

Navya- The Automated Data Driven Bot

Problem Statement:

Finding the live data insights from huge data, is the key challenge. These data insights drive the decisions making and helps to take the corrective steps. At broader level, data can be in the form anything. This can be the result of specific actions. This Bot is programmed to resolve following key problem statements.

1) **Cognitive Quality Analysis:**

Compromised quality of any software products/services can be inimical. It becomes pivotal to get the insights about the live quality details keeping pace with trending digital market place.

2) **Resource Management:**

Managing huge records of resource profiles on day to day basis, has its own challenges. An automated system that naturally handles the frequently asked queries & makes HR process streamlined, becomes an essential tool for such enterprise level applications.

How it Works:

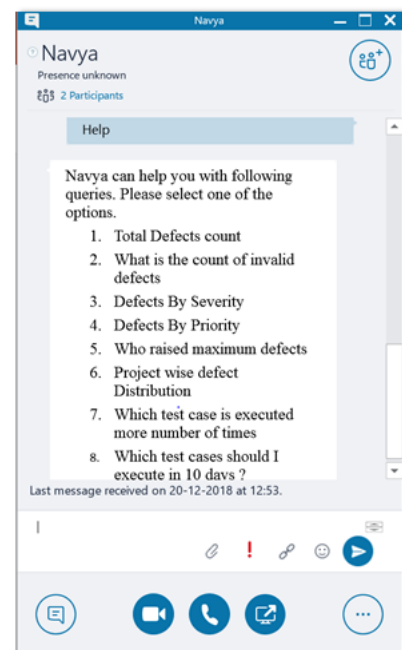
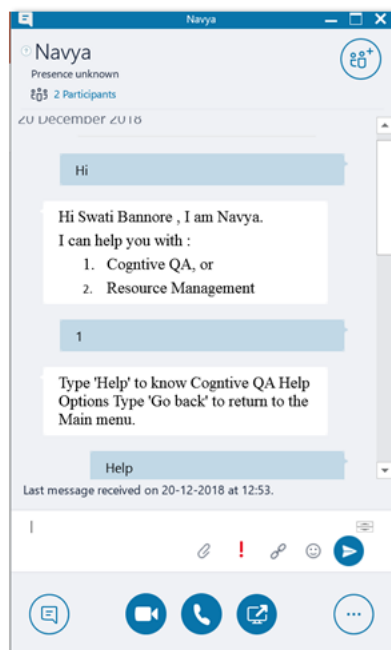
Navya is the data driven Bot that responds to user queries with natural language understanding intelligent service & using questions and answers knowledge base services.

Navya for Cognitive Quality Analysis

Cognitive Quality analysis can be done in **Skype For Business** and **Webchat Messengers** as described below.

Skype For Business

Navya Bot is **easily discoverable** on Skype for Business interface. This keeps QA team & business partners connected with Navya Bot through **instant messaging**. After the Bot is discovered, customer can initiate the discussion with the Bot in Natural Language as described below.



Then Navya Bot displays the help options to gain specific data insights. Customer can respond with the specific option. For example if Customer wants to know about recommended test cases that needs to be executed for specific time period, he/she can respond with option 8. Based on Customer's consent Bot responds with test case report as the email attachment.

The sequence of screenshots illustrates the following steps:

- The user selects option 8 from a list of help options.
- The bot responds: "There are total 2939 test cases. With the duration you have mentioned, you could execute top 432 test cases which will take 10.00 days. Would you like to view these test cases?" The user responds "yes".
- The bot states: "I have sent the test cases to your email id. Please check your mailbox in next 5-10 minutes." An arrow points to an Excel spreadsheet titled "TCReport" showing columns: TEST_NAME, RN, DURATION, EXECUTION_FREQUENCY, FAILURE_FREQUENCY, DEFECT_COUNT, and RECENT. The spreadsheet lists various test cases like CQS_012, CQS_014, etc.

Navya Bot can provide live status of specific Project

The chat shows the user asking: "STATUS Closed in project QTD. 4 defects for status Closed in project S&C." The bot responds with a detailed report: "Project ATR. Project Wise distribution of defects is as follows: 19 defects for status Answered in project ATR. 43 defects for status Assigned in project ATR. 247 defects for status Closed in project ATR. 5 defects for status Consult in project ATR. 33 defects for status Duplicate in project ATR. 2 defects for status New in project ATR. 2 defects for status Rejected in project ATR. 33 defects for status Retest in project ATR. 8 defects for status Work In Progress in project ATR." The last message received is on 21-12-2018 at 13:28.

Navya Bot can provide project details with specific status

The chat shows the user asking: "Type 'Help' to know Cognitive QA Help Options Type 'Go back' to return to the Main menu." The bot responds: "Project status as closed. Project Wise distribution of defects is as follows: 247 defects for status Closed in project ATR. 158 defects for status Closed in project Field Services. 79 defects for status Closed in project MDM. 188 defects for status Closed in project PLM. 104 defects for status Closed in project PTC. 121 defects for status Closed in project PTR. 154 defects for status Closed in project QTD. 4 defects for status Closed in project S&C." The last message received is on 21-12-2018 at 13:25.

Navya Bot can prompt to contact helpdesk if required

The chat shows the user asking: "2. Resource Management". The bot responds: "1. Type 'Help' to know Cognitive QA Help Options Type 'Go back' to return to the Main menu. Please share documents location. Now you are in Main menu, Type anything to continue further!!! Please type help to understand the questions that you can ask or reach out to Supportdesk@capgemini.com for more information." The last message received is on 21-12-2018 at 13:36.

Webchat

Navya Bot is accessible in browser based Webchat channel. The Customer interaction with the Bot is similar to Skype for Business channel except he/she has to be authenticated explicitly with Azure AD Credentials. After successful authentication, test case report will be sent to the Customer's email ID. Also Customer can download the report from webchat channel itself.

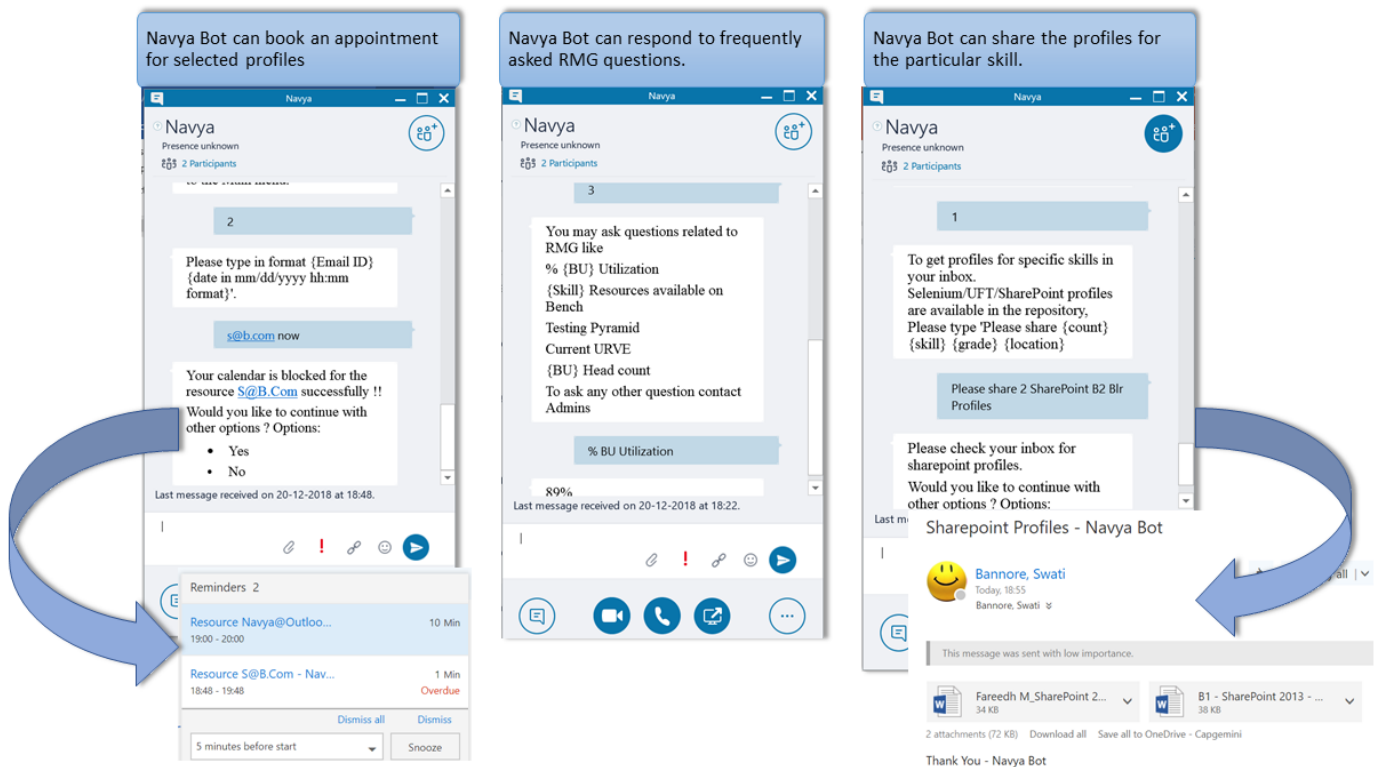
The screenshot displays the Navya Bot webchat interface. On the left, a menu lists various test analysis options: Defect Summary, Causal Analysis, Prediction, Test Analysis, Traceability, Orphan Artifacts, What If Analysis, What To Test, Test Selection, Settlement Analysis, Automation Summary, Mapped Defects, Duplicate Test Cases, Test Case to Req Mapping, Key KPIs, Environment Summary, Production Data, Agile Dashboard, Response Summary, Performance Summary, Response Time Prediction, and Prescriptive Analysis. The main area shows a 'COGNITIVE QA' banner with the text 'LEVERAGE AI AND ANALYTICS FOR GREATER SPEED AND QUALITY'. Below the banner, there's a section for 'test case execution report' with a 'Yes' button. A blue arrow points from this section to a chat window on the right. The chat window shows a conversation between 'You' and 'Navya'. The messages are: 'Please click to sign in: Authentication Required', 'Please paste back the number you received in your authentication screen.', '468423', 'Thanks Bannore, Swati. You are now logged in.', and 'This document is sent to swati.bannore@capgemini.com'. The chat window also shows a 'Type your message...' input field and a 'Type your message...' button.

Navya for Resource Management

Resource Management can be done in **Skype for Business** Messenger as described below.

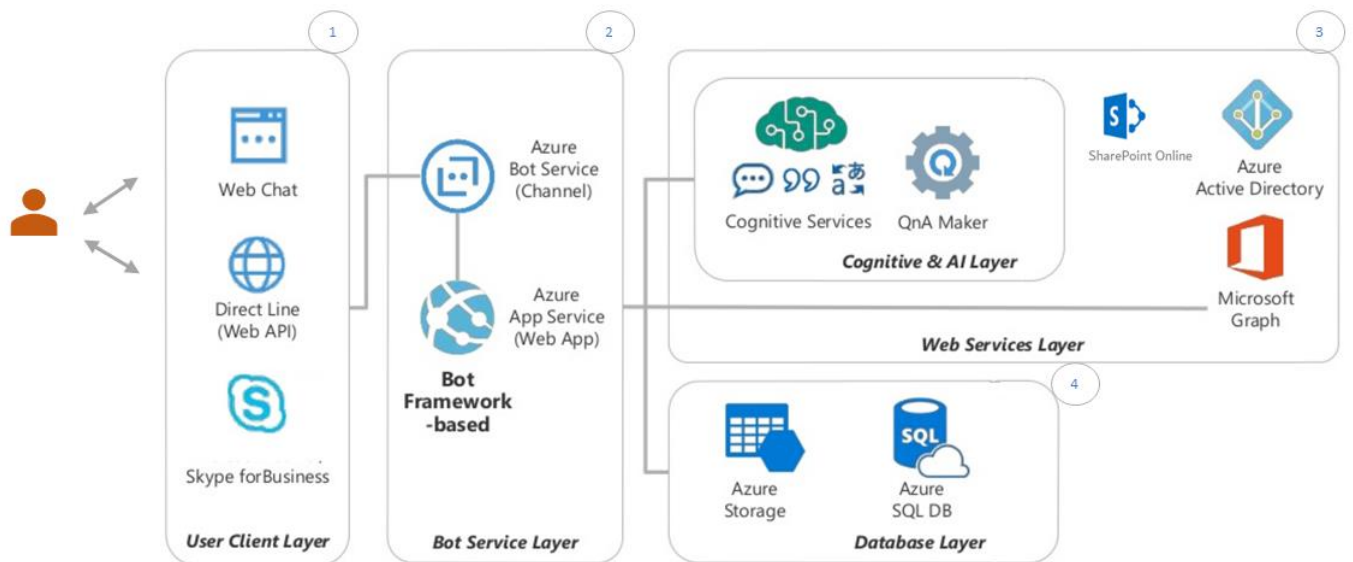
Navya Bot is **easily discoverable** on Skype for Business interface. This keeps Resource Management team & business partners connected with Navya Bot through **instant messaging**. After the Bot is discovered, customer can initiate the discussion with the Bot in Natural Language as described below.

The image shows two screenshots of the Navya Bot chat interface in Skype for Business. The first screenshot shows the initial greeting: 'Hi Swati Bannore, I am Navya. I can help you with: 1. Cognitive QA, or 2. Resource Management'. The second screenshot shows the help menu: 'Type 'Help' to know RMG Help Options & Type 'Go back' to return to the Main menu.' Below the help menu, there's a list of options: '1. Finding right resource with right skillset(with CVs)', '2. Scheduling interview with selected resource', and '3. Other operations KPI updates(For selected resource)'. Both screenshots show a 'Type your message...' input field and a 'Type your message...' button.



Solution Overview:

Following high level technical architecture diagram describes the information flow from Customer to Bot & responses are generated from Database layer/Cognitive & AI Layer/Web Service layer with respect to corresponding user information flow.



1. User Client Layer

Customer can initiate discussion with Navya Bot through Webchat or Skype for business channel as described in the above sections.

2.Bot Service Layer

A controller hosted as App Service Plan receives the input text and pass on to Cognitive/AI layer. The controller acts as middleware to predict intents from Input text dynamically and then to process the predicted Intent including database interactions.

3.Cognitive & AI Layer

As described in the previous section LUIS (Language Understanding Integrated Service) determines the Intent dynamically and generate responses from Data Layer or Knowledge base services. Here the intent of the input text would be predicted based on pre-trained Utterances and Entities.

4.Database Layer

Azure SQL database table contains the list of intents and corresponding SQL queries that requires dynamic execution based on user requests.

5.Web Service Layer

In Webchat channel, user may need to login with Azure Active directory credentials, to get the report sent to corresponding email id. This has been implemented using Microsoft Graph concept.

In Skype for Business channel & for Resource management option, Bot can book the appointment or share the profiles using Office 365 Microsoft Flow concepts

Technology Stack:

- Microsoft Azure Bot Service – Controller deployed in Azure as App service Plan
- Microsoft Azure SQL Database
- C# .NET MVC – Web App deployed as App Service Plan
- LUIS – NLP tool of Microsoft
- QnA Maker - Knowledge base Cognitive Service
- Office 365 – Collaboration & document management
- Speech API – Cognitive SDK of Microsoft

Salient Features:

- Proactive recommendations for next level planning
- 24x7 real time data assistant on different channels
- Predications, Guidance based on Live status
- Easy & Quick Interaction through Natural Language Processing