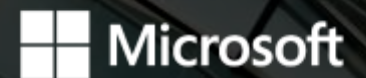




# Cognitive Services & BOT

Mehul Shah  
Cloud Solution Architect



//

OUR GOAL IS TO **DEMOCRATIZE A.I.**  
TO EMPOWER EVERY PERSON  
AND EVERY ORGANIZATION  
TO **ACHIEVE MORE**

//

**SATYA NADELLA**



# Microsoft AI

For every person and every organization



Agent



Applications



Services



Infrastructure



# Agent

## Cortana

Knows you | Knows your work + life | Knows the world

1,000+ skills and knowledge

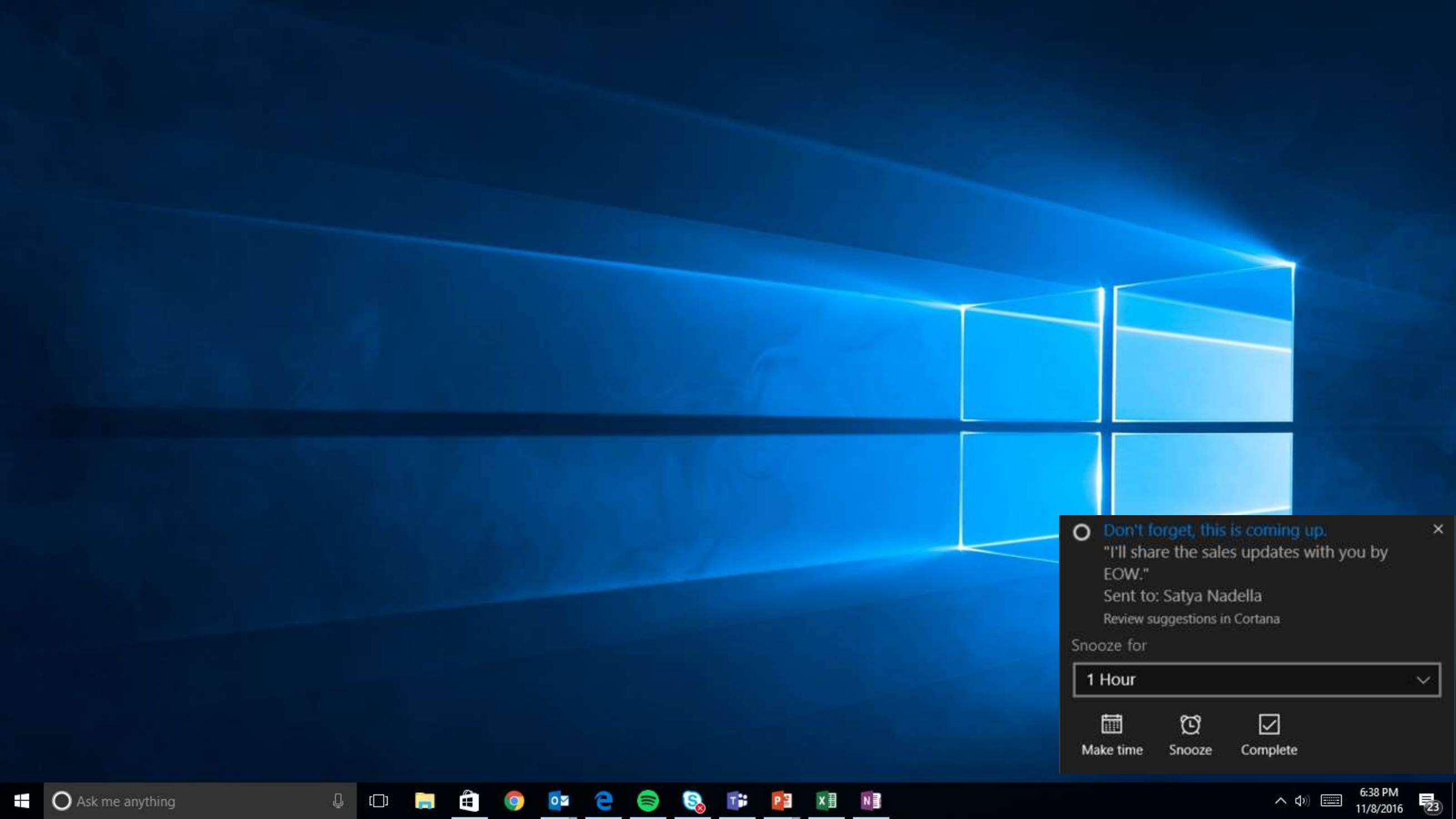
133 million users | 12 billion questions





# DIGITAL PERSONAL ASSISTANTS











**Don't forget, this is coming up.**


"I'll share the sales updates with you by EOW."


Sent to: Satya Nadella

Review suggestions in Cortana


Snooze for

1 Hour






Make time



Snooze



Complete



# Applications

Office 365

Dynamics 365

Flow Keyboard

Pix

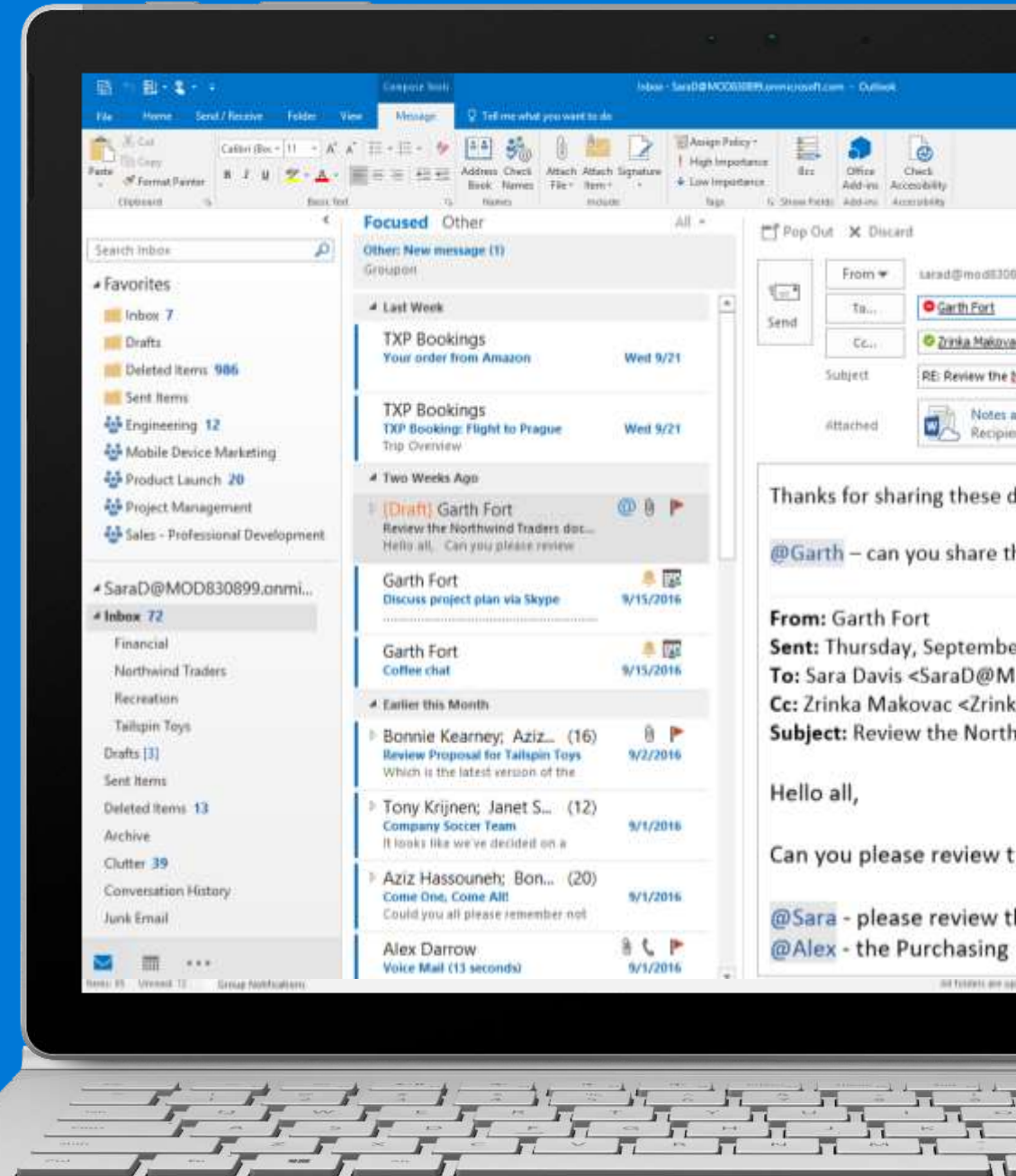
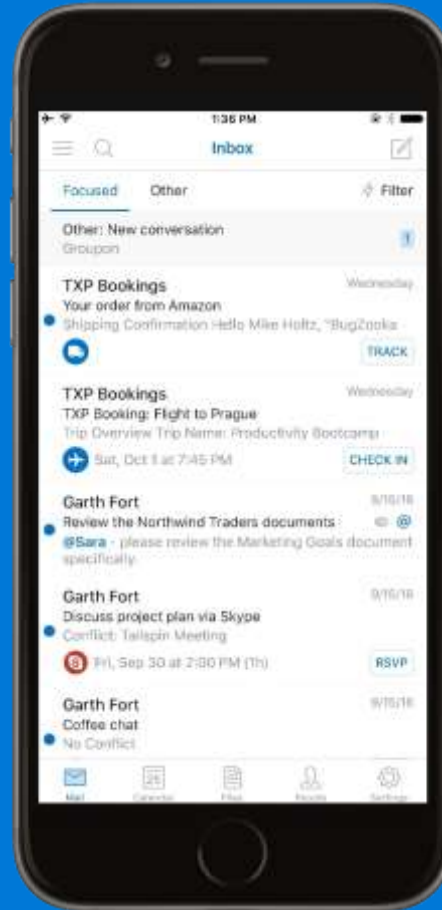
Customer Service and Support

Skype

Teams

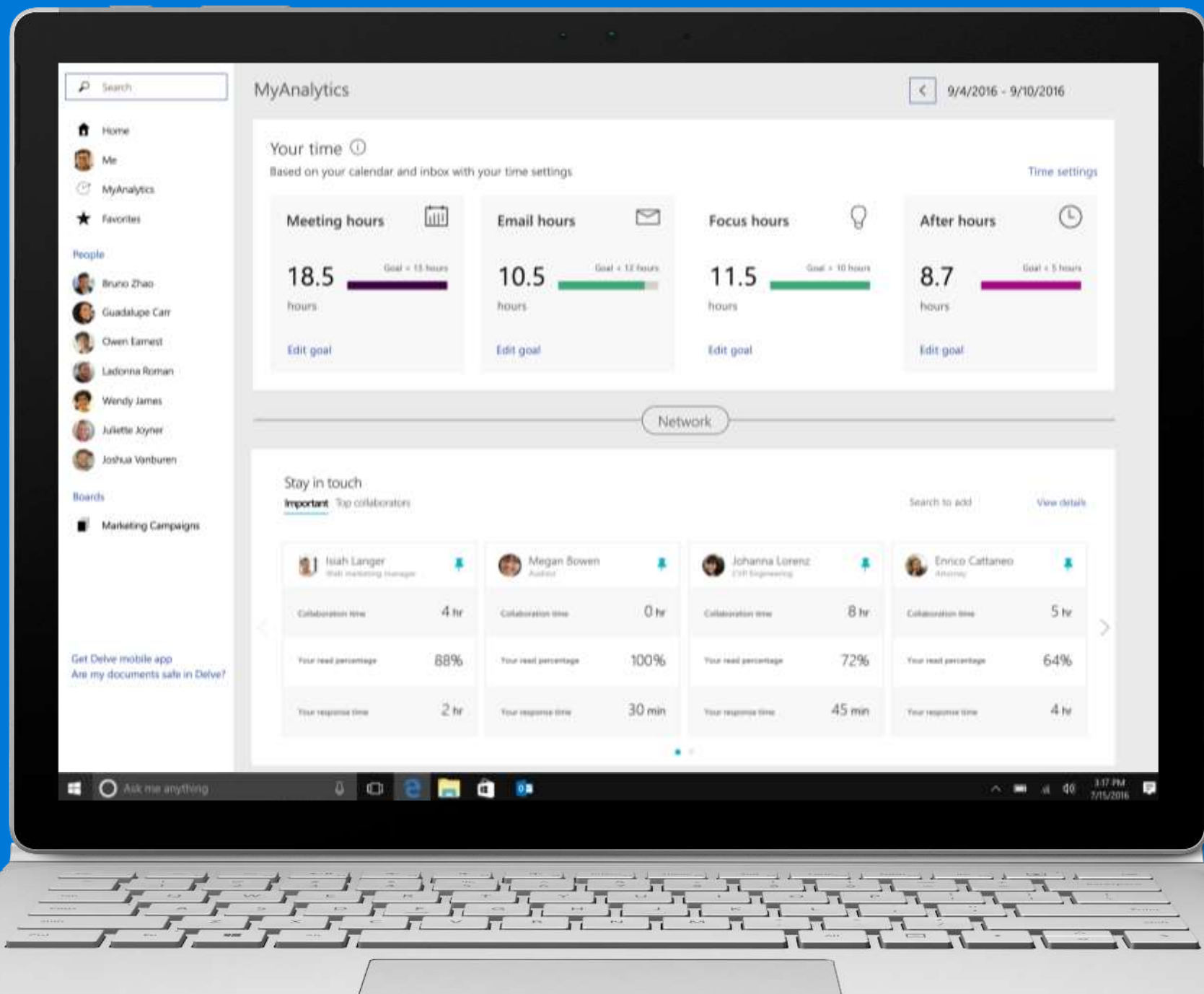
Calendar.help

## Focused Inbox





# MyAnalytics



# Calendar.help

From: **Marcus**

To: **Carrie**

CC: **Cortana**

Subject: **Project Kickoff**

Carrie,

Let's have our project kickoff meeting next week.

**Cortana**, can you find a time that works for us?

Marcus



# Microsoft Dynamics 365



# Intelligence from the web graph



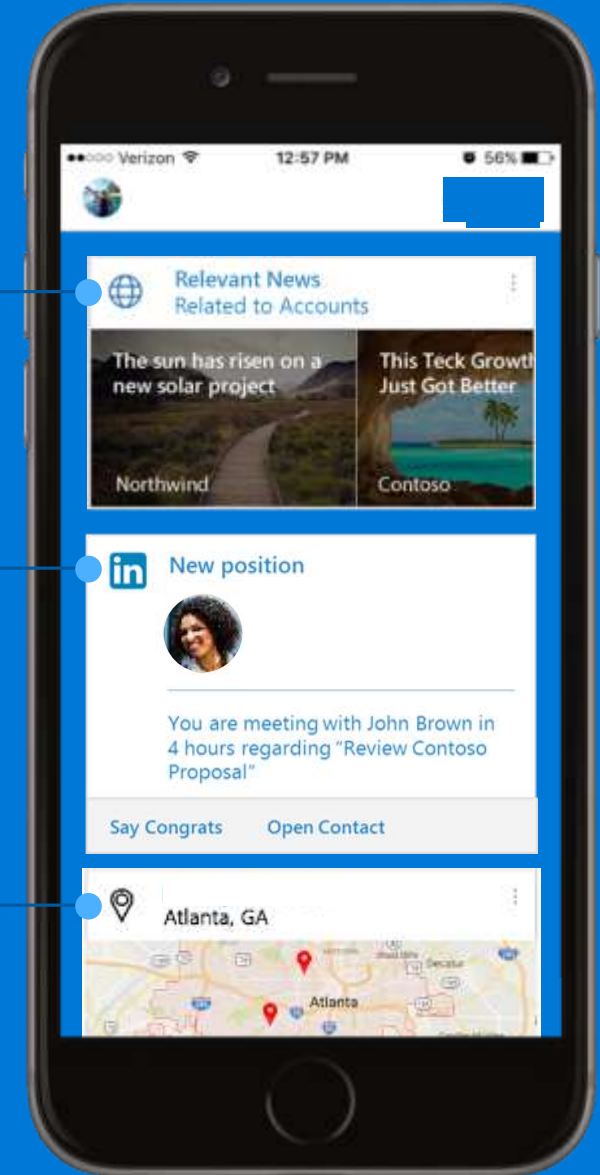
Relevant News



Your connections



Your schedule & travel



# Intelligence from the CRM graph



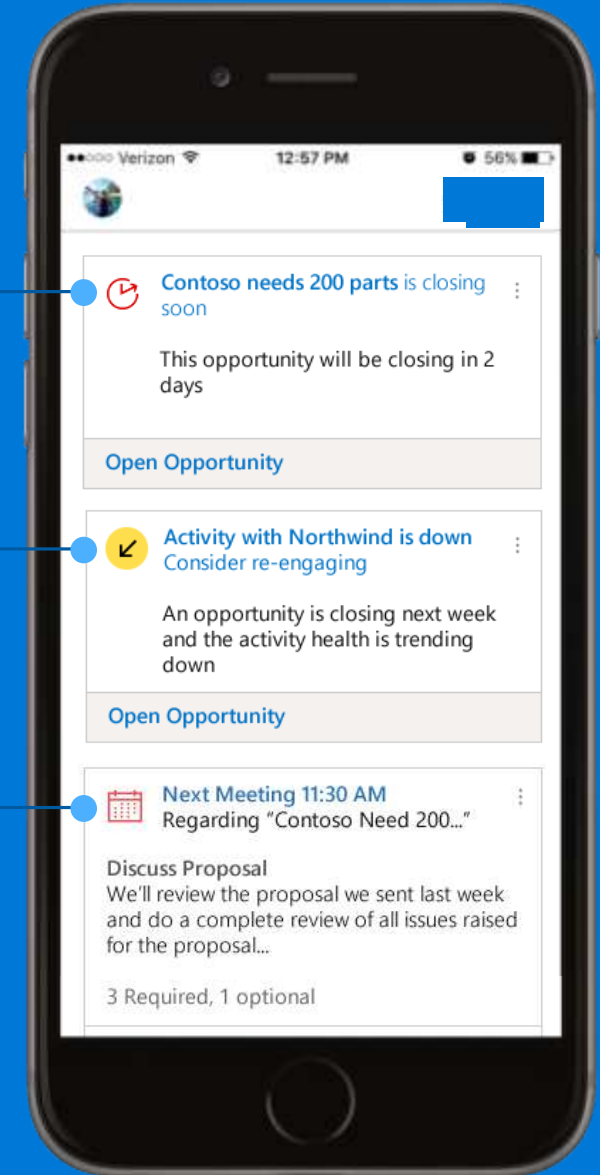
Close alert



Monitor account activity



Action







# Services

Cortana Intelligence

Cognitive Services

Bot Framework

Cortana Devices SDK

Cortana Skills Kit SDK

Cognitive Toolkit



# CORTANA DEVICES SDK



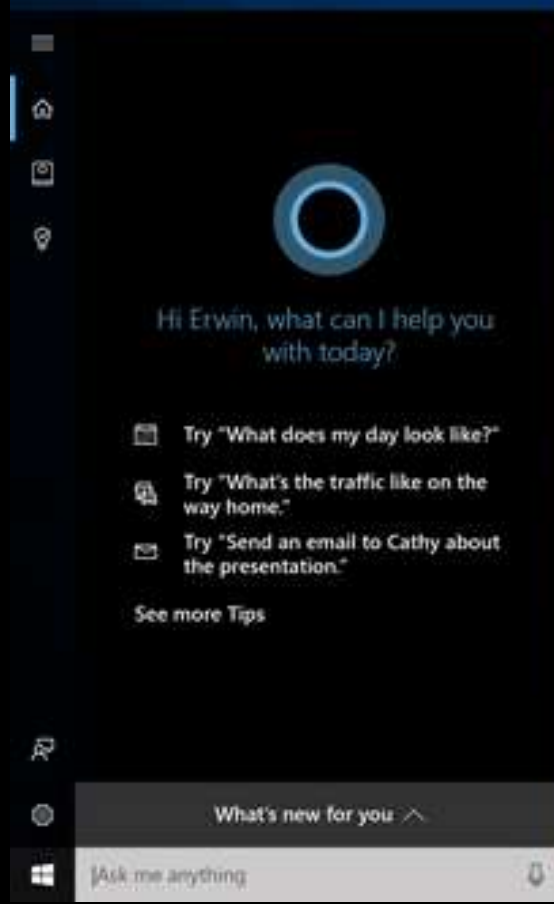


Premium Audio Meets  
Your Personal Assistant





# CORTANA SKILLS KIT









# Cortana's got skills

A number of partners are currently developing skills for Cortana. Some of the first skills are now available<sup>1</sup> as an early preview and are listed below. Many of these skills work best on Windows 10 Creators Update, in addition to Android and iOS.<sup>2</sup> For any skills that aren't working for you, please provide us feedback in Cortana using the feedback button.


Featured All




**Dark Sky**  
"Hey Cortana, ask Dark Sky for today's forecast."  
● ● ●  
[LEARN MORE](#)




**Domino's Pizza**  
"Hey Cortana, ask Domino's to place my Easy Order."  
● ● ●  
[LEARN MORE](#)




**Food Network**  
"Hey Cortana, ask Food Network for brunch recipes by Ina Garten."  
● ● ● ● ●  
[LEARN MORE](#)




**Insurance Advisor**  
"Hey Cortana, open Insurance Advisor."  
● ● ●  
[LEARN MORE](#)




**OpenTable**  
"Hey Cortana, ask Open Table to reserve a table at Palomino."  
● ● ● ●  
[LEARN MORE](#)




**Progressive**  
"Hey Cortana, ask Progressive Insurance for tips to save money on my car."  
● ● ●  
[LEARN MORE](#)




**Skyscanner**  
"Hey Cortana, ask Skyscanner if the BA flight to Edinburgh is on time?"  
● ● ●  
[LEARN MORE](#)



**StubHub**  
"Hey Cortana, ask StubHub to find me concerts this weekend."  
● ● ●  
[LEARN MORE](#)



**TuneIn**  
"Hey Cortana, play 90.3 on TuneIn."  
● ● ●  
[LEARN MORE](#)



**iHeartRadio**  
"Hey Cortana, play Z100 on iHeartRadio."  
● ● ●  
[LEARN MORE](#)

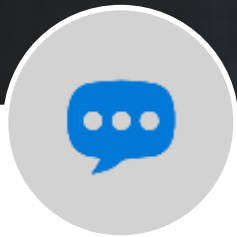
# Microsoft Cognitive Services

Give your apps a human side



## Vision

From faces to feelings, allow your apps to understand images and video



## Speech

Hear and speak to your users by filtering noise, identifying speakers, and understanding intent



## Language

Process text and learn how to recognize what users want



## Knowledge

Tap into rich knowledge amassed from the web, academia, or your own data



## Search

Access billions of web pages, images, videos, and news with the power of Bing APIs




## Labs

An early look at emerging Cognitive Services technologies: discover, try & give feedback on new technologies before general availability



# Microsoft Cognitive Services

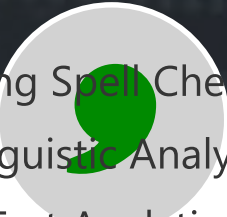
Give your apps a human side




Computer Vision  
Content Moderator  
Emotion  
**Vision**  
Video  
Video Indexer  
Custom Vision Service



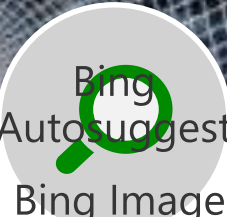
Bing Speech  
Speaker Recognition  
Custom Speech Service  
**Speech**



Bing Spell Check  
Linguistic Analysis  
Text Analytics  
Translator Text & Speech  
Web Language Model  
Language Understanding  
**Language**



Academic Knowledge  
Entity Linking  
Knowledge Exploration  
Recommendations  
QnA Maker  
Custom Decision Service  
**Knowledge**



Bing Autosuggest  
Bing Image Search  
Bing News Search  
Bing Video Search  
Bing Web Search  
Bing Entity Search  
Bing Custom Search  
**Search**



Project Prague (gesture)  
Project Cuzco (events)  
Project Johannesburg (routing)  
Project Nanjing (isochrones)  
Project Abu Dhabi (distance matrix)  
Project Wollongong (location)  
**Labs**

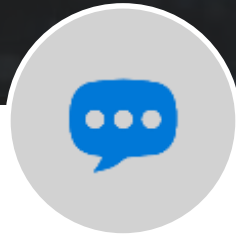
# Microsoft Cognitive Services

Give your apps a human side



## Vision

Computer Vision  
Content Moderator  
Emotion  
Face  
Video  
Video Indexer



## Speech

Bing Speech  
Speaker  
Recognition



## Language

Bing Spell Check  
Linguistic Analysis  
Text Analytics  
Translator Text  
& Speech  
Web Language  
Model



## Knowledge

Academic  
Knowledge  
Entity Linking  
Knowledge  
Exploration  
Recommendations  
QnA Maker



## Search

Bing  
Autosuggest  
Bing Image  
Search  
Bing News  
Search  
Bing Video  
Search  
Bing Web Search  
Bing Entity  
Search



## Labs

Project Prague  
(gesture)  
Project Cuzco (events)  
Project Johannesburg  
(routing)  
Project Nanjing  
(isochrones)  
Project Abu Dhabi  
(distance matrix)  
Project Wollongong  
(location)

## CUSTOMIZATION

Custom Vision  
Service

Custom Speech  
Service

Language  
Understanding

Custom Decision  
Service

Bing Custom  
Search

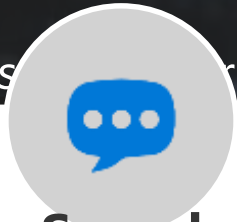
# Microsoft Cognitive Services

## Customization

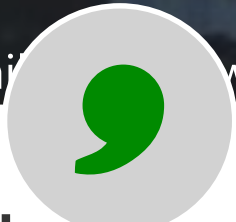
The set of custom services available for creating custom solutions using their own data with algorithms



**Vision**



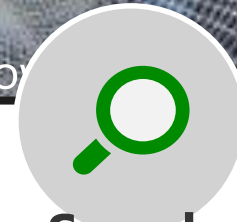
**Speech**



**Language**



**Knowledge**



**Search**



**Labs**

Custom Vision  
Service

Custom Speech  
Service

Language  
Understanding

Custom Decision  
Service

Bing Custom  
Search



# Why Microsoft Cognitive Services?

## Easy

Roll your own with REST APIs  
Simple to add: just a few lines of code required



## Flexible

Integrate into the language and platform of your choice  
Breadth of offerings helps you find the right API for your app  
Bring your own data for your custom experience



## Tested

Built by experts in their field from Microsoft Research, Bing, and Azure Machine Learning  
Quality documentation, sample code, and community support

GitHub





# Vision



## Computer Vision API

Distill actionable information from images



## Face API

Detect, identify, analyze, organize, and tag faces in photos



## Emotion API

Personalize experiences with emotion recognition



## Video API

Analyze, edit, and process videos within your app



## Content Moderator

Machine-assisted moderation of text and images, augmented with human review tools



## Custom Vision Service

Customizable web service that learns to recognize specific content in imagery



## Video Indexer

Process and extract smart insights from videos

# Intelligent Kiosk





# Speech



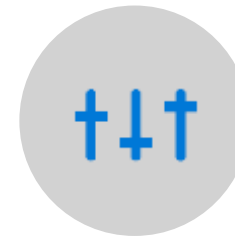
## **Bing Speech API**

Convert speech to text and back again, and understand its intent



## **Speaker Recognition API**

Give your app the ability to know who's talking



## **Custom Speech Service**

Fine-tune speech recognition for anyone, anywhere



# Language



## **Bing Spell Check API**

Detect and correct spelling mistakes within your app



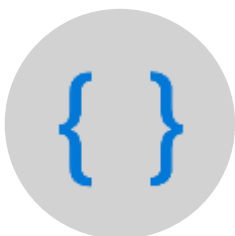
## **Web Language Model API**

Leverage the power of language models trained on web-scale data



## **Linguistic Analysis API**

Easily parse complex text with language analysis



## **Language Understanding Intelligent Service**

Teach your apps to understand commands from your users



## **Text Analytics API**

Detect sentiment, key phrases, topics, and language from your text



## **Translator**

Easily perform speech and text translation





# Knowledge



## **Academic Knowledge API**

Explore relationships among academic papers, journals, and authors



## **Knowledge Exploration Service**

Add interactive search over structured data to your project



## **Entity Linking Service**

Contextually extend knowledge of people, locations, and events



## **Recommendations API**

Provide personalized product recommendations for your customers



## **Custom Decision Service**

Create custom experiences with adaptive, contextual decision-making



## **QnA Maker**

Distill information into conversational, easy-to-navigate answers

# QnA Maker



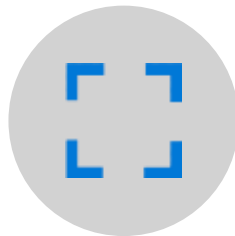


# Search



## Bing Web Search API

Connect powerful search to your apps



## Bing Image Search API

Bring advanced image and metadata search to your app



## Bing Video Search API

Trending videos, detailed metadata, and rich results



## Bing News Search API

Link your users to robust and timely news searches



## Bing Autosuggest API

Give your app intelligent autosuggest options for searches



## Bing Entity Search

Enrich user experiences with contextual entity search results



## Bing Custom Search

Create a highly-customized web search experience



# Microsoft Cognitive Services Labs

An early look at emerging Cognitive Services technologies:  
discover, try, and give feedback on new technologies before general availability



## **Project Prague**

Gesture based controls



## **Project Cuzco**

Event associated with Wikipedia



## **Project Johannesburg**

Route logistics



## **Project Nanjing**

Isochrones calculations



## **Project Abu Dhabi**

Distance matrices



## **Project Wollongong**

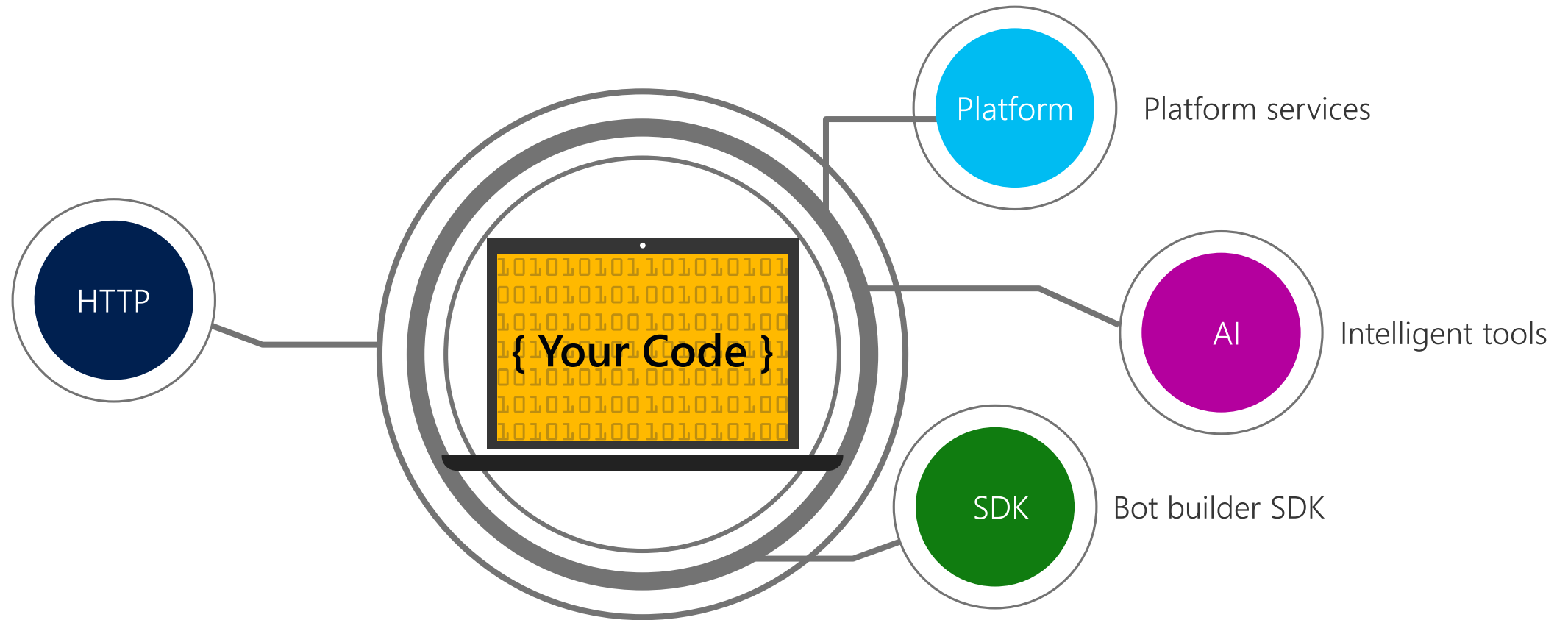
Score location attractiveness

# Conversation as a platform

BOT demo



# What is a bot?



REST endpoint  
[Direct Line Protocol](#)



Conversational and  
business logic

Canvas aware



Context  
sensitive



# What is the bot framework?

## What?

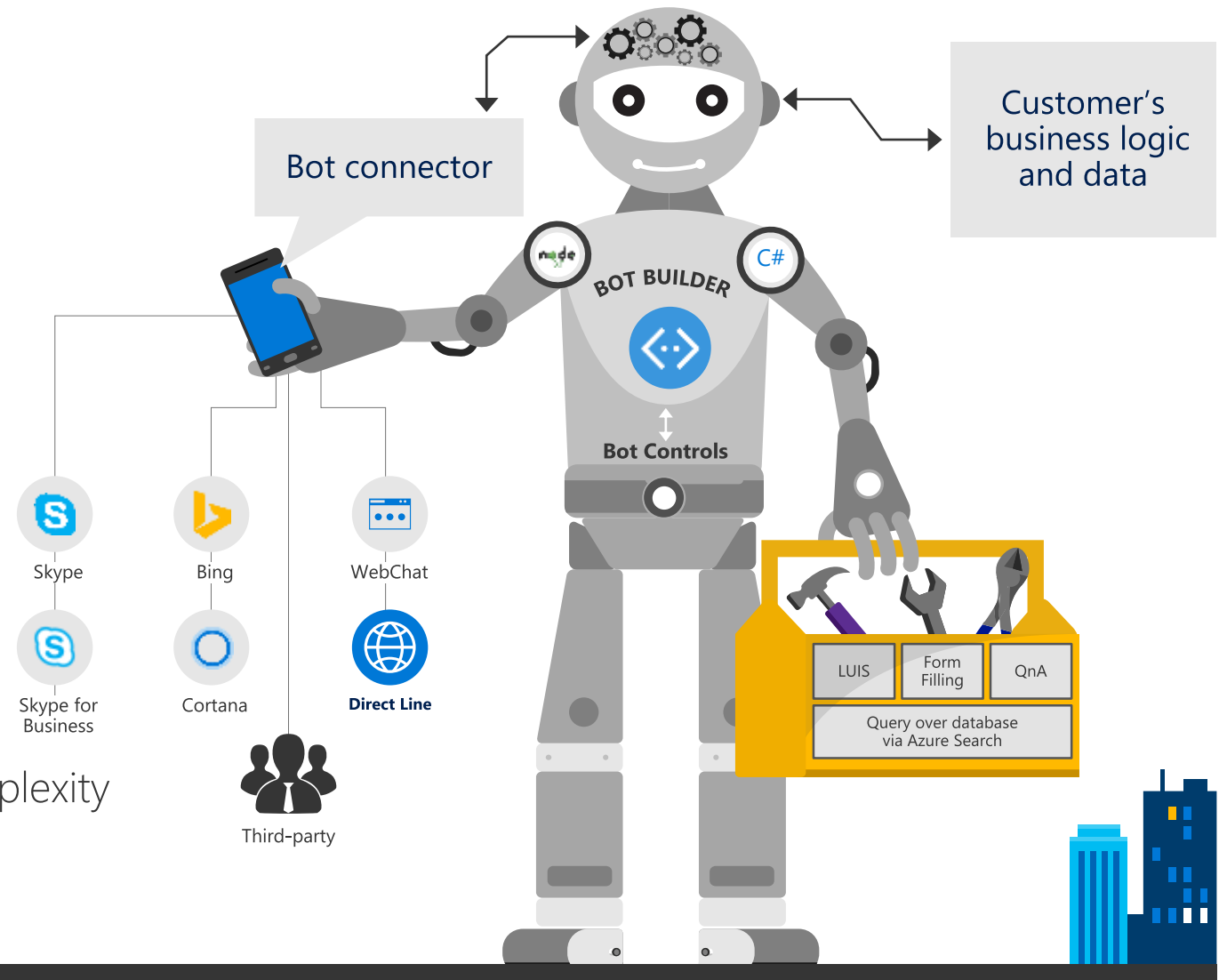
- Tools for building REST websites
- Services to enrich
- Mechanisms for receive events
- Data to debug and tools to analyze

## Why?

- Implements standard protocols
- Modeling conversations is hard; tools help!
- UI across multiple canvases is hard; cards rock!
- Language understanding is hard
- Common and well understood patterns

## Goals

- Start simple; add complexity; no dead-ends
- Bot adapts to the user, based on context
- Composable and intelligent controls to manage complexity



# | Bot patterns

01

## Information Retrieval

Lookup, reference and information seeking, scenarios backed by a data source

*“What are the features of service plan A?”*

*“When are the trains leaving on Thursday?”*

02

## Transactional

Look up info, make amendments, scenarios backed by a data source

*“Upgrade my account to plan B”*

*“book two tickets for film A on Monday using my credit card”*

03

## Advisory Role

Prescriptive guidance via ‘expert systems’ based on user input.

*“How much can I save if I switch to payment plan B?”*

*“Should I add an additional component to my service plan? ”*

04

## Social Conversations

Ability to sense sentiment and engage in open-ended conversation within the bots area of expertise.

*“Your product is terrible, I would like a refund.”*

*“I have had a terrible experience, who can I talk to?”*

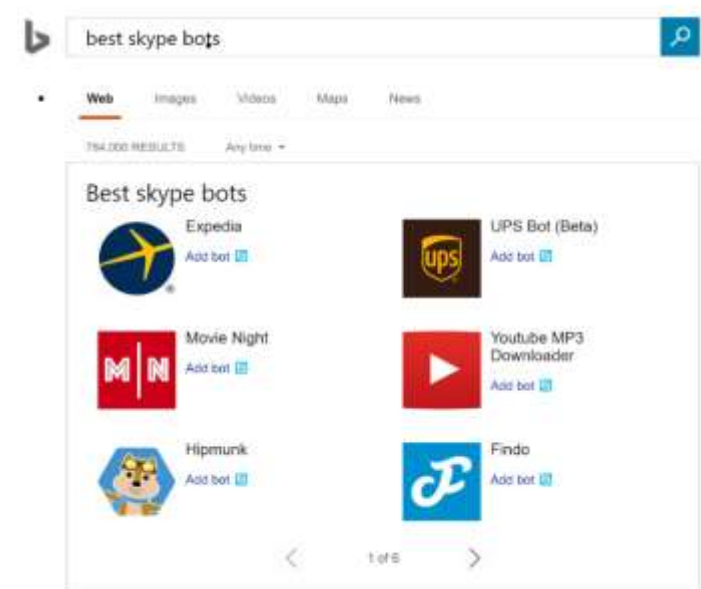
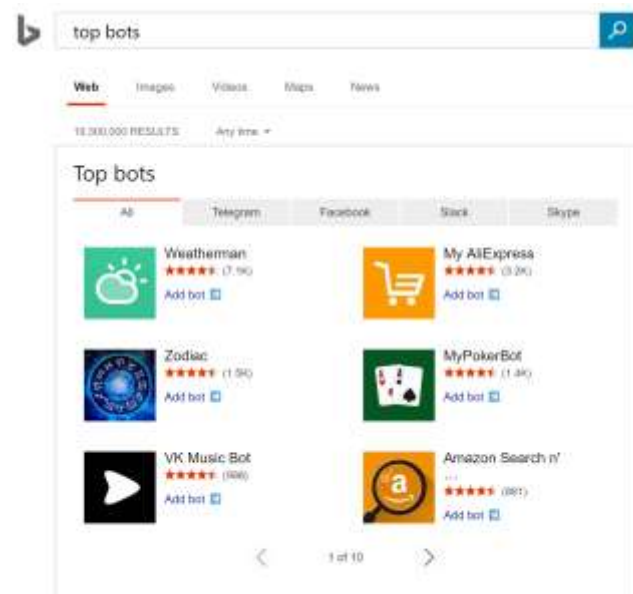


# Bot discovery

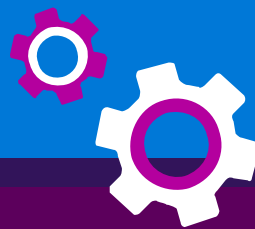
## B I N G   S E A R C H   F O R   B O T S

### Bing Search Terms

- Top bots
- Top Skype bots
- Famous Skype bots
- Best Facebook bots
- Latest Slack bots



# BOT BUILDER SDK



▶ C#

▶ NodeJS

▶ Cross platform emulator

This screenshot shows the GitHub repository for Microsoft BotBuilder. The repository name is "Microsoft / BotBuilder". It has 1,655 commits, 6 branches, and 54 releases. The description states: "The Microsoft Bot Builder SDK is one of three main components of the Microsoft Bot Framework, providing just what you need to build and connect intelligent bots that interact naturally whether by text/SMS to Skype, Slack, Office 365 mail and other popular services." The page includes tabs for Code, Issues (184), Pull requests (12), Projects (0), Pulse, and Graphs. A commit by Stevenic is highlighted, showing updates to CSharp, Node, .gitattributes, Contributing.md, LICENSE, and README.md. The commit message is "Updated to support TypeScript 2.1".

Microsoft / BotBuilder

Code Issues 184 Pull requests 12 Projects 0 Pulse Graphs

The Microsoft Bot Builder SDK is one of three main components of the Microsoft Bot Framework, providing just what you need to build and connect intelligent bots that interact naturally whether by text/SMS to Skype, Slack, Office 365 mail and other popular services. <http://botframework.com>

1,655 commits 6 branches 54 releases

Branch: master New pull request Create new pull request

Stevenic Updated to support TypeScript 2.1 ...

CSharp	Merge pull request #1936 from brandonh-msft/promptdialog-fixes
Node	Updated to support TypeScript 2.1
.gitattributes	More documentation.
Contributing.md	Update Contributing.md
LICENSE	Update LICENSE
README.md	Update README.md

README.md

## Bot Builder SDK

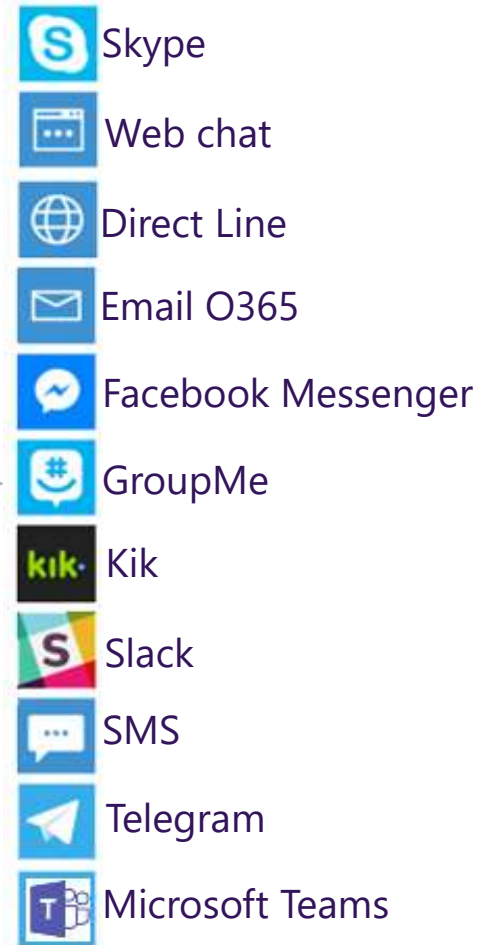
Bot

Web Application

## Bot Connector

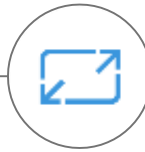
Routes Messages  
Manages State  
Bot registration/directory  
Session Tracking  
Per-user, per-bot storage  
APIs

## Bot Channels

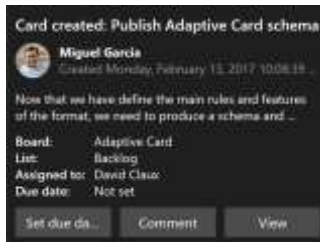


# BOT CONNECTOR

# Adaptive cards



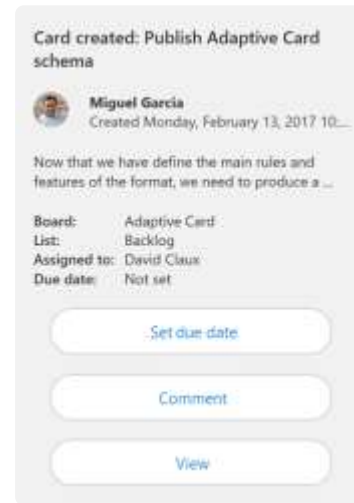
OPEN FRAMEWORK  
MULTIPLE CANVASES



Notification



Microsoft Teams



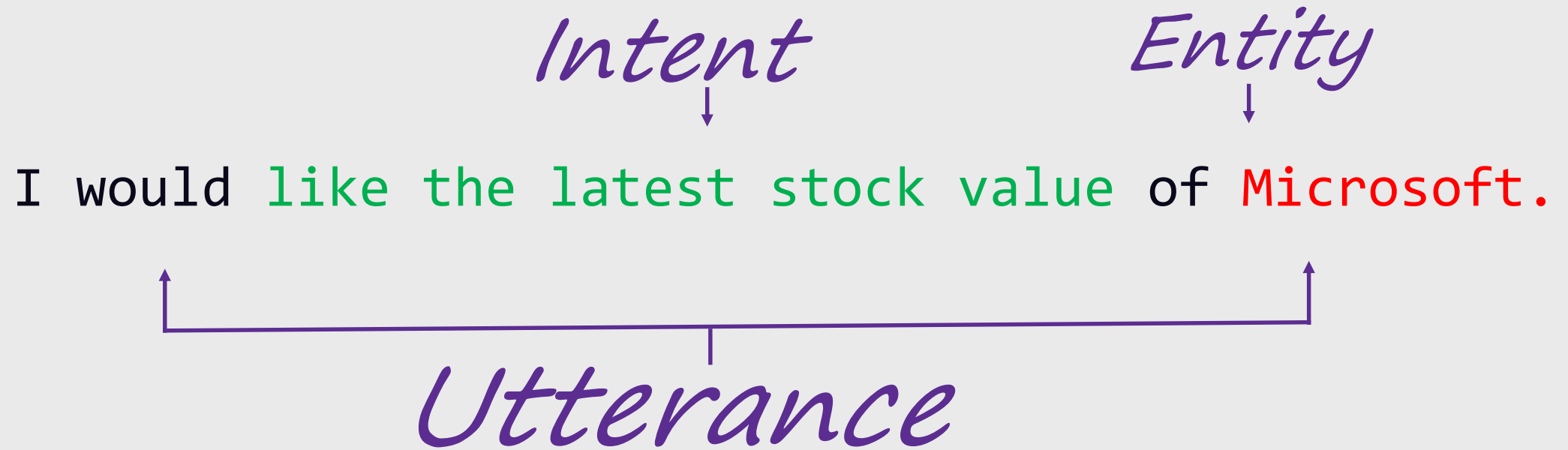
Skype



Android



iOS





# LUIS

---

## L A N G U A G E   U N D E R S T A N D I N G

### Top requested features

- Production staging and versioning
- More languages (Dutch, Korean, dialects)
- Increased intent and entity limits
- 25 customizable prebuilt domains

### More new features

- Lists
- Improved recognizers(\*)
- Semantic dictionaries
- Spell checking

(\*) Recognizers are open-sourced

# LUIS

---

## L A N G U A G E   U N D E R S T A N D I N G

### Pre-built domains

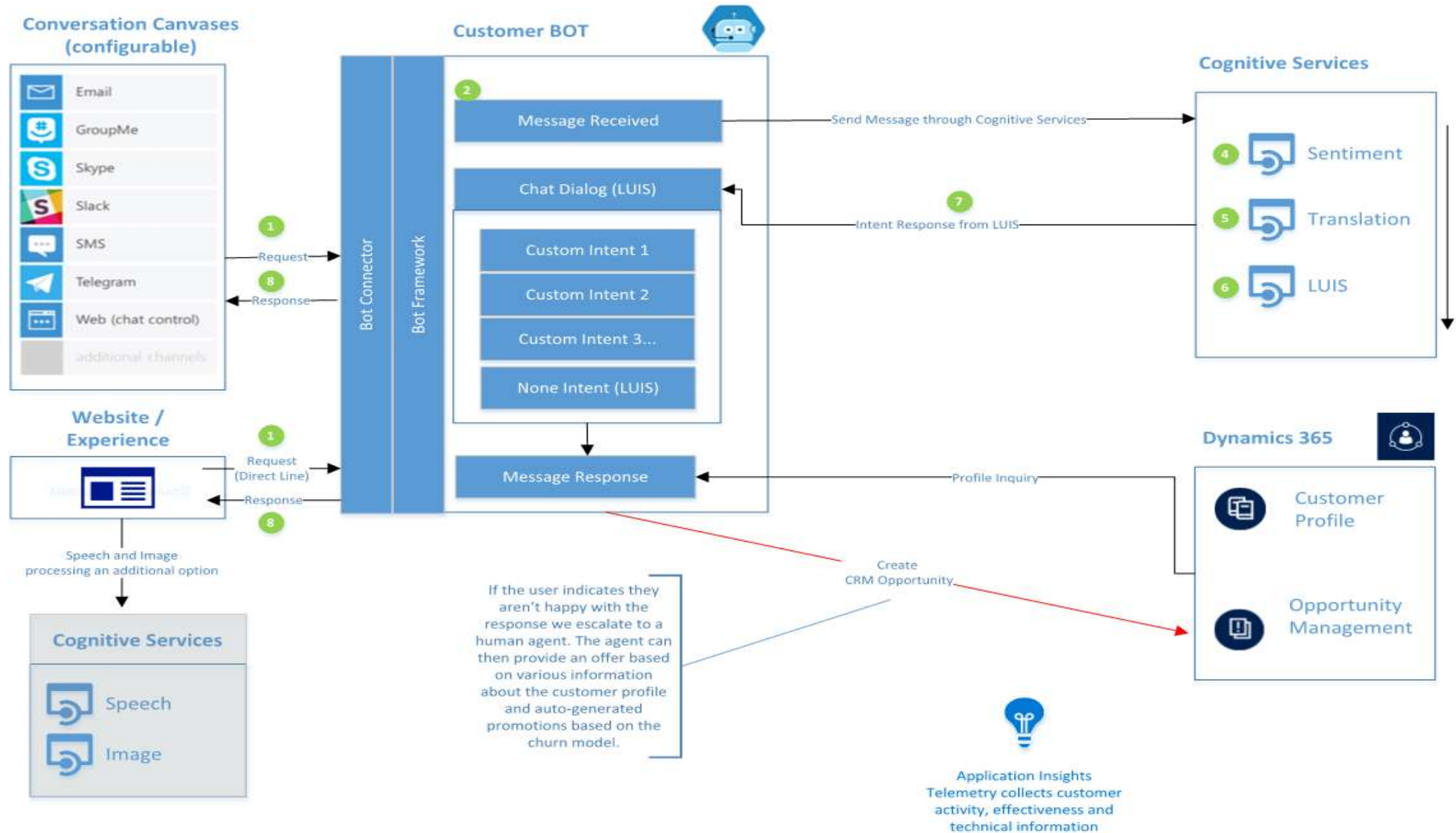
- Predefined packages
- Bootstrap model creation
- Customizable!

### Examples of pre-built domains

- |               |                   |
|---------------|-------------------|
| ○ Sports      | ○ Entertainment   |
| ○ Weather     | ○ Fitness         |
| ○ Stock       | ○ Home automation |
| ○ Contacts    | ○ Music           |
| ○ Calendar    | ○ Translation     |
| ○ Restaurants | ○ Movie tickets   |

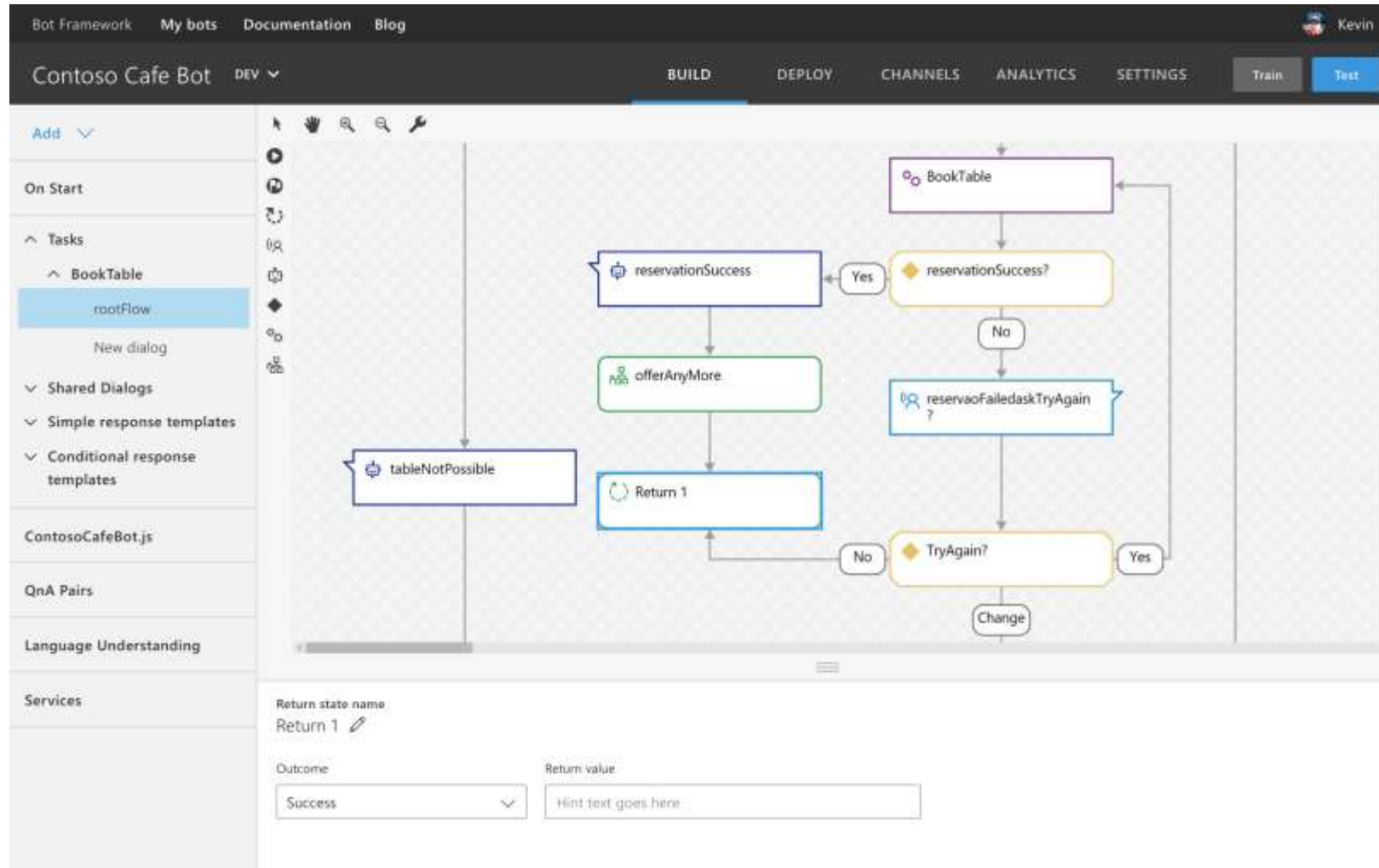
# Bot analytics





# Azure bot service v.Next

## Conversation designer





# The Microsoft AI platform

## AI SERVICES

### CONVERSATIONAL AI

Bot Framework

### TRAINED SERVICES

Cognitive Services

### CUSTOM SERVICES

Azure Machine Learning

## AI INFRASTRUCTURE

### AI ON DATA

Cosmos DB

SQL DB

SQL DW

Data Lake

### AI COMPUTE

Spark

DSVM

Batch AI

ACS

Edge

CPU, GPU, FPGA

## AI TOOLS

### CODING & MANAGEMENT TOOLS

VS Tools for Machine Learning

Azure ML Studio

Azure ML Workbench

Others (Pycharm, Jupyter notebooks...)

### DEEP LEARNING FRAMEWORKS

Cognitive Toolkit

TensorFlow

Caffe

Others (Scikit-learn, MXNet, Keras, Gluon...)

# Call to action

- Build bots—<https://dev.botframework.com/>
- Docs—<https://docs.microsoft.com/en-us/bot-framework/>
- GitHub—<https://github.com/Microsoft/BotBuilder>
- Continue your education at [Microsoft Virtual Academy](#) online

# Code resources

## Microsoft Cognitive Toolkit (CNTK) website

- Tutorials: <https://docs.microsoft.com/en-us/python/cognitive-toolkit/tutorials?view=cntk-py-2.0>
- Code examples: <https://github.com/Microsoft/CNTK/tree/master/Examples>

## In-depth tutorials

- Object detection: <https://github.com/azure/ObjectDetectionUsingCntk>
- Image Similarity: <https://github.com/Azure/ImageSimilarityUsingCntk>
- Image Classification: <https://github.com/Azure/ImageClassificationUsingCntk> (coming soon)

## Solution guide

- Object detection: <https://github.com/Azure/cortana-intelligence-product-detection-from-images>