NEAL ANALYTICS

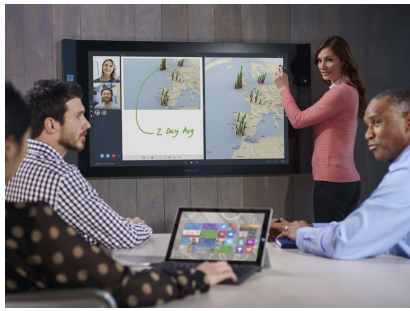
Microsoft

Bot Framework

Design, Architecture, and Demo

Microsoft Partner
Gold Data Analytics
Gold Cloud Platform

Microsoft Partner of the Year
2015 Finalist
Big Data and Analytics



Agenda

Introductions	
About Neal Analytics (Company Background)	*5 mins*
Review of Your Current Situation/Objectives	*10 mins*
Bot Design Principles and Architecture - Break	*30 mins*
Bot Demos – QnA Maker Bot (OOTB), REI Bot (OOTB), Decision Tree Bot	*45 mins*
Q&A	*10 mins*

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We are a specialist, Microsoft-exclusive SI(1)

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Microsoft

Our Mission	Drive business value with Data/Cognitive Services, IoT, and Analytics on the Microsoft platform
Our Company	We are growing, Seattle-based company with 43 management consultants, application developers, data engineers, and data scientists that have helped dozens of customers improve their businesses. We were founded in 2011
Industry Alignment	Our objective is to make Data/Cognitive services, IoT, and analytics accessible to institutions of all sizes across our verticals. Our team specializes in creation of analytical practices to help companies grow and scale
Partnership	We are a Microsoft partner that has deep and meaningful relationships within the Microsoft Product Groups and Sales Organizations. We enjoy a two-way sharing of ideas and best practices
Services	Application Development and Integration, Cognitive Services Integration, Decision modelling, field management, process and machine optimization, and predictive success management

(1) SI: Systems Integrator; Our skills include developer tools (e.g. .NET, SQL), Platform (e.g. Azure, SQL Server), and methodology (e.g. Agile, ITIL)

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Objectives and Approach

Business Objectives

- **Increase personnel effectiveness** by enabling employees to find the right answer to understood questions automatically
- **Speed up action** by reducing costly delays and out of support hours gaps. Lower data access barriers, leading to faster delivery and time to market reductions for new support materials
- **Empower employees** by creating additional time for intellectual and creative resources to focus on high value activities such as strategy and innovation

Approach

- **Translate** Business logic and information system architecture into a graph that can be searched and traversed using a chat bot
- **Integrate** bot and data sources so ERP data can be consumed and leveraged by chat bot
- **Train** artificial intelligence systems to understand English expressions and translate them into commands to retrieve information from the program
- **Humanize** interface by adding emotion to responses and leveraging common user interface (Skype).

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Advantages of Bot Automation

Better
Improved Accuracy/Compliance

- Improved compliance with FastTrack processes from people (users & support agents) wanting to engage
- More accurate outcomes from better policy adherence & knowledgebase adherence
- Reduced tactical mistakes due to improved availability of information
- Improved Scale of Service (out-of-hours support)

Faster
Time Savings

- Response turnaround reduces to minutes
- Efficient navigation to the answer, no need to peruse FAQs
- Improved speed of execution due to easier access to needed information, systems, forms, and other FastTrack processes
- Up-leveling valuable personnel from route tasks to value-adding activities

Cheaper
Lower Cost To Serve

- Lower FastTrack help desk costs
- More efficient usage of help desk time through tiering of issues
- Improved ROI of FastTrack groups due to more time spent on high value strategic initiatives

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Key BOT Use Cases

Process Automation & Expert System

- Programmatic hooks into process database with write-back capability
- Expert process knowledge to facilitate process progress and adherence
- Distinct pathing and expertise in order to answer questions
- Reductions in processing time due to 24/7 availability of an expert
- Ability to integrate with other BOTs and systems.

Support Response Automation & Q+A

- Azure Search configured over highly relevant content provides a seamless way to do deep indexing
- Existing Q+A features and ability to store historically successful answers enable great email & chat support
- Scalable BOT allows for support staff requirements to remain minimal as companies use technology to scale

Automated Sales

- Lower FastTrack help desk costs
- More efficient usage of help desk time through tiering of issues
- Improved ROI of FastTrack groups due to more time spent on high value strategic initiatives

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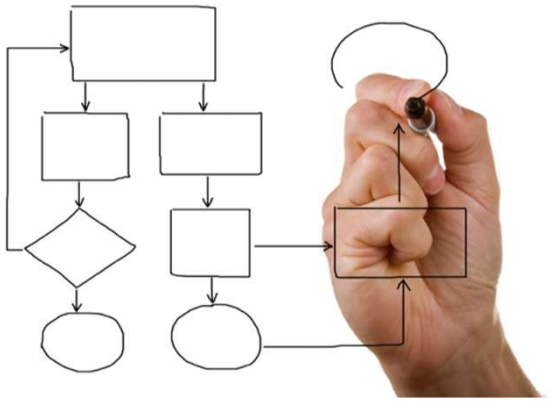
Three Paths to Bot Interaction

1 Natural Language

Bot respond to direct questions related to procurement in conversational form

2 Business Process



Bot follows business logic matching desired procurement process

3 Logic Programming

How to make tea?

```
Organise everything together;
Plug in kettle;
Put teabag in cup;
Put water into kettle;
Wait for kettle to boil;
Add water to cup;
Remove teabag with spoon/fork;
Add milk and/or sugar;
Serve;
```

Bot can be updated by uploading simple instructions into a database

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Bot Technology Functional Architecture – Process Bot

Neal Analytics Architecture in Azure

User Seeking Help

skype™

Skype serves as user interface. Bot leverages native capabilities of Skype, is embedded in a webpage or operates via email

Bot framework serve as core connector and communicates with Skype, SQL, and LUIS.

Bot Framework

SQL

Business Logic is encoded in SQL. This facilitates flexibility and extensibility

Process Flow
User Choices
Next Prompt
Action

Actions
Action

Log
User Choices
Action
Timestamp

LUIS Model provides natural language understanding

LUIS Model

Solution is hosted in Azure, a highly flexible and powerful cloud platform

Azure

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A System That Grows Smarter With Use

Natural Language Improvement

A log is kept of all user inputs (text and selections)

Natural Language Learning

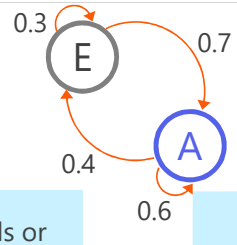
Text and Selections can be used to retrain natural language models

New model is published

Auto-populate to all end points

Business Process Improvement

A log is kept of all user inputs (text and selections)



Business Logic Learning

Paths which lead to dead ends or loops can be analyzed and improved. New branches built

New Business Logic is updated in SQL

Auto-populate to all endpoints

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Microsoft Cognitive Services enables bot functionality to be extended

Cognitive Services

Vision
- Computer Vision
- Emotion
- Face
- Video

Speech
- Customer Recognition
- Speaker Recognition
- Speech

Language
- Bing Spell Check
- Linguistic Analysis
- Language Understanding
- Text Analytics
- Web Language Model
- Translator

Knowledge
- Academic Knowledge
- Entity Linking
- Knowledge Exploration
- Recommendations

Search
- Bing Web Search
- Bing Image Search
- Bing Video Search
- Bing News Search
- Bing Autosuggest

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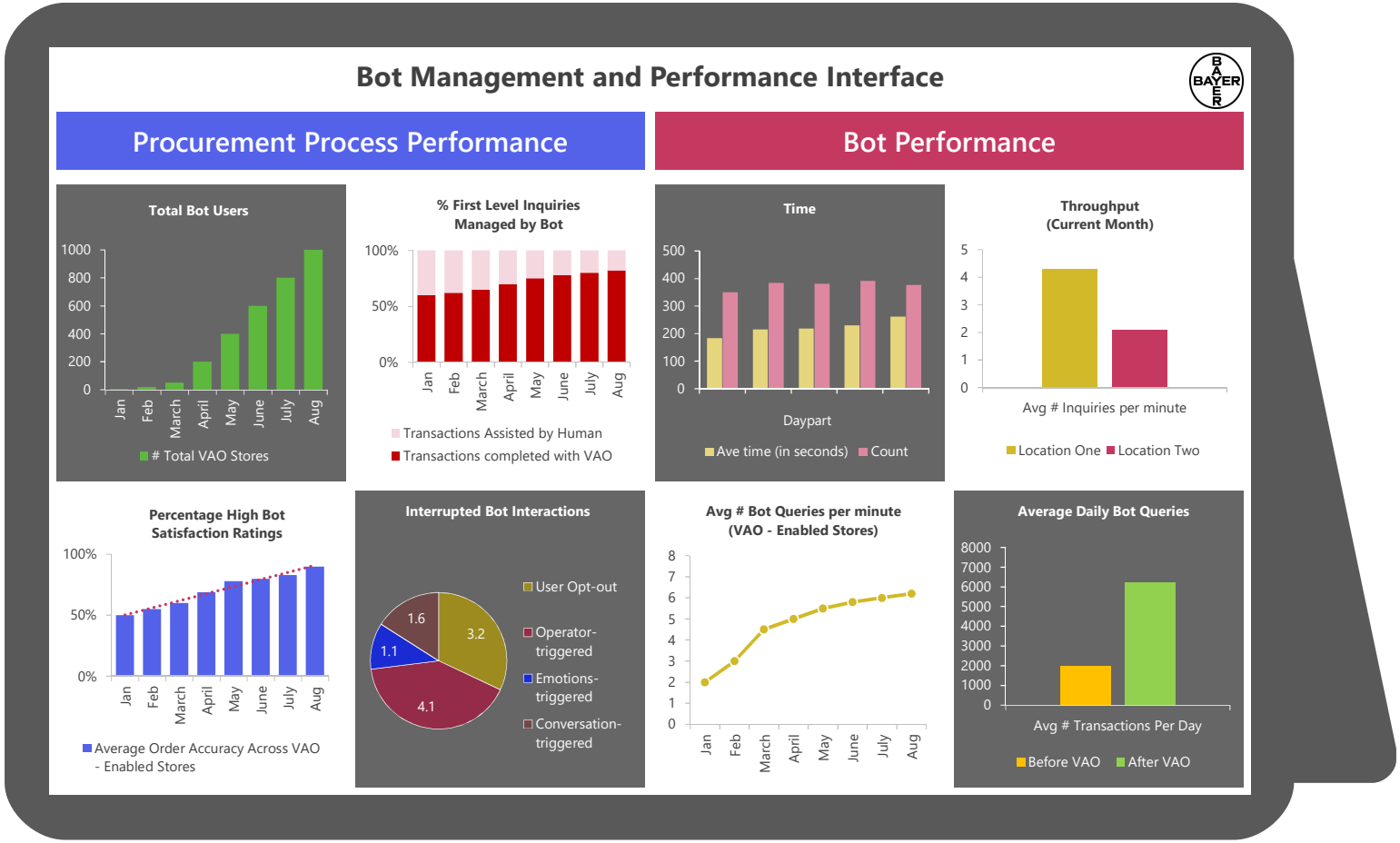
Real-time view into performance of Bot

ILLUSTRATIVE



Considerations

- The number of interactions fed to bot system
- As the POC progresses, LUIS will continue to show improvement in learning and interpretation
- Sentiment data can provide additional opportunities to consider
- Automatic logging of activities will enable greater visibility into procurement processes, allowing for development of more efficient processes

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Bot Features Overview

A Chat/IM Interface

- Variety in the chat interfaces (standalone web client, Skype)
- Carousel-based UI to display options
- Understand intent and conversation context
- Natural, human-like interactivity

B Integration and Workflow

- Integration to the Document Management Systems
- Integration to Ticket Management Systems
- Integration to ERP/CRM systems

C Self-improving/Learning

- Flexible LUIS framework to support improved natural language understanding over time
- Easily programmable business logic design to allow for modifications and improvements

D Security & Data Integrity

- Secure capture of text and voice transmission to the Azure Cloud (secure end-points)
- Integration to Azure Active Directory and User Access Rights

E Admin

- Activity Logging: Capture all activity user, client IP, alias, Company, etc.
- Manage access, locations, integrations
- Manage ML refreshes and custom module deployments

F Visualization

- Visualize the most frequently asked topics
- Visualize graphs of how users traverse topics
- Visualize feedback and usefulness scores
- Infra: Azure Consumption and Mgmt. Dashboard

G Historical and Trending

- Trends in Chat Bot performance
- Trends in Utilization, Frequency, Unique Users
- Trends in User/Customer Sat metrics

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Demo

1) West QnA Maker Bot
   a) http://westchatbot.azurewebsites.net/
   b) QnA Source
2) West Basic Bot
   a) http://westdemo2017.azurewebsites.net/
   b) Basic Bot Source
3) West Decision Tree Bot
   a) http://westbotprocurement.azurewebsites.net/
   b) Decision Tree Bot Resources

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Appendix