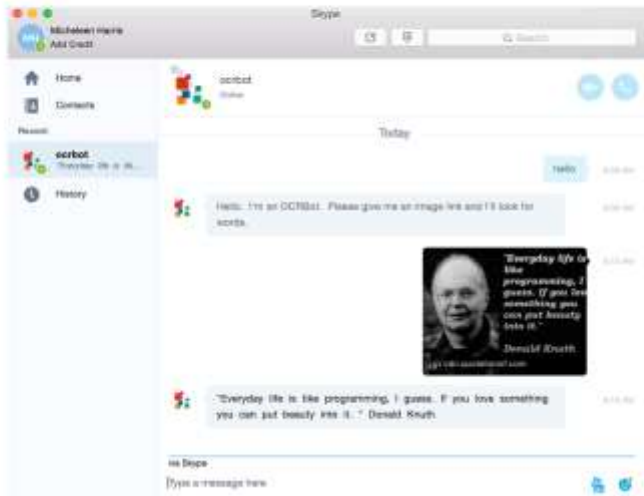
Bots must be submitted for review and approved in order to appear in the directory

As of Nov. 17, 2016 there are 94 bots in the directory

from MS and other  
companies

# Working with channels

Skype channel example



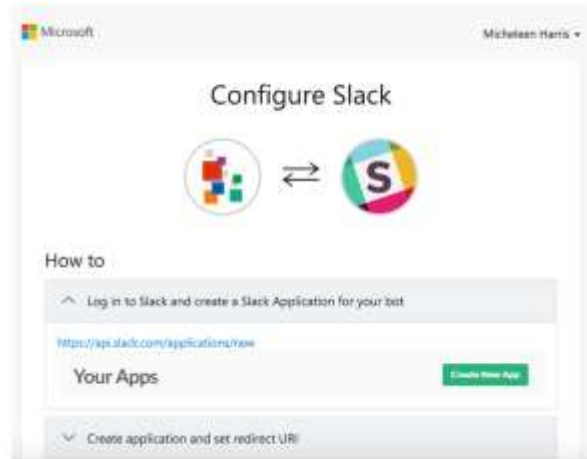
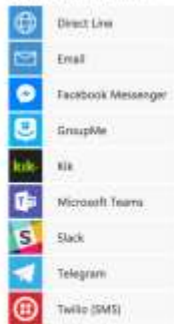
Slack channel example



## Adding a channel

- Skype is added by default
- Instructions are laid out

### Add another channel



**Often, the most time will be spent** configuring your credentials as a developer on the target service, registering your app, and getting a set of OAuth keys that Microsoft Bot Framework can use on your behalf

## Editing a channel



Skype for instance, through configuring we can:

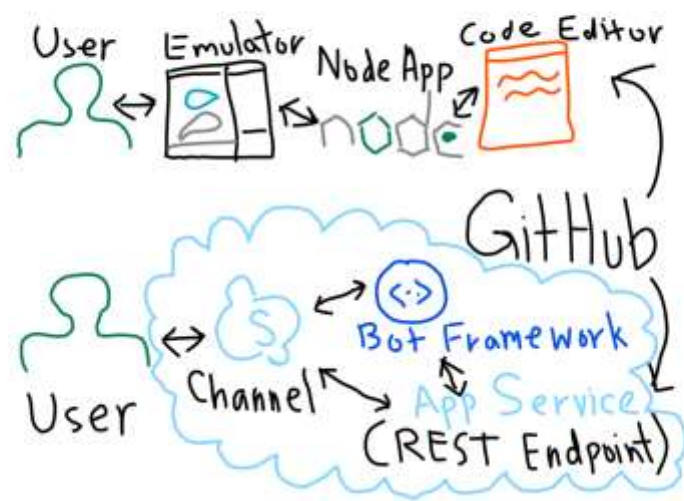
- Disable/enable globally
- Turn on/off group messaging
- and more



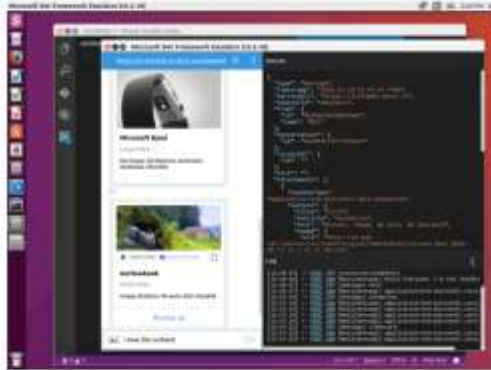
# Toolbox

Let's see some tech stuff and code!

Dev process



## The BF Emulator – New Unix-Compatibility



- **New** Support for Mac, Linux and Windows
- **New** All the Bot Framework card types are supported
- **New** Save multiple profiles for when you're working online and off
- **New** Simplifies configuration when you're working with ngrok
- **New** Uses the webchat control for higher fidelity layout and consistency with the webchat experience

Emulator purpose:

Send requests and receive responses to/from your bot endpoint on localhost

Inspect the Json response

Emulate a specific user and/or conversation

## Node App: get the Bot Builder Node.js module

Get the package as easy as this one line in the terminal:

```
npm install --save botbuilder
```

Or to clone the latest entire repository (big, but has samples as well):

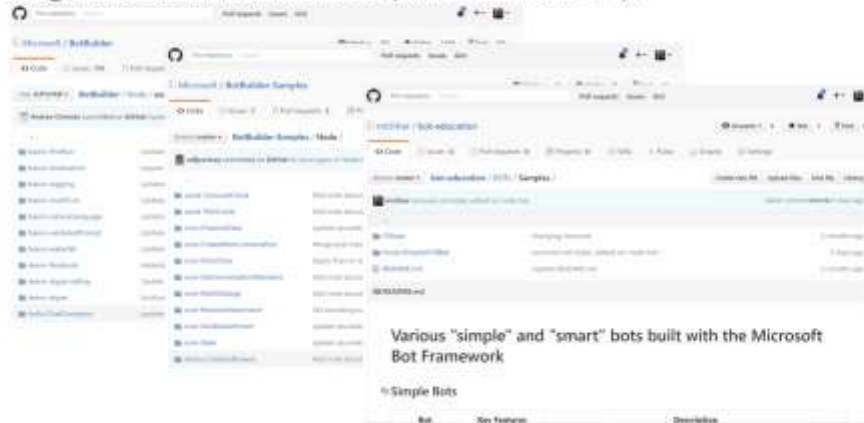
```
git clone https://github.com/Microsoft/BotBuilder.git  
cd BotBuilder/Node  
npm install
```

We will set up after the Cognitive Services Overview

<https://docs.botframework.com/en-us/node/builder/guides/core-concepts>

## Tons of sample code on GitHub

On github from Microsoft (and elsewhere):



<https://github.com/Microsoft/BotBuilder-Samples>

<https://github.com/Microsoft/BotBuilder/tree/master/CSharp/Samples>

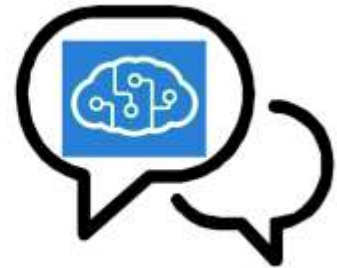
<https://github.com/Microsoft/BotBuilder/tree/master/Node/examples>

<https://github.com/Azure/bot-education/tree/master/Student-Resources/BOTs>

<https://github.com/MicrosoftDX/botFramework-proactiveMessages>

More out there...so many, can't list...

## Integration with cognitive services

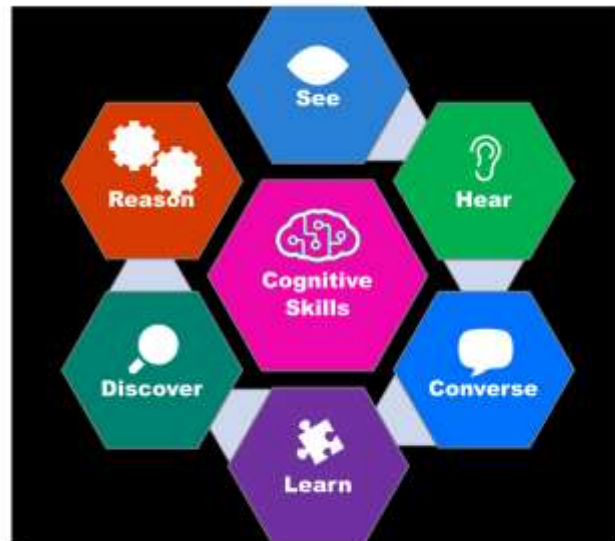


## Cognitive Services meet Bots

We'll learn how to add  
**Cognitive Skills** to  
your Bots

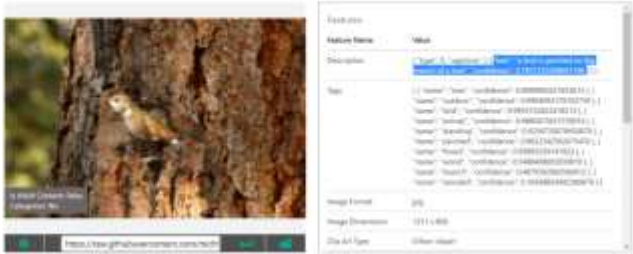


Build smarter  
experiences that  
delight and engage  
your users



# Cognitive services vs. bots

We can have a bot  
without cognitive  
services.



We can have an  
intelligent app  
without a bot.

**Stubhub:** Find tickets for shows, games and concerts with StubHub.  
Computer vision API demo on this page: <https://www.microsoft.com/cognitive-services/en-us/computer-vision-api>

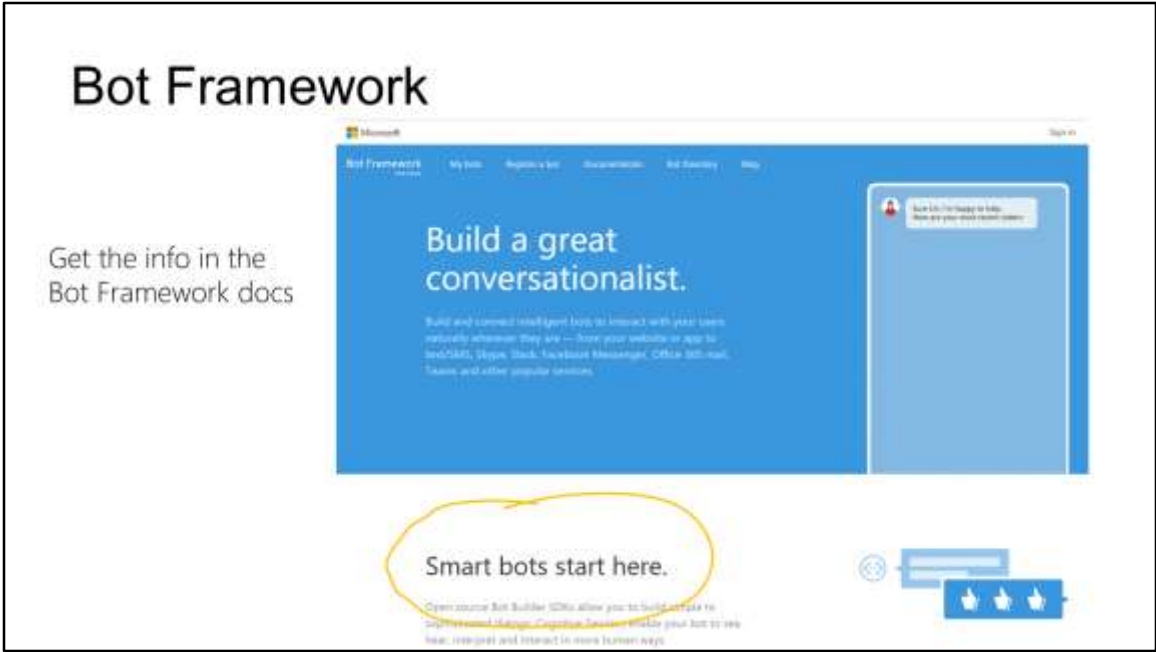


## A few use cases

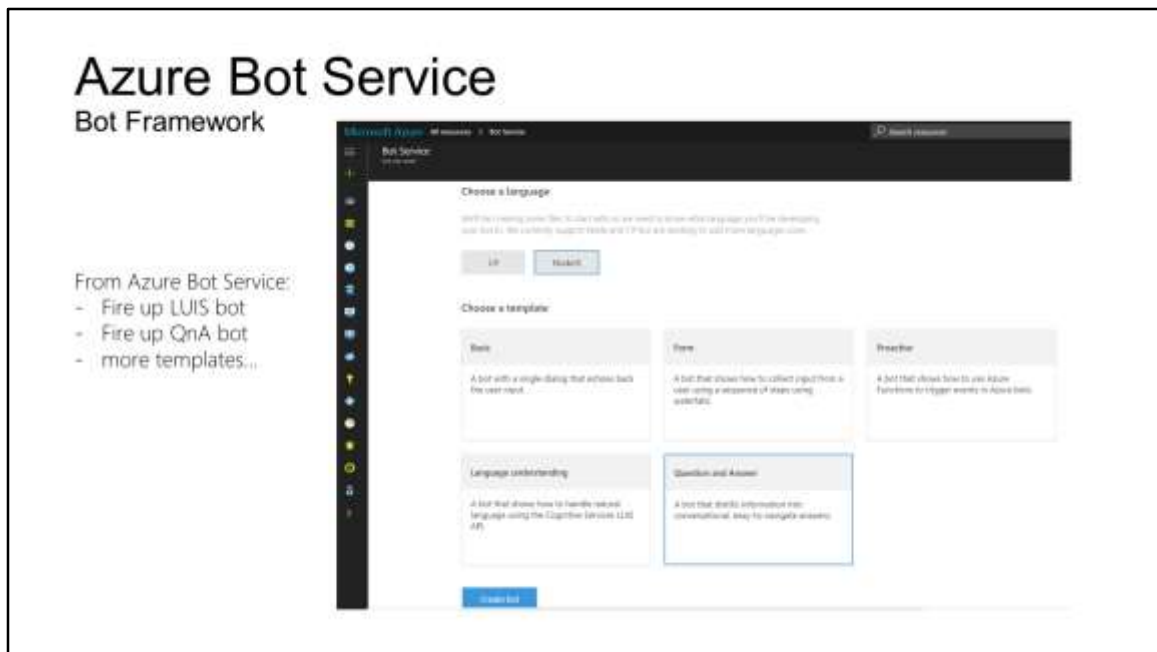
1. Create human readable captions for the content of an image
2. Authenticate users using a voiceprint
3. Recognize the intent of a user
4. Recommend products frequently bought together
5. Ease the burden of typing queries in a conversational setting with autosuggest



1. Computer Vision API - Like CaptionBot.ai – a bot that reports back in human way the contents of an image
2. Speech API - Authentication as a user speaks to the bot with a speaker verification profile or “voiceprint”
3. LUIS API for analysis of queries such as “What is the weather in Toyko today?” using entities to parse out intent (what the user is asking for)
4. Knowledge API. Recommendations based on our knowledge and/or a user’s history. Also, could search through a graph or user-defined database to return relevant academic papers from a natural language query
5. Bing Search API for autosuggest - Search also has other capabilities such as returning the latest trending news on a topic for example



Main doc page: <https://docs.botframework.com/en-us/>

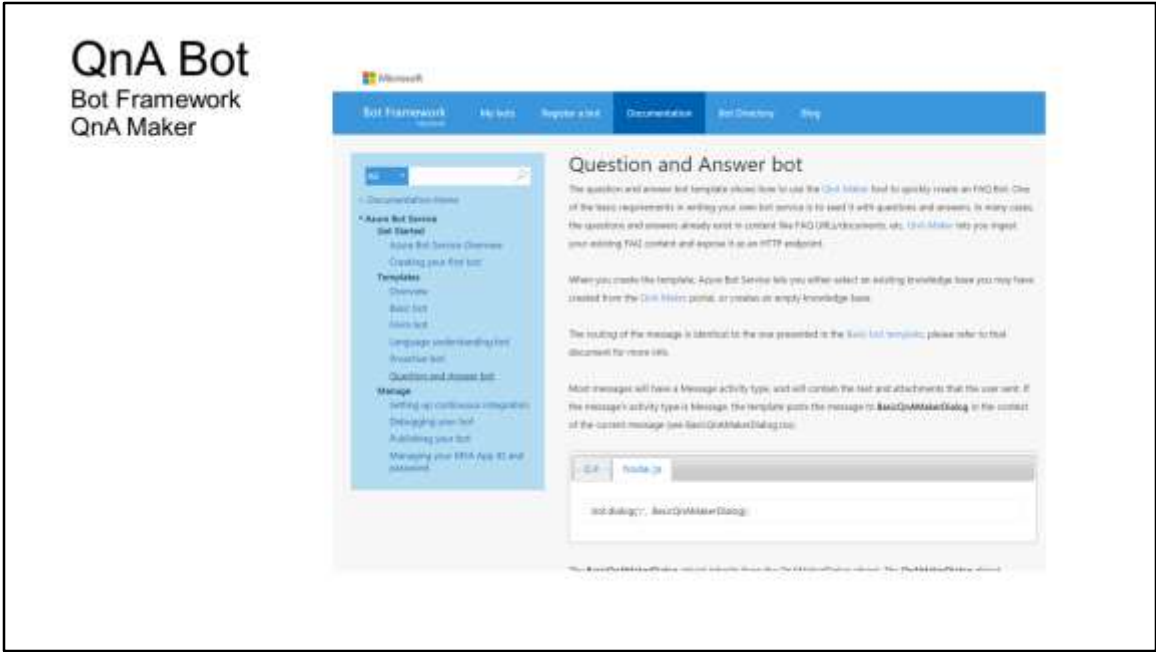


Create your first bot: <https://docs.botframework.com/en-us/azure-bots/build/first-bot/#navtitle>

Done through the Azure Portal

Options as of now for templates are:

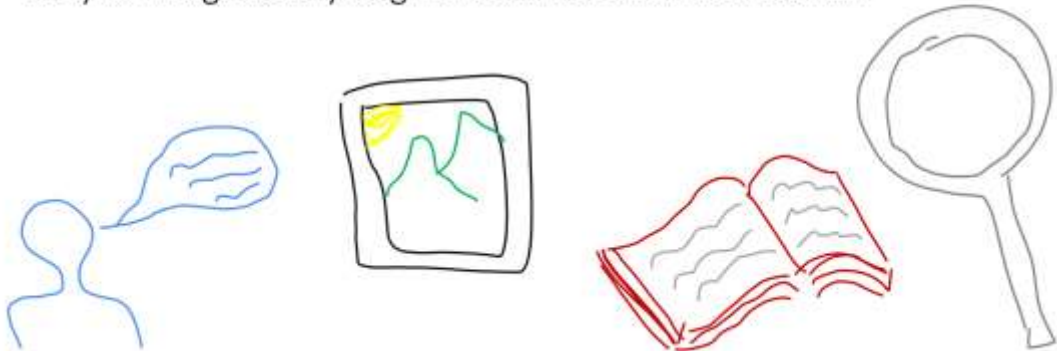
- Basic
- Form
- Proactive
- Language understanding
- QnA



A QnA bot guide (can choose the SDK here): <https://docs.botframework.com/en-us/azure-bot-service/templates/qnamaker/#navtitle>

## More integrations...

- LUIS is tightly coupled in the SDKs
- Easy to integrate any Cognitive Service with it's REST API



## Parting thought (before the lab)



**We can aim for our bots to:** Be transparent and have algorithmic accountability so that humans can undo unintended harm. (Satya Nadella)

Ethical and societal considerations taken directly from an article by Satya Nadella:  
<https://www.linkedin.com/pulse/partnership-future-how-humans-ai-can-work-together-solve-nadella>

## Resources

Support	Contact
Technical FAQ	<a href="https://docs.botframework.com/en-us/technical-faq">https://docs.botframework.com/en-us/technical-faq</a>
Bot Builder SDK issues and suggestions	Use the issues tab on our github repo: <a href="https://github.com/Microsoft/BotBuilder/">https://github.com/Microsoft/BotBuilder/</a>
Using a bot	Contact the bot's developer through their publisher e-mail
Community support	Use StackOverflow, with the hashtag #botframework
Reporting Abuse	Contact us at <a href="mailto:bf-reports@microsoft.com">bf-reports@microsoft.com</a>
Gitter discussion forum	<a href="https://gitter.im/Microsoft/BotBuilder">https://gitter.im/Microsoft/BotBuilder</a>

<https://docs.botframework.com/en-us/support>

# Lab

## Bot dev environment

### Instructions:

Check prerequisites have been completed

Quick primer on git cloning and GitHub

- don't forget your .gitignore

In git bash:

Make a folder for project locally

Follow along with the "Build a Bot" instructions

<https://github.com/Microsoft/BotBuilder/tree/master/Node/core#build-a-bot>

Create code in VSCode

Back in Git bash:

Type: npm install

Type: node server.js

Botemulator:

Open



Select app on port  
Keep app id and app password blank  
Hit connect  
Type a message to the bot and wait for a response

Questions?

Also, try the course gitter chatroom at  
[aka.ms/botedu-discuss](https://aka.ms/botedu-discuss)

