Taming of the Chatbots

An Insider's Story

Webinar - June 8 2018

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About Dj Das

-

- Founder & CEO of ThirdEye Data
  - A Big Data & Data Sciences focused consulting company, based in the Bay Area.
- Thought leader and a pioneer in the world of Big Data & Machine Learning & AI. Also passionately runs a regular meetup group named “Big Data Cloud”.
- Serial entrepreneur.
- Angel investor in various tech startups.

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What is this Presentation NOT about

Assuming that we all know about these:

- Value proposition of Chatbots
- Kinds of Chatbots and their use cases
- How are Chatbots being used in enterprises
- Crazy adoption rates
- Peak of hype curve

(but if you really want to talk about these, please get in touch with me!)

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What is this Presentation About

This presentation will focus on:

- How to make the Chatbots work for enterprises
- The do’s and don’ts, the gotchas and oops

irrespective of the technology platform used for building and deploying these Chatbots.

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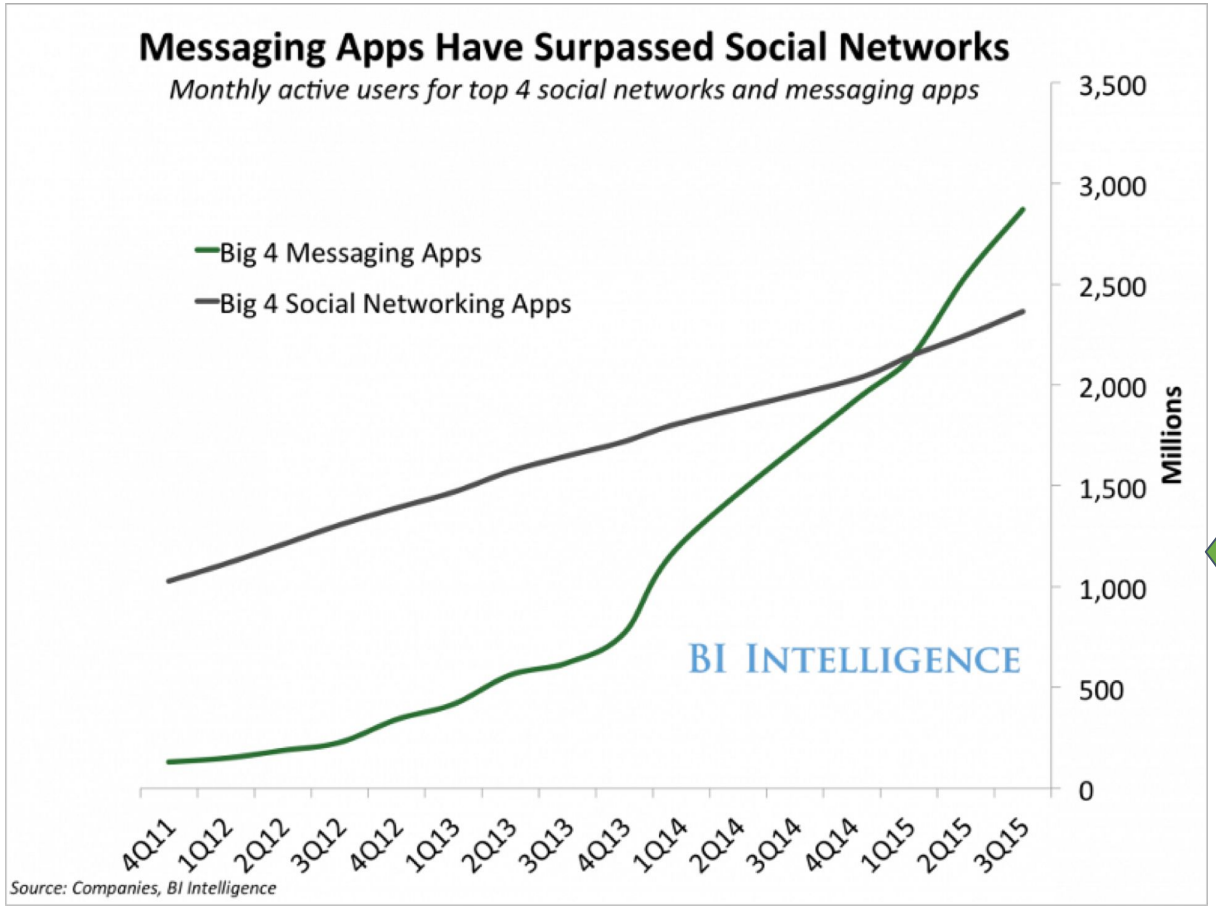
The Rise of the Chatbots



This chart is about **Chatbots**, typically used by **consumers** - and not about **Chatbots** in general, as used in various **enterprises**.

The numbers would be much higher then!

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Chatbots are Transforming Business Models

- Chatbots are essentially virtual robots.
- Transforming the way companies interact and engage with their customers, partners, website visitors, employees etc.
- Getting up-close and personal to their human counterparts, to a point at which its sometimes difficult to tell the difference!

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Business Applications

Use Cases

- Order/Transaction Management
- Customer Support
- Technical Support
- Concierge Services
- Financial Consulting
- Virtual Assistant

Sectors

- Retail
- Telecom & ISP
- Banking & Financial
- Medical Services

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How Chatbots Work

Chatbots are Purpose Created.

- **Rule Based**

  Function on predefined set of options and answers questions which are within its designed parameters.

- **Artificial Intelligence Based**

  Function on more sophisticated Data Sciences related techniques
  - Artificial Intelligence
  - Natural Language Processing
  - Deep Learning

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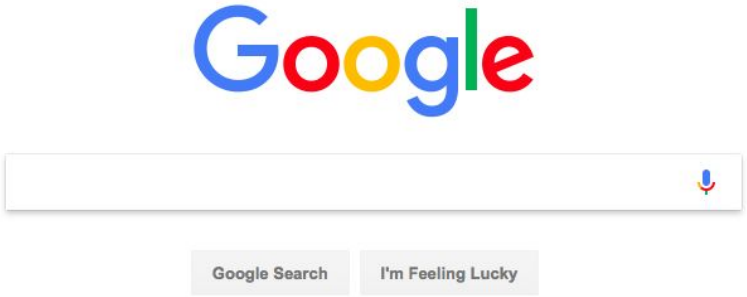
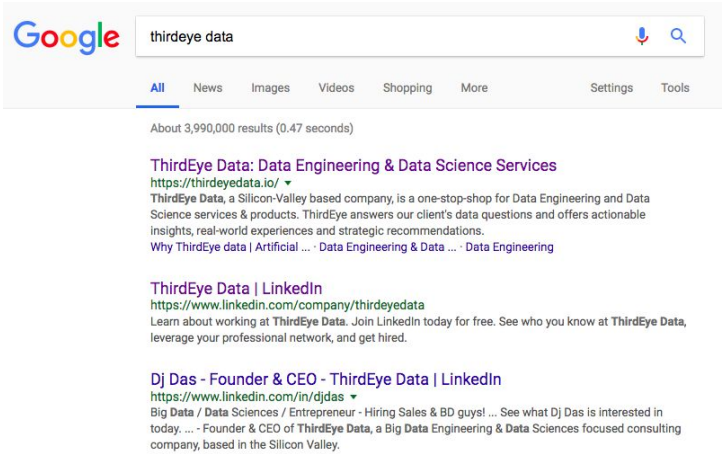
Simplicity Hides the Complexity

Google Search Engine like **simplicity** in the **front-end** which hides a whole lot of **complexities** at the **back-end**.





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UX Challenges of Developing Chatbots

Chatbots have to deliver targeted and real value to its users in a very short span of time.

- Very Short User Attention Span
- Limited Application Real Estate
- No back buttons, No home button.
- Need to unlearn everything that we have learned in past 20 years about developing web application UX!

If a Chatbots fails to engage, users usually don’t come back!

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Enterprise Chatbots for Knowledge Management

Today's global enterprises have:

1. Offices spread across the globe.
2. Employees speak and work in various different languages.
3. Information tucked away in documents, spreadsheets, databases, web portals, etc. and in other silos.

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Enterprise Chatbots for Knowledge Management

It’s a Challenge to:

- Find relevant information
- Find information at the right time
- Access, analyze and search through all available information.

Solving these challenges is critical for business success.

This Chatbot makes enterprise information available on finger tips!

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A Bot for Knowledge Management - *KMbot*

Business Need

Need to efficiently identify relevant SMEs located anywhere in the world on various topics of current interest.

IT Need

Need to process geographically dispersed documents and make it available for search & analysis.

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A Bot for Knowledge Management - *KMbot*

Value Proposition

KMbot enables its users to identify relevant SMEs on various topics of current interest by asking simple questions and getting a detailed response with ranked SMEs.

KMbot provides contextual and relevant responses by querying in real time an extensive database of pre-processed documents of all types.

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Areas of Consideration

- Domain knowledge of KMbot should be clearly defined.
- The personality of KMbot should be based on the target audience.
- Given the geographically dispersed nature of any modern day enterprise, KMbot should be multilingual - English, Spanish, French, Hindi etc.

Areas of Consideration

KMbot's conversation should be scripted as per the following guidelines:

- Structure
  - opening, small talk, main goal, fallbacks, ending, others.
- Type of questions that can be asked.
- Use of buttons, carrousels and/or images and and when applicable.
- Types of responses given.

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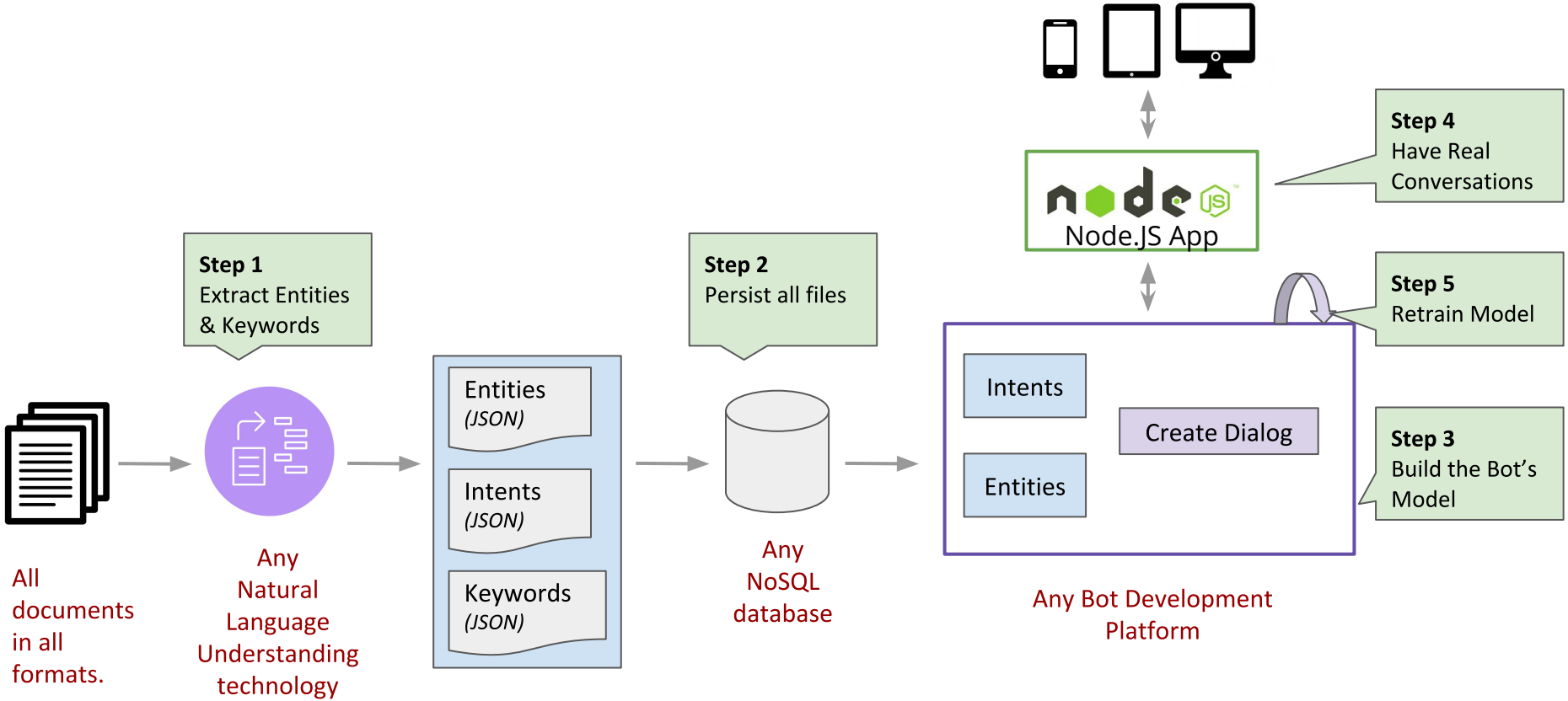
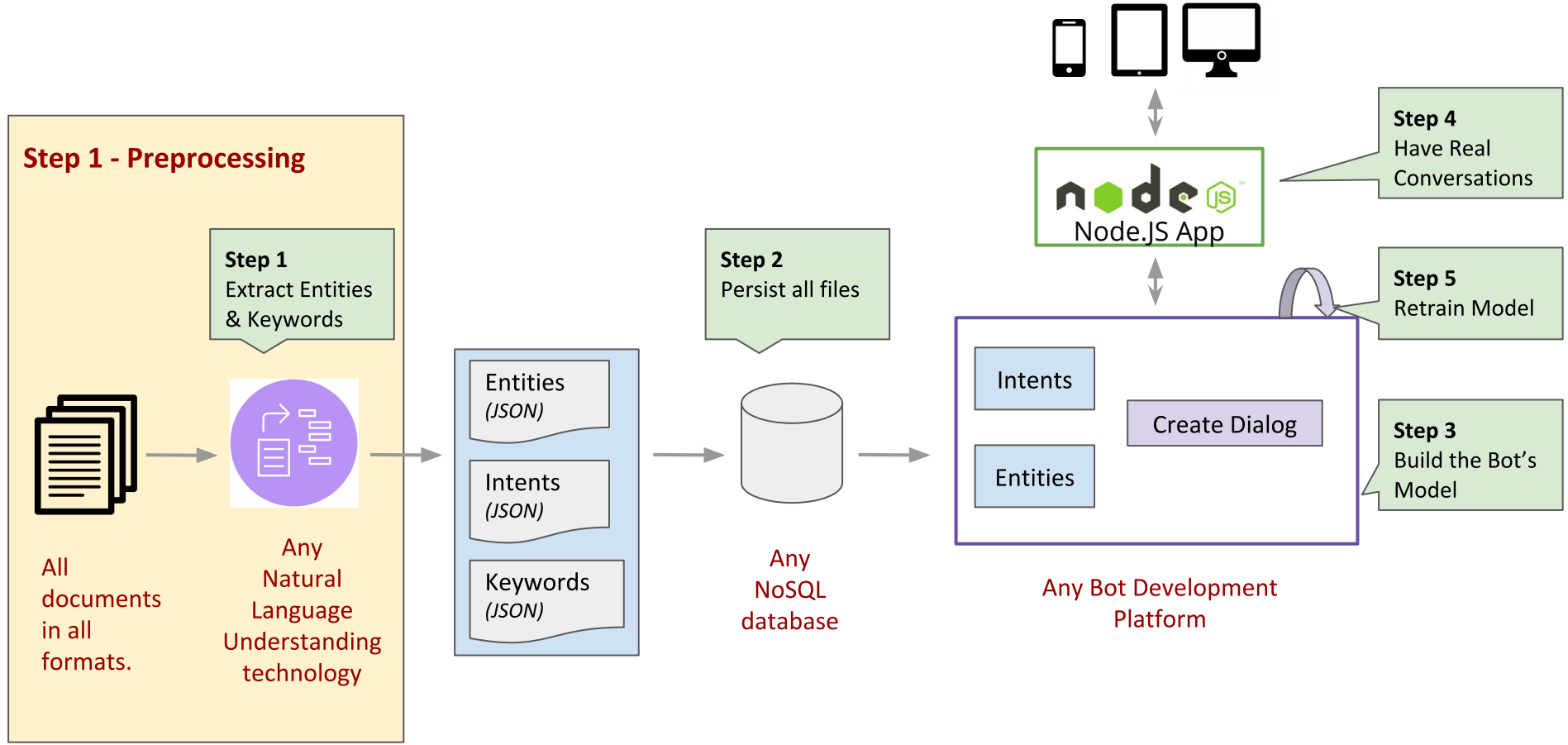
KMbot's Process Flow



KMbot's Process Flow



Step 1 - Preprocessing

- All documents should be preprocessed using any available Natural Language Understanding technology.

- NLU would extract entities and keywords in JSON format from the documents that are fed into it.

- These documents form the knowledge base for KMbot.

Step 1 - Preprocessing

- KMbot’s responses would be limited to this knowledge base.

- Any document conversion from various languages to English is also performed.

Step 1 - Preprocessing - BE AWARE!

- Selection of the Natural Language Understanding (NLU) technology.

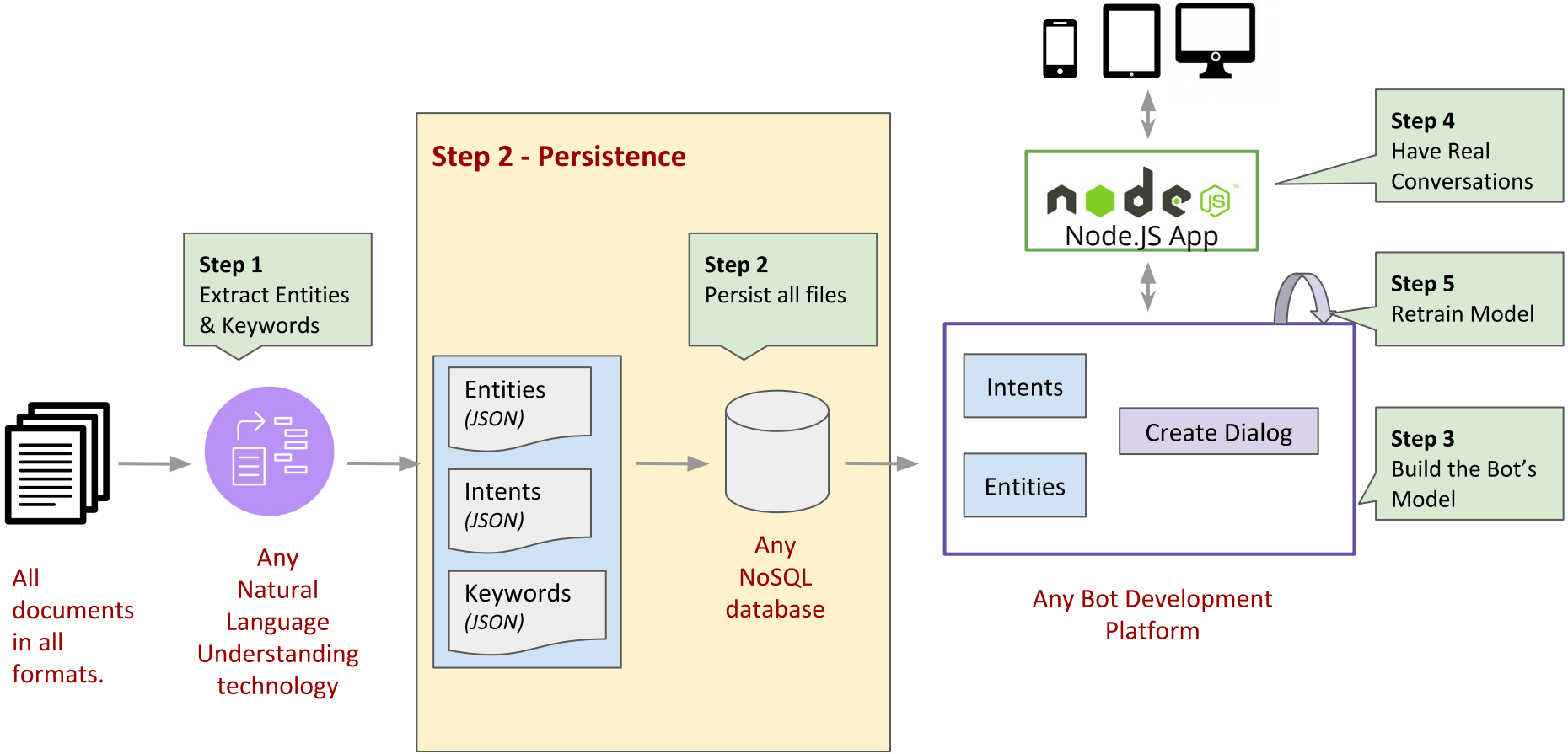
- For documents not supported by the selected NLU technology, custom solutions may have to be built.

Step 1 - Preprocessing - BE AWARE!

- JSON file structure definitions
  - Depends on the the number and kind of entities that are needed to be worked upon.
  - NoSQL databases don’t perform well with highly nested JSON files.

- Selection of the Language Conversion technologies.

KMbot's Process Flow



Step 2 - Persistence

- All entities and keywords that were retrieved as JSON files from NLU would be persisted to a NoSQL datastore.

Step 2 - Persistence - BE AWARE!

- Selection of the appropriate NoSQL datastore.
- Its ability to query natively all file formats, especially JSON.
- Performance with heady data loads.
- Ability to index, partition and bucketize data for fastest querying abilities.

Sample JSON


```
_id:                "YVON MELLINGER"
_rev:               "31-a0e078fc25b50cc3d2e0c566a1db0b06"
role:               "Water & Sanitation Lead Spec"
department:         "INE"
location:           "Barbados"
country:            "BAHAMAS"
project_details:
  0:
    project_number: "BH-T1017"
    project_title:  "LEGAL AND REGULATORY FRAMEWORK UPDATE (WATER SECTOR)"
    project_type:   "TECHNICAL COOPERATION"
    total_cost:     "USD 300,000"
    country:        "BAHAMAS"
    sector:         "WATER AND SANITATION"
    subsector:      "WATER AND SANITATION"
    url:            "http://www.iadb.org/en/projects/project-description-title,1303.html?id=BH-T1017"
  1:
    project_number: "BA-T1010"
    project_title:  "PREPARATION FOR BA-L1015 - WATER AND SANITATION UPGRADE PROGRAM"
    project_type:   "TECHNICAL COOPERATION"
    total_cost:     "USD 450,000"
    country:        "BARBADOS"
    sector:         "WATER AND SANITATION"
    subsector:      "WATER AND SANITATION"
    url:            "http://www.iadb.org/en/projects/project-description-title,1303.html?id=BA-T1010"
  2:
    project_number: "BR-T1182"
    project_title:  "SUPPORT TO ENVIRONMENTAL SANITATION PROGRAM FOR IPOJUCA HYDROLOGICAL BASIN"
    project_type:   "TECHNICAL COOPERATION"
    total_cost:     "USD 900,000"
    country:        "BRAZIL"
    sector:         "WATER AND SANITATION"
    subsector:      "WATER AND SANITATION-SANITATION RURAL AND PERI-URBAN"
    url:            "http://www.iadb.org/en/projects/project-description-title,1303.html?id=BR-T1182"
  3:
    project_number: "BR-T1244"
    project_title:  "SUPPORT TO PREPARATION OF THE INTEGRAL SANITATION PROGRAM FOR MAUES"
    project_type:   "TECHNICAL COOPERATION"
    total_cost:     "USD 600,000"
    country:        "BRAZIL"
```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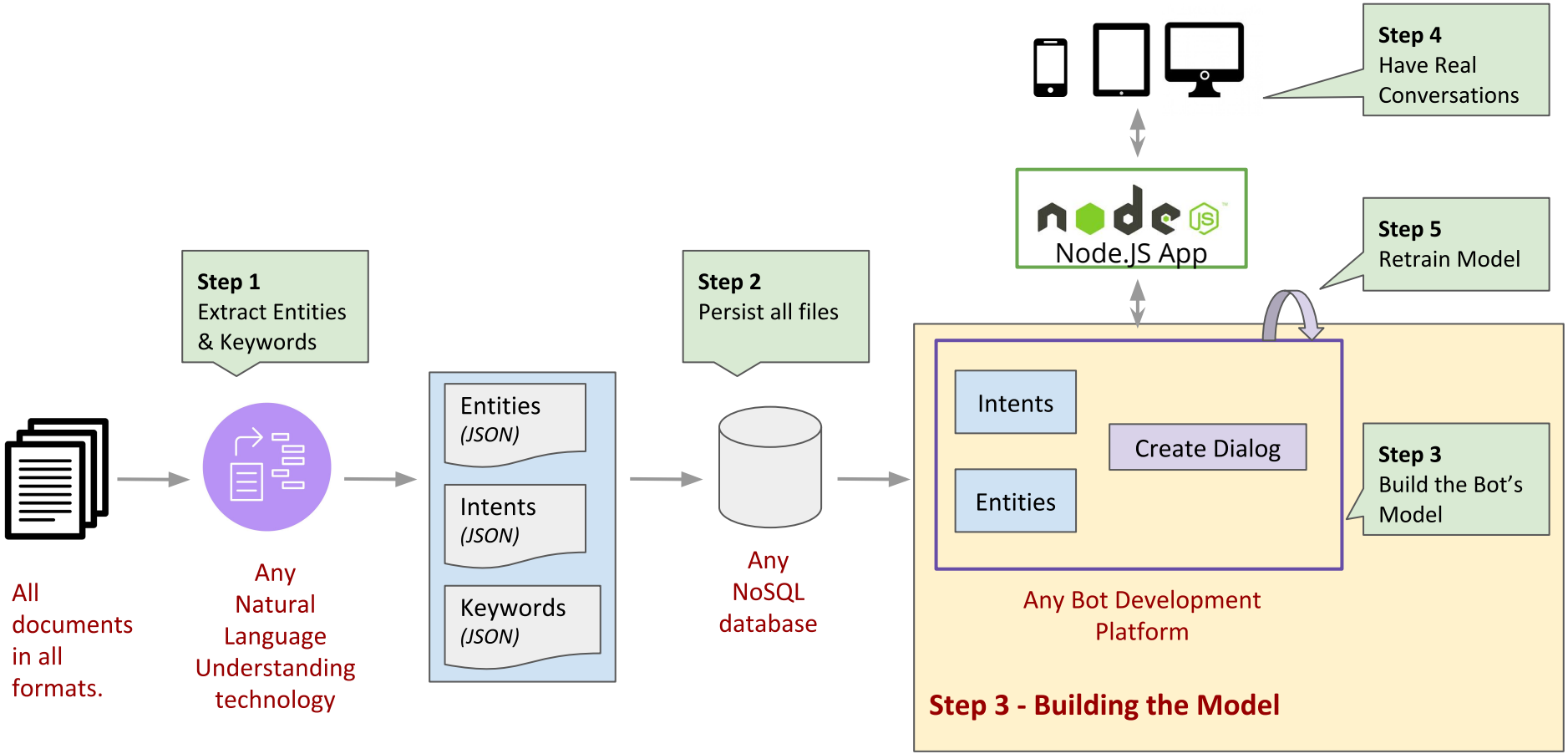
KMbot's Process Flow



Step 3 - Building the Model

- The model, which emcompasses the business logic of KMbot, is developed using previously selected Bot Development platform.

- The entities, intents and keywords are retrieved out of the NoSQL datastore and used to build the Bot's model.

- Intents and Entities are used to create the 'Dialog' aspects of the Bot.

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Step 3 - Building the Model - BE AWARE!

- Selection of the appropriate Bot Development platform is THE toughest decision
  - *This will impact the very fundamentals of the Bot - how it reacts, responds, provides value etc.*

- Development of a valid and an accurate model is critical.
  - *No one gets it right the first time, its an very iterative process!*

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Step 3 - Building the Model - BE AWARE!

- Ensuring all “Entities” have been extracted from the documents accurately.

- Ability of the platform to identify proper “Intent” as per the questions being asked by the users.

- Based on the “entities” and the “intent” in the user’s query, mash up the proper valid response/s.

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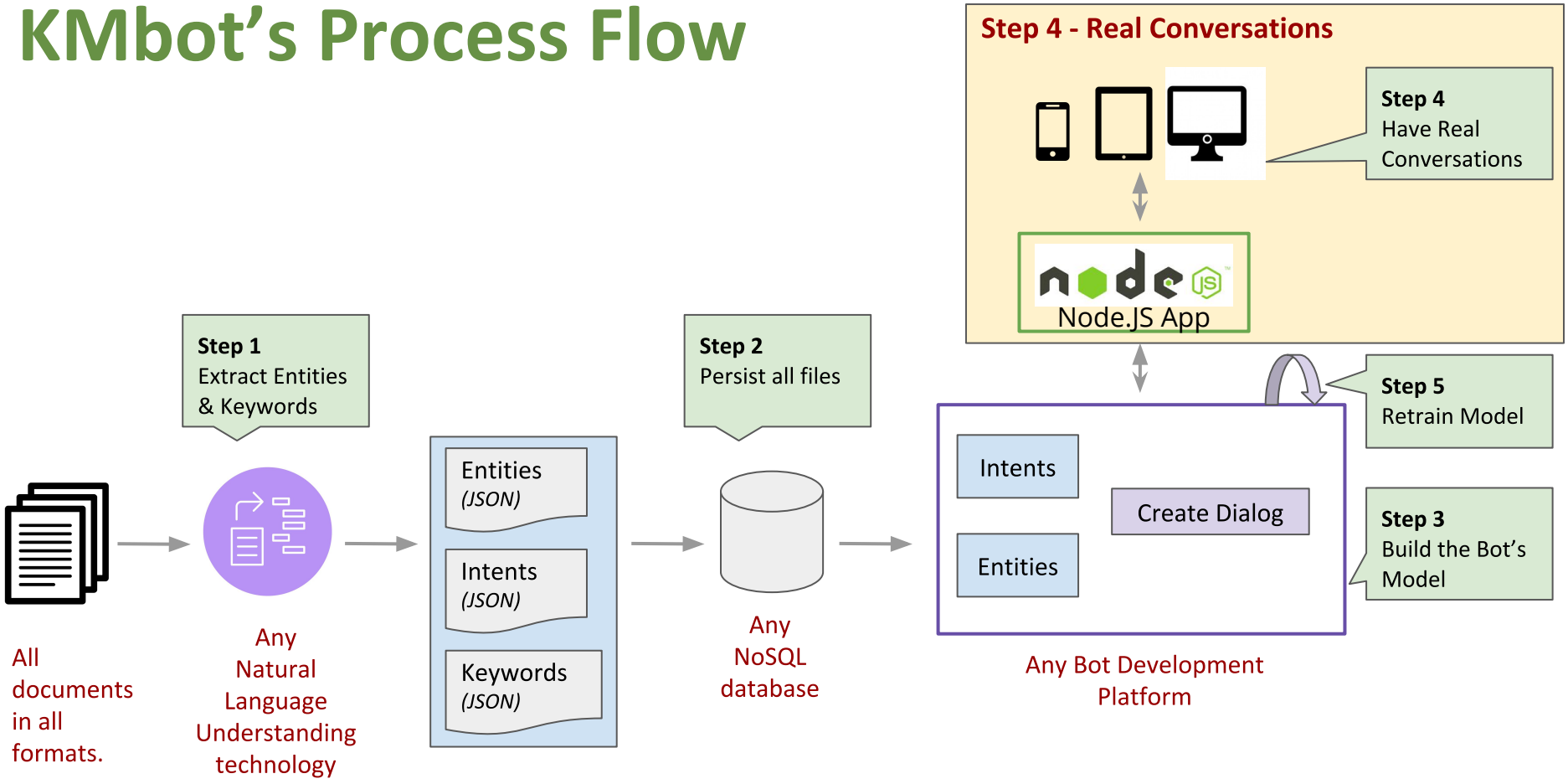
KMbot's Process Flow



Step 4 - Real Conversations

- Unleash KMbot in the open world and let actual user's have real conversations with it.

- During these real world conversations, note the KMbot's responses:
  - How is the KMbot opening the conversation.
  - How is its ability to do small talk.
  - How is it achieving its main goal - of responding with relevant answers for the questions being asked.

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Step 4 - Real Conversations

- During these real world conversations, note the KMbot's responses:
  - How is it handling fallbacks.
  - How is it handling the conversation endings.
  - The speed at which the responses are being delivered.

- Users can use any device for asking their questions.
  - KMbot's frontend should be responsive for all devices generally available today.

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Step 4 - Real Conversations - BE AWARE!

This is where the rubber meets the road!

- Analyse the logs of all questions and answers.
- Understand for which questions, the Bot’s answers were appropriate and for which were not appropriate.
- Understand when does it totally fails and frustrates the user.
- Understand how were the user’s interacting with the Bot.

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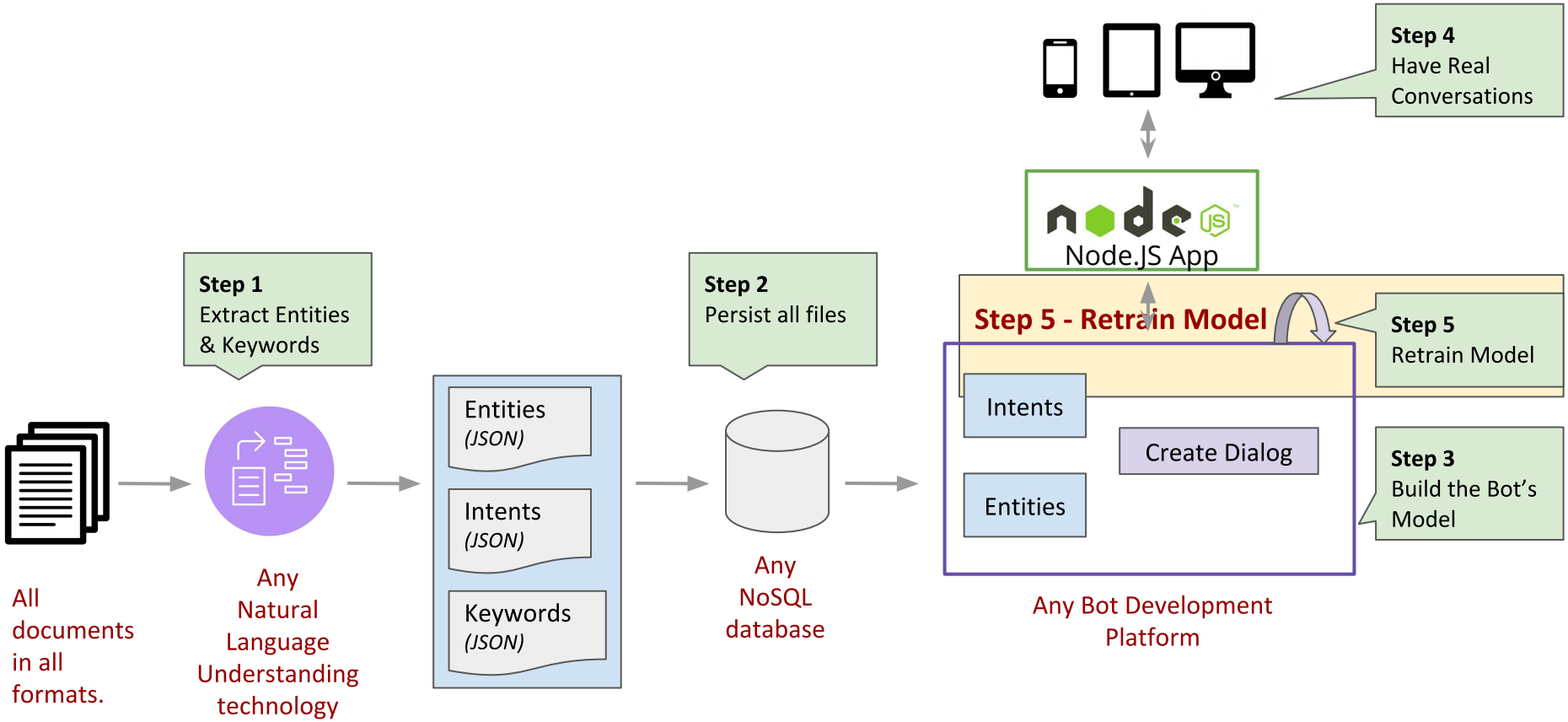
KMbot's Process Flow



Step 5 - Retrain Model

Like a human child, Chatbots also needs to be trained and retrained so that it starts to answer questions as per normal expectations.

- Based on the KMbot's responses, Subject Matter Experts from the enterprise will weigh in their viewpoints and provide detailed feedback.

- KMbot's developers will then retrain it as per the feedback.

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Step 5 - Retrain Model

- Prior to retraining, Developers may need to:
  - Optimize the Entity extraction process
  - Modify JSON file structures
  - Perform performance querying on the NoSQL database.
  - Build the knowledge base again.

- This is an iterative process.
  You will need minimum 3-5 iterations to get the Bot responding as per user's expectations.

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Presentation Layer

- The presentation layer should be selected very carefully.
  - Typically an Node.js app developed using Node.js works well to provide rich user interactions.

- The app would be responsive and usable on all mobile devices as well as desktops and laptops.

Summarizing

Building a Chatbot is Easy
- Taming it, is the Hard Part!

Much like the puppy that you bring home in all excitement but then you spend your lifetime in taking care of it!

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KMBot
- The Knowledge Management Chatbot

KMBot enables users to identify Subject Matter Experts across the geographical boundaries of a typical enterprise.

This is the Chatbot that was discussed in the webinar.

Check out this KMBot live in action here:
https://findmeanexpert.mybluemix.net/

Chat with other live Chatbots here:
https://syra.ai/live-chatbots/

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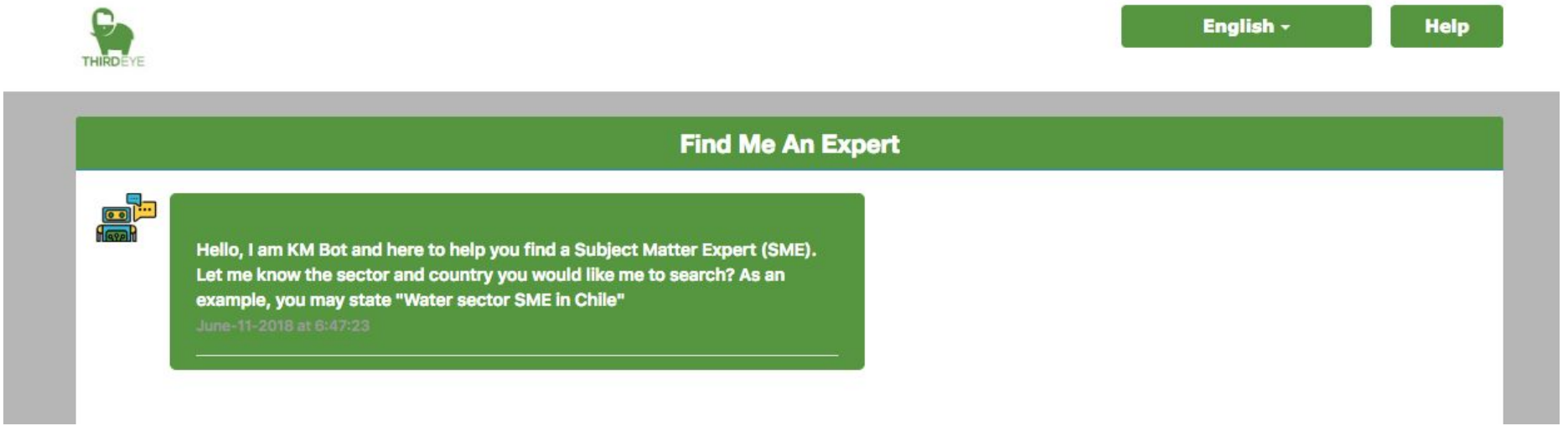
KMBot - Screenshots



Above is the screenshot of the live KMBot site that we discussed in the webinar.

Check out this Chatbot live in action here:
https://findmeanexpert.mybluemix.net/

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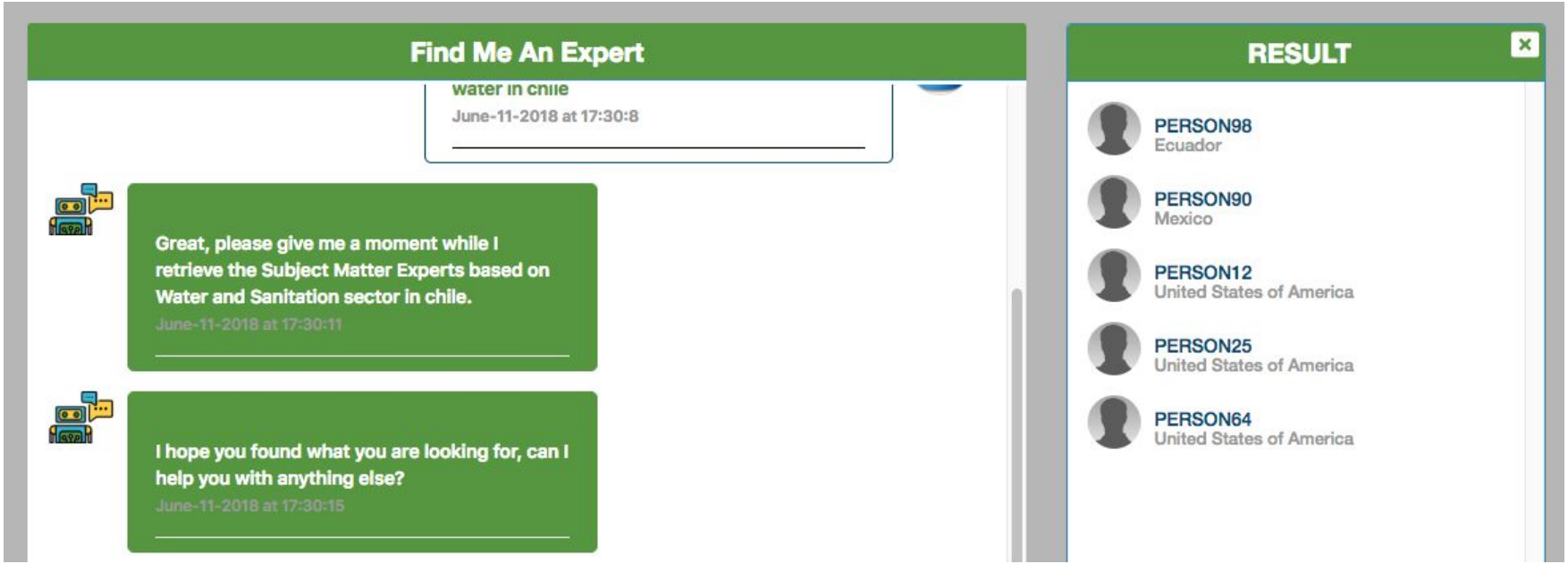
KMBot - Screenshots



When asked a question about SMEs on “Water and Sanitation” subject in the country of Chile, the Chatbot displays the responses, as shown on the right of the screen.

Check out this Chatbot live in action here:
https://findmeanexpert.mybluemix.net/

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KMBot - Screenshots

When the user clicks on the SMEs shown in the results pane, it opens a page that shows exactly why this person is considered a SME and provides a mechanism to connect.
Check out this Chatbot live in action here:
https://findmeanexpert.mybluemix.net/

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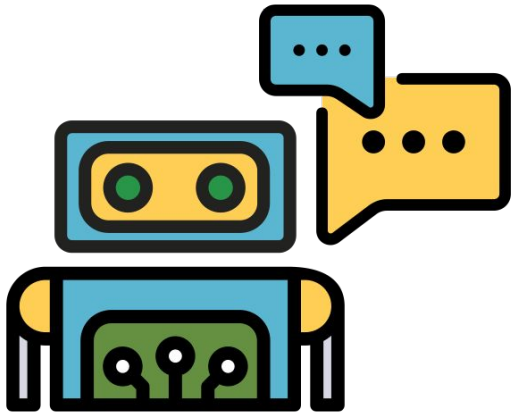
TEbot - the Big Data Advisor

TEbot answers your questions about Big Data technologies and helps you decide on which technologies to use when, why and how.



Check out this TEbot live in action here:
https://bigdata.chat

Chat with other live Chatbots here:
https://syra.ai/live-chatbots/

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TaxHelpBot - the Tax Advisor

TaxHelp Bot answers questions about tax laws and policies for both Federal and local state governments.

Check out this TaxHelpBot live in action here:
http://whichbigdata.com/MikeBot/Embed.html#

Chat with other live Chatbots here:
https://syra.ai/live-chatbots/

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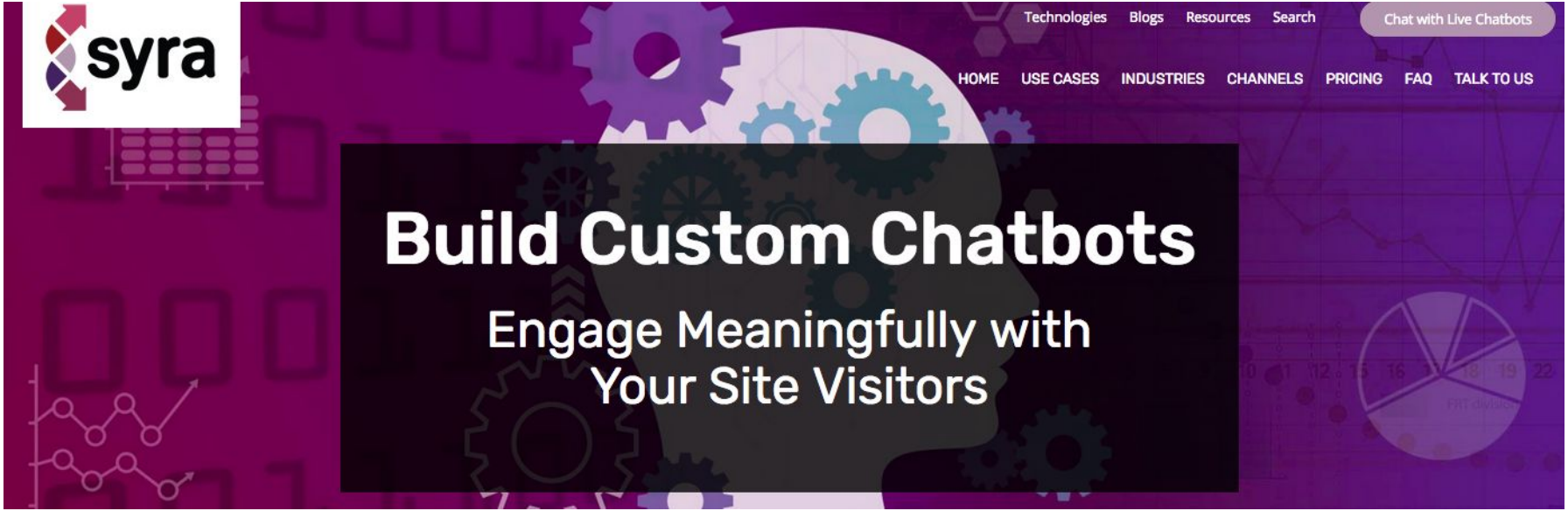
Syra - Build Custom Chatbots



Syra delivers Custom Chatbots that have specific knowledge about your business, services, and products. Easy to use, these Custom Chatbots become fully operational in days and have a low cost of integration.

Chat out the site here:
https://syra.ai

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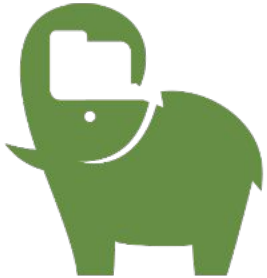

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