

QAD Project Requirements Document (v2)

Team Name: Team TRANSform

Project Name: QAD Virtual Assistant

Company: QAD

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Introduction:

QAD's ERP (Enterprise Resource Planning) platform currently allows users to view and manage a wide variety of data including sales orders, financial statements, and analytics.

Problems/Solutions:

The user may have trouble navigating to a certain action through the current UI. The easiest way to browse data is through a search bar, but even then it can be difficult to find a specific part of the application. This is because QAD's search results give too broad of a range of potential answers, which leads to the search bar becoming not as effective. The search bar is unable to determine what exactly we're looking for. Customers have to contact the support team for technical troubleshooting.

The QAD application is large in size and can be difficult to navigate for both beginners and veteran users. As an ERP, it is essential that the application enhances the user's experience by boasting efficiency and quick-use. Currently in some cases, users will find that they are forced to click through a multitude of tabs (and URLs) to reach their destination.

With the way technology continues to evolve, more and more people are beginning to use virtual assistants in place of manually typing in data. Speech-to-text in the context of the QAD application would be useful in providing free-hand functionality for the user, promoting quick

usage, and creating a more flexible environment so that a user does not have to learn and follow strict guidelines.

Existing technologies:

Siri/Alexa are the biggest examples of virtual assistants that are used by consumers. These assistants have a broad range of understanding ranging from music selection to home temperature adjustments. Instead of breadth, we want to target specific actions in the QAD platform and make sure the assistant can perform those tasks properly. The general approach to NLP is three steps: speech recognition, natural language understanding, and natural language generation.

Hala.ai is an existing virtual assistant for business software. Hala can create a purchase order, add time activity, track time, create invoices, add expenses, post journal entry or make batch transactions in a blink of an eye.

Objectives:

For our use case, we want to specialize language interpretation to understand actions that can be done on the QAD platform. Most actions and views in the application can be reached through a unique URL which includes query strings. Our initial MVP will likely be a REST service that can generate these URLs. The request to this server will include the intended action in plain English, ex. "Edit sales order SO011010", and the response will include the URL that directs the user to the page for editing sales orders. The majority of modern conversational AI applications are built with a classifier that determines the intent of the user. Additional classifiers are used to extract entities in the text that are required to interpret the intent.

Our initial prototype uses Rasa, a framework for building conversational AI, which is written in Python and built on top of spaCy, a Python NLP library. With Rasa, we can define our own training data and labels in .yaml files and configure the training pipeline's hyperparameters. One problem we have to consider is how we will generate enough training data and how we can split the data. After training, the bot can then be deployed as a pre-built Docker image on a Heroku server where our front end React app can interact with it through HTTP requests. Additionally, Rasa X is a testing UI that quickly packages the bot to be sent to others for gathering additional training data. For our MVP, we will build the business logic for a few components on the website such as sales orders and action requests. We can then apply the same logic to other components.

Goals:

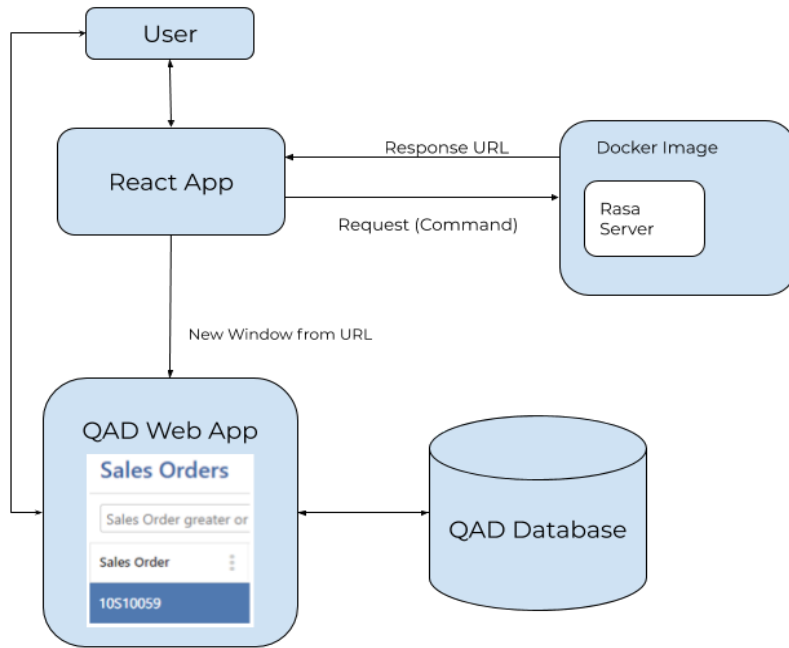
The goal of this project is to create a virtual assistant that interprets natural language commands and finds the appropriate action for the user. This assistant should work similarly to Alexa and Siri, both of which have speech-to-text capability and built-in NLP. Utilizing existing NLP resources, we hope to implement a flexible system that provides a quicker avenue for navigating the QAD application.

- Mapping of each intent and entities to correct URL
- Asking for required fields if user is not specific
- Fast & accurate pipeline for input text
- Chat bot functionality for inputting commands and returning correct URL
- Speech to text capability
- Proper error handling for user permissions and unknown commands
- Integration with QAD platform

Assumptions:

The main audience that this application is targeted towards are manufacturers who need to keep track of their customers, supplies, and orders. We are assuming that the user is familiar with many parts of the QAD platform, but may not remember how to reach specific views. In addition to the actual implementation, we are hoping to put in-place a system that is intuitive so that the user can be guided with recommended options.

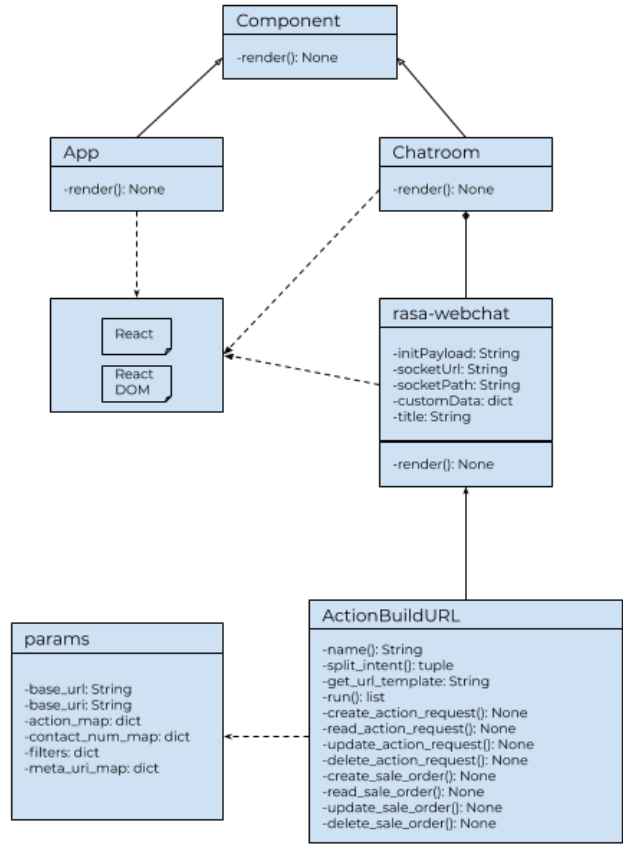
System Architecture:



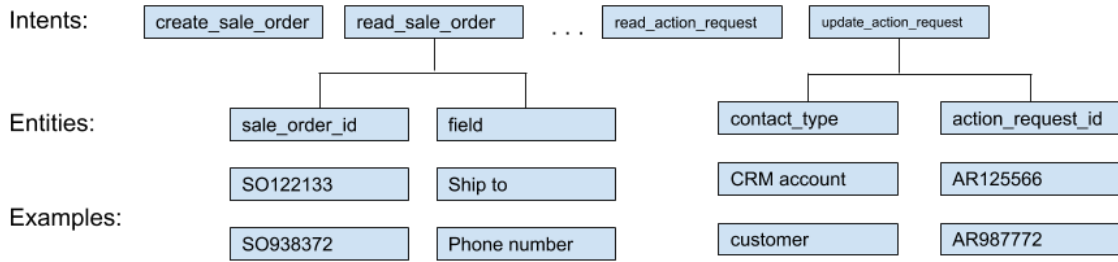
User Workflow:

1. Access web UI chatroom page
2. Input search query (i.e. "Open sales order SO120059")
3.
 - a. Receive response URL from Rasa server which is opened in a new tab, and a message back from the assistant if no errors.
 - b. Assistant prompts for additional information or responds with error message if command is not clear

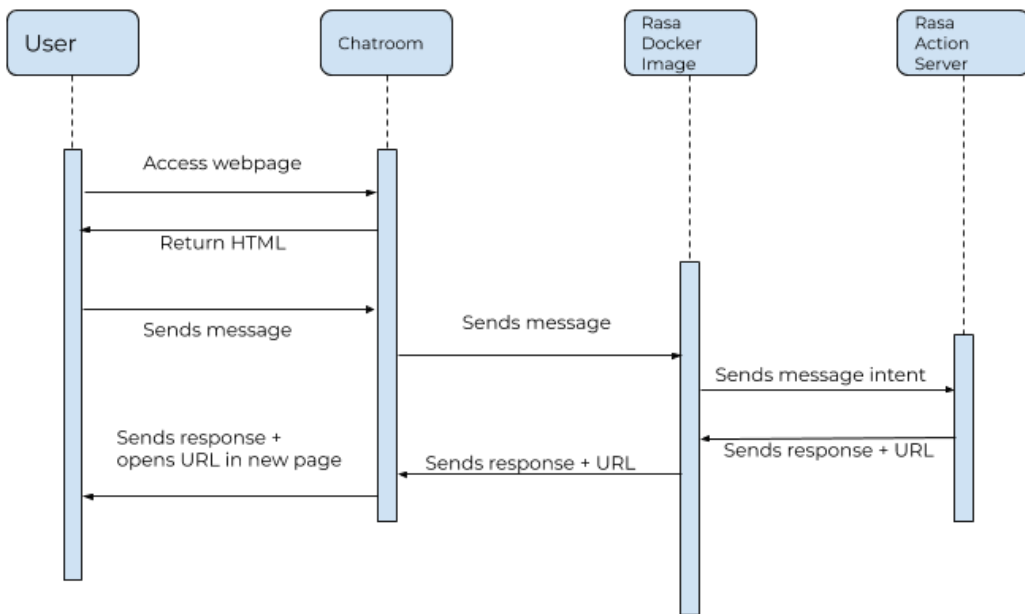
System Models:



Intent/Entity classification:

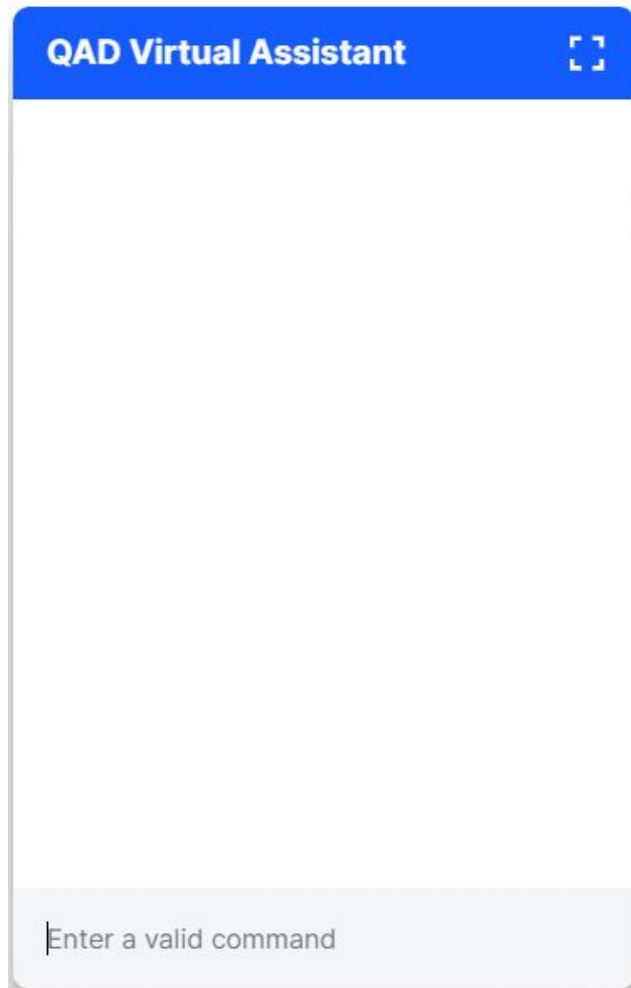


User Sequence Diagram:

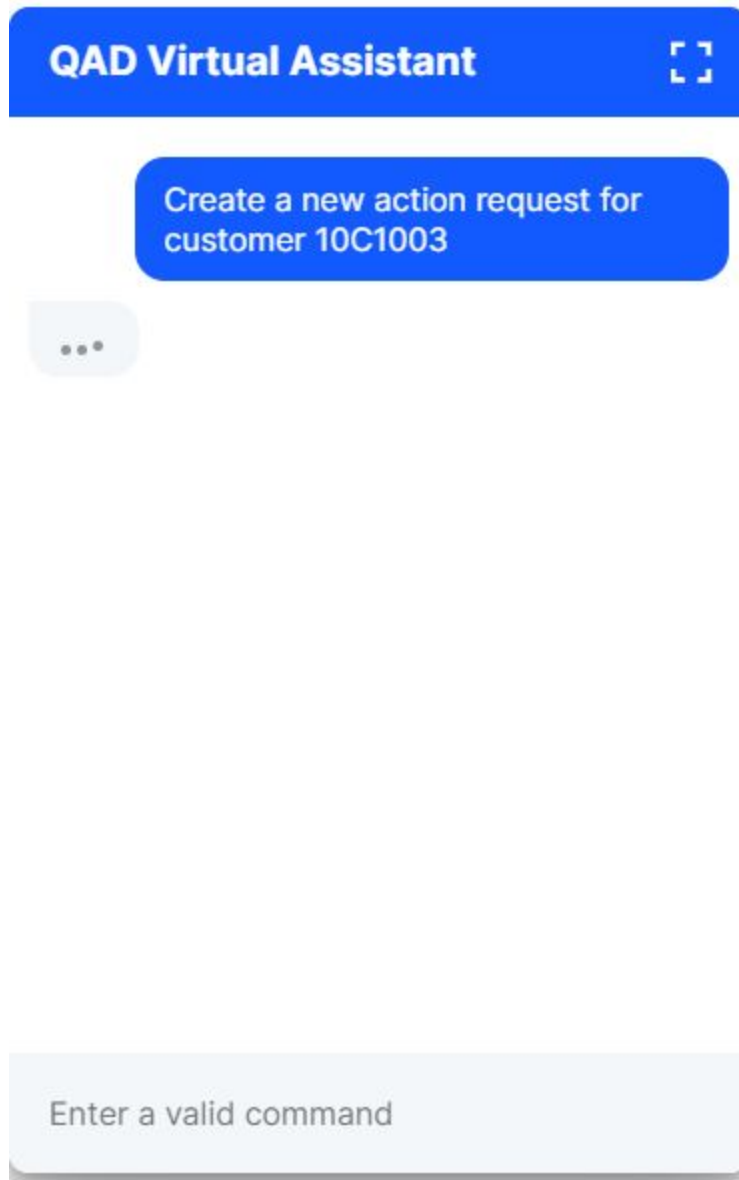


Primary UI:

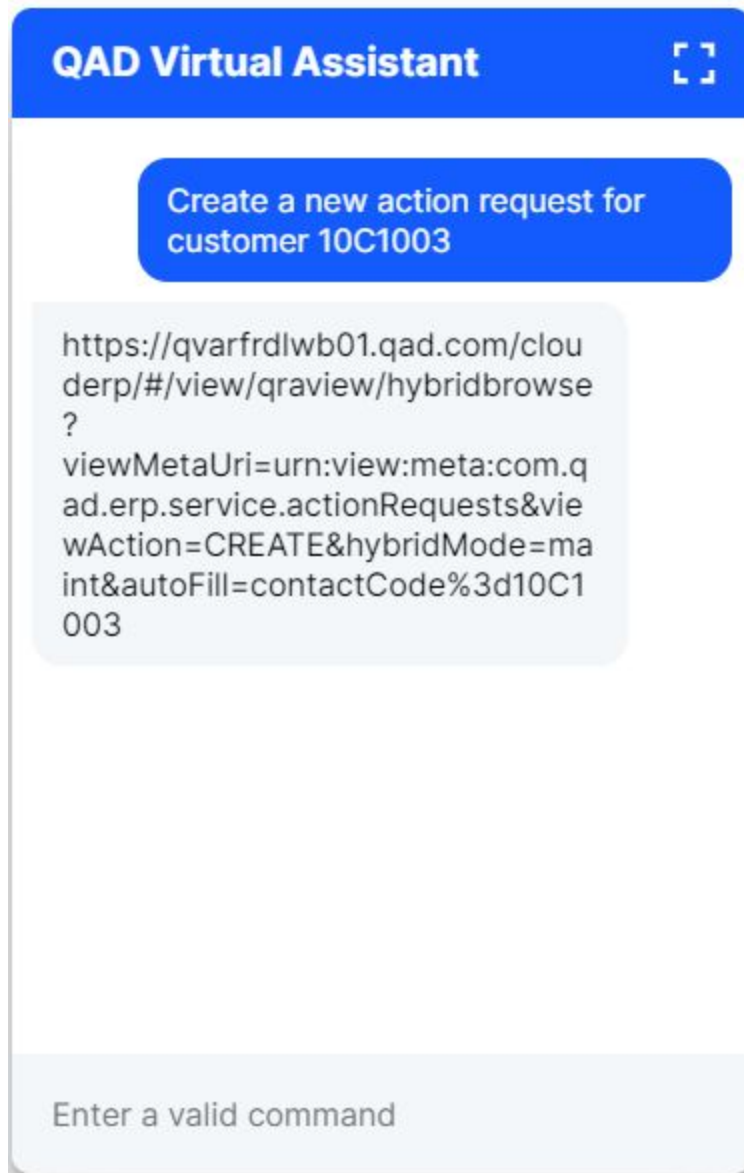
Initial chatroom opens up



User inputs a command and waits for a response

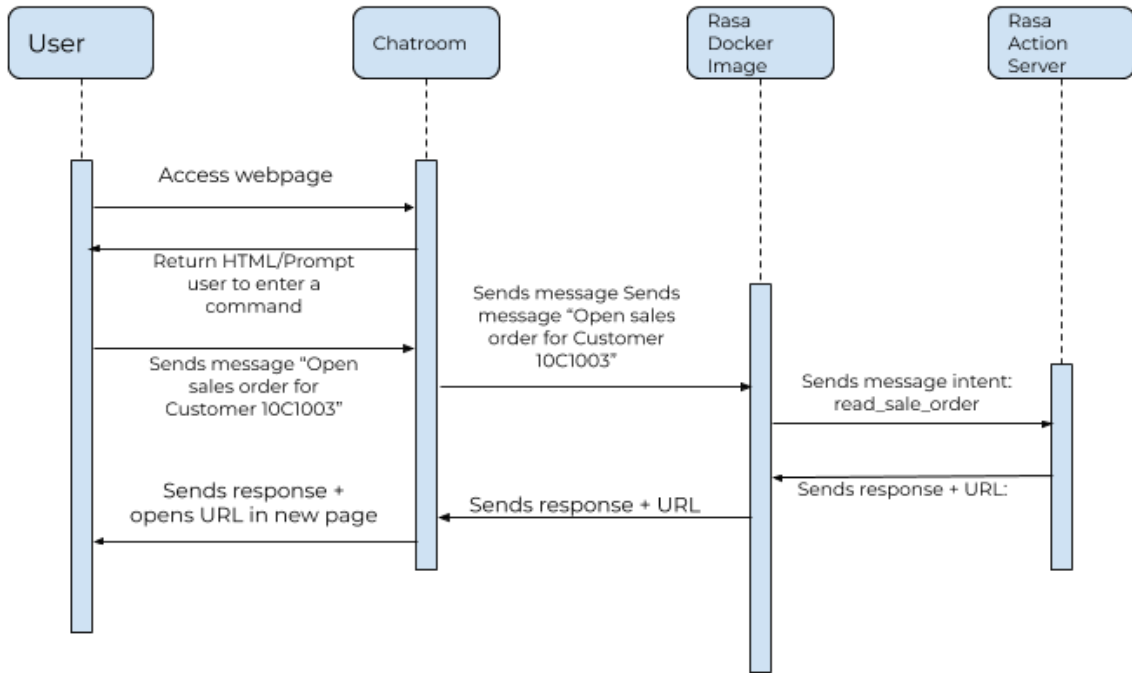


Chat bot responds with the correct URL to the command specified

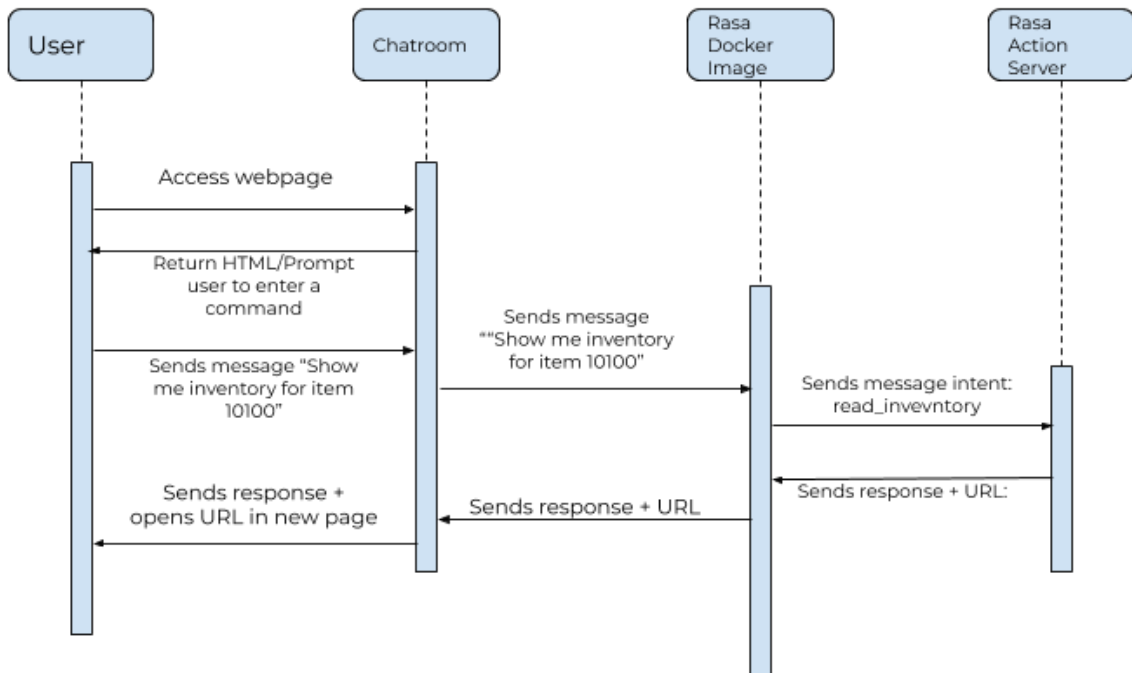


User Interactions Diagrams:

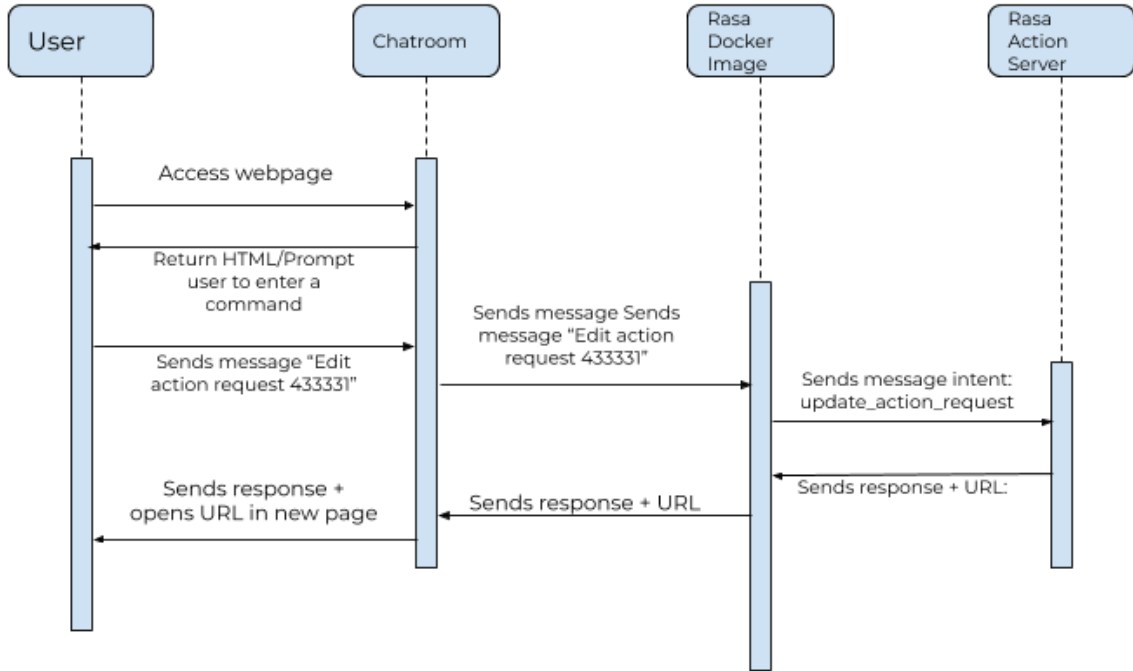
User wants to open the sales order for a customer



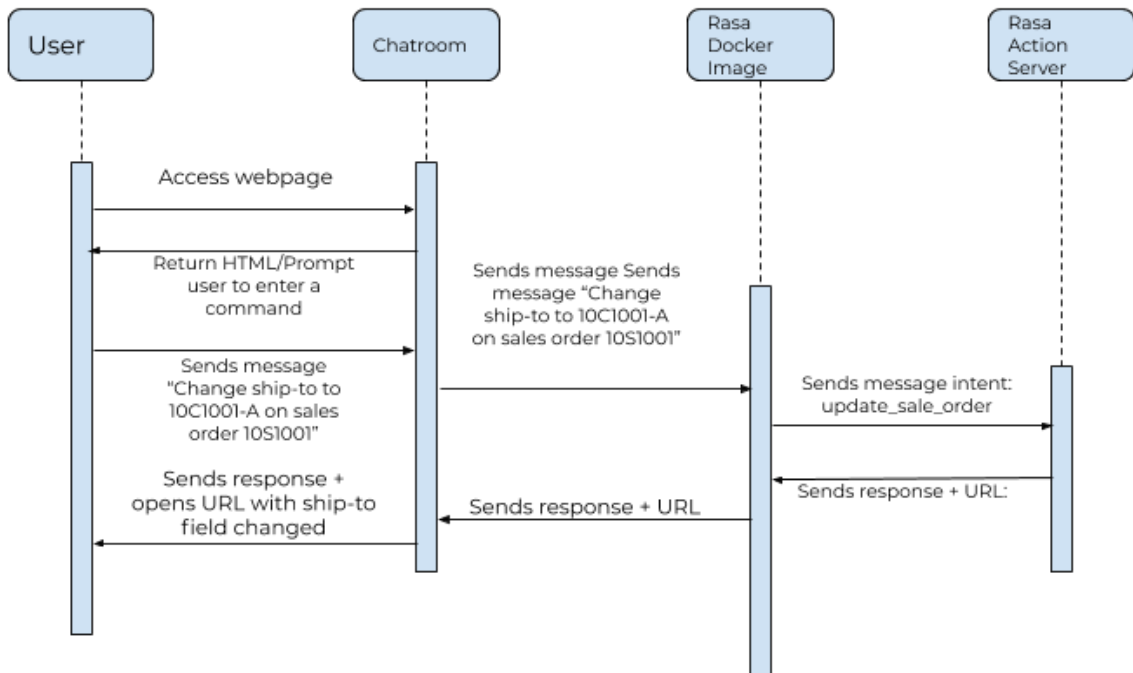
Service Manager wants to get the inventory for a specific item



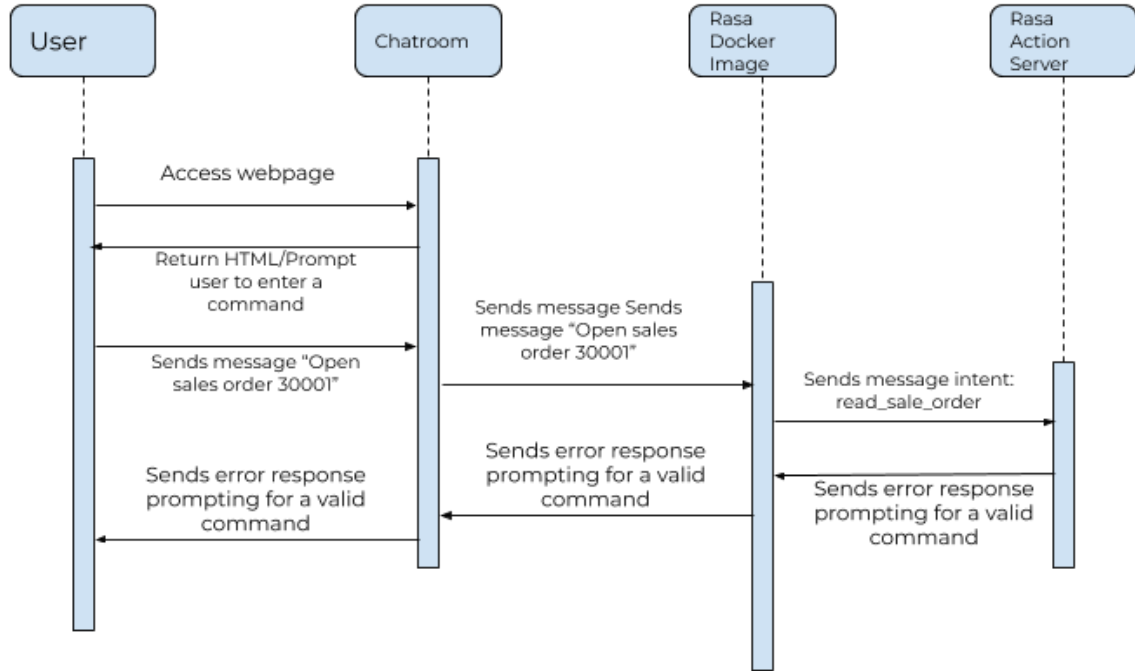
Sales Manager wants to edit an action request



Customer Service Manager wants to edit a field for a sales order

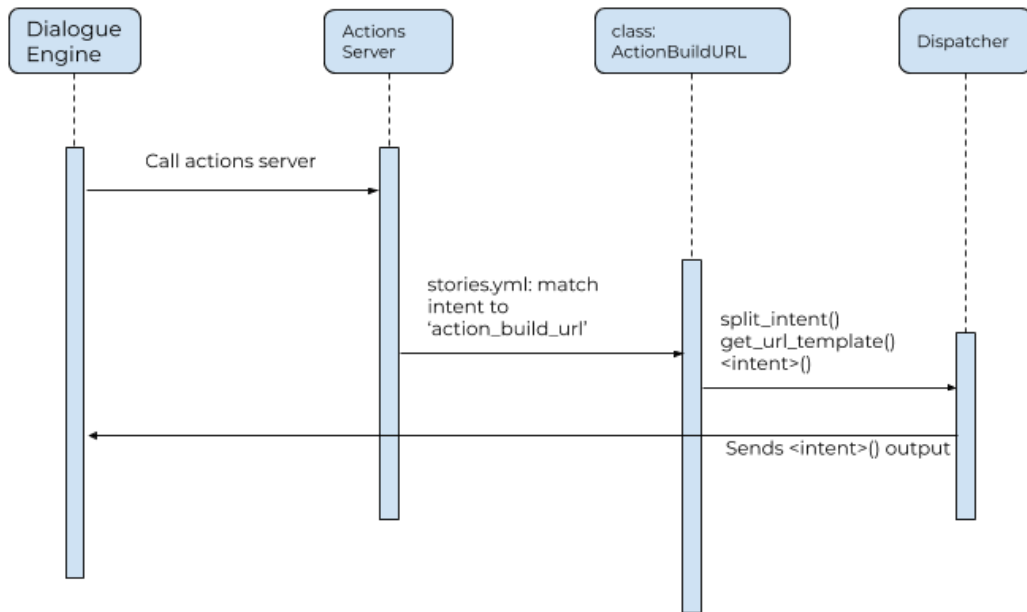


User wants to view a non-existent sales order

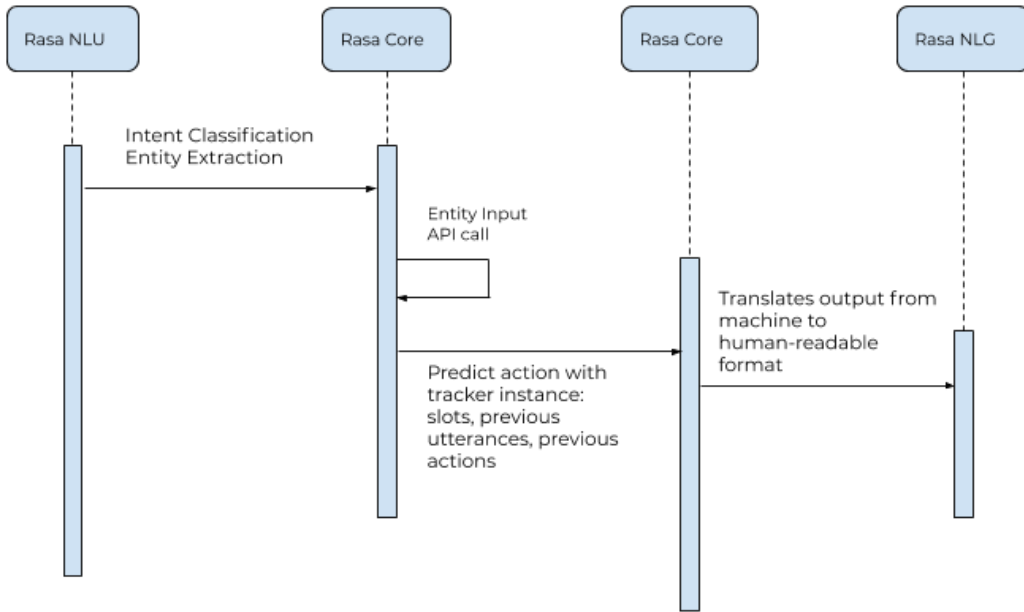


Sequence Diagrams:

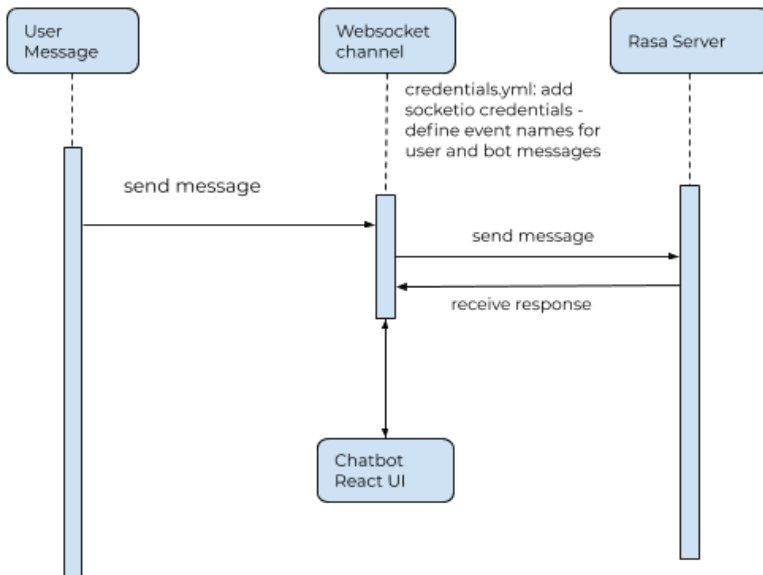
URL extraction from custom action



Machine Learning



Chatbot UI



User Stories/Cases:

User navigation of the QAD application

1. As a user, I can navigate through the QAD platform using commands.
 - a. “Open sales order” would open a browse, “Open [sales order] 10S10035” would open the specific (10S10035) record within the browse.
 - b. Acceptance Criteria:
 - i. The correct window within the ERP application will be brought up based on the user’s command

2. As a user, I can run a query through the QAD platform using commands.
 - a. “Open my requisitions” would apply a filter to the browse and apply a specific stored search, “Run Sales by Customer for year 2020” would run a report.
 - b. Acceptance Criteria:
 - i. The correct query, with filters applied, will be brought up based on the user’s command

3. As a user, I can change data within the QAD platform using commands.
 - a. “Create a new [sales order] for [customer] 10C1001” would create the specific sales order, “Receive unplanned inventory” and “Ship [sales order] 10S1001” would run the specific “action” -- receive and ship, for example.
 - b. Acceptance Criteria:
 - i. The data that the user wants to manipulate/edit is changed correctly within the application

4. As a user, I can contact one another within the QAD platform using commands.
 - a. “Email [or text or call] Gary Weinert at [customer] 10C1001” would, for instance, email, text, or call, “Directions to customer Walmart” would access directions to the specific location.
 - b. Acceptance Criteria:
 - i. The specified communication method wanted by the user will be opened/created for the correct recipient

5. As a user, I can update an action request I made earlier.
 - a. The command “change action request AR192834” should first validate that I am cleared to access that action request’s information and then open up the form to change “AR192834”.
 - b. Acceptance Criteria:
 - i. The user has to have rightful access to the information contained in “AR192834”. The user should then be able to change the fields.

QAD navigation of the QAD application

6. As a Buyer, I want to see which orders are currently available.
 - a. "I want to purchase open orders" will display a list of orders with specific details such as the site, order date, etc. In addition, it will only show the list of open orders with a filtered search to see if the status is open.
 - b. Acceptance Criteria:
 - i. The Buyer can see the list of open orders and proceed to make a purchase of their choice.

7. As a Customer Service Manager, I can keep track of the quantity of a certain inventory.
 - a. In the event that stock shortages may occur, the user could say "Alert me if safety stock for item 01010 drops below 15." This would keep track of the inventory for the specific item or multiple items, and set a notification to alert the user or multiple users in the event that the quantity falls below the threshold.
 - b. Acceptance Criteria:
 - i. The application will keep track of and alert the user about inventories they have specified

8. As a Customer Service Manager, I can make different edits to orders.
 - a. The user could say "Change ship-to to 10C1001-A on [sales order] 10S1001.". This specific command should first access sales order 10S1001, then edit the shipping address for this order to the new location, 10C1001-A.
 - b. Acceptance Criteria:
 - i. The specified order will have the right fields edited with the new information given by the user

9. As a Customer Service Representative, I can ask questions about inventory.
 - a. "How much inventory for 01010 is available at site 10-100?" The expected result would be something along the lines of: "Item: 01010 at Site: 100 has 50.0 EA.", by accessing the inventory list for the site 10-100, then finding the specific item, then returning the quantity.
 - b. Acceptance Criteria:
 - i. The correct quantity for the specified item will be returned to the user, either as a numerical answer or the item will be displayed, with the inventory available on screen.

10. As a Customer Service Representative, I can approve orders for shipping or receiving.
 - a. The command “Ship [sales order] 10S1001.” would move the order 10S1001 into the shipping stage. The command “Receive [purchase order] PS1001.” would allow the order PS1001 to be confirmed, and would allow workers to begin packing the order.
 - b. Acceptance Criteria:
 - i. The application will approve the specified order for being shipped or received

11. As a Sales Manager, I can create a new sales order with autofilled components.
 - a. A sales order can be “sold to”, “billed to”, or “shipped to.” A command of “create a new sales order sold to 21C3019” should create a new sales order and autofill the “sold to” field to have the value “21C3019”.
 - b. Acceptance Criteria:
 - i. The sales order can be created with the sold to field inputted in correctly.

12. As a Sales Manager, I can create a new sales order with multiple autofilled components.
 - a. A command of “create a new sales order sold to 21C3019 and billed to 129420” should create a new sales order and autofill the “sold to” and “billed to” fields to “21C3019” and “129420” respectively.
 - b. Acceptance Criteria:
 - i. The sales order can be created with the sold to and billed to fields inputted incorrectly.

13. As a Sales Manager, I can update the inventory for an item.
 - a. A command of “update inventory for item 03011” should open up the inventory list and bring up the item “03011”
 - b. Acceptance Criteria:
 - i. The item must exist or it will show the default view for inventory. The pulled up information should be for item “03011”.

14. As a Sales Manager, I want to create an action request for a specific contact type.
 - a. A contact type can be a “customer”, a “crm account”, etc. A command of “create an action request for customer 10C1004” should pull up the action request form for “10C1004” with the “contact type” filled out as “customer”.
 - b. Acceptance Criteria:
 - i. The action request will be created with the contact type and customer id field already filled out.

15. As a Sales Manager, I can check the price list to check different types.
 - a. “Open Price List” is an example of a command to open a page of price lists to see what the amount type, quantity type, or combination type it is. A specific price list, for example, PROCON-N will have amount type “Net Price” and combination type “Exclusive” for customer 10C1003.
 - b. Acceptance Criteria:
 - i. The Sales Manager will be navigated to the Price Lists section and can view details for specific price lists.

16. As a QAD Admin, I want to see what happened to a previously approved order.
 - a. The command “Approval Type for link P1010008” will open up the Approval Log to see what happened to the approved order: it will provide its submitted date, status, workspace, and whom it was submitted by. By doing so, I can see the progress this approved order is going through.
 - b. Acceptance Criteria:
 - i. The QAD Admin will be navigated to an opened approval log with details to keep track of a previously approved order.

17. As a QAD Admin, I can view and edit what certain users can access and see if they are active.
 - a. “View User Access” will grant the QAD Admin to see a list of User IDs with their specific usernames and current status (active or not). “Edit User access for [User ID]” will open options the QAD Admin can choose this certain user to have as a role.
 - b. Acceptance Criteria:
 - i. The QAD Admin will be navigated to the list of users or an edit section if they specify a User ID.

18. As a QAD Admin, I want to change a Domain’s time zone.
 - a. “Open Domain Details for the France Division” will display that its domain/search name is 20FRA and its base currency is in EUR (Euro). After realizing that its time zone was set wrong, “Change 20FRA’s time zone” will navigate to a list of time zones that I can choose to change into.
 - b. Acceptance Criteria:
 - i. The QAD Admin will be navigated to a detailed page of a specific Domain and then a list of time zones to change into.

Speech-to-text use-cases

19. As a manufacturer, I am notified that there is a dispute regarding one of the customer's orders. I am currently involved in live-chatting with one of the company's representatives and want to quickly navigate to the customer's page.
 - a. "Open Sales by Customer" is an example of a possible command used to open all the sales from a specific customer. Speech-to-text functionality would allow me to quickly pull up this information on another tab while I continue to maintain contact with the company representative who filed the complaint.
 - b. Acceptance Criteria:
 - i. The specified customer's information page will be pulled up after issuing the command

20. I am a beginner user of the QAD application but I am fully aware of what I need to do. I need to be able to create a note underneath one of the sales to clarify some special instructions. However, given the depth of the QAD application, I can't seem to find the location of that function.
 - a. In plain english, I know that I want to "write a note underneath sales number [10S10059]." The QAD application will be able to interpret this sentence and recognize that a note needs to be written. Even though the statement is not a valid command in itself, the application will be able to use NLP and validate the intention of the statement.
 - b. Acceptance Criteria:
 - i. The user will be navigated to the "Notes" section under the specified sales order

Appendix (Technologies Employed):

Frontend: React, HTML/CSS

Backend: Python

NLP: Rasa