

iNube Internship Report

Application:

837P X12 EDI Maker

Created For:

iNube

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Acknowledgement

I would like to thank iNube for giving me the opportunity to work on this Web Development based Project which helps the organization to seamlessly convert between EDI and JSON formats ,parse EDI documents and syntactically validate the influx of EDI documents.

As a fresher in this industry, this internship really helped me dive deep and really understand the development process of a product Exploring React and Material UI for the frontend really enabled me to acquire a comprehensive understanding of these powerful technologies. Through diligent learning and hands-on experience, I delved into the core concepts of React, such as components, state management, and virtual DOM, allowing me to build dynamic and interactive user interfaces with ease. Additionally, my journey with Material UI provided me with a deep appreciation for its extensive collection of pre-built, customizable UI components, which drastically streamlined the development process. I honed my skills in designing visually appealing interfaces that adhered to Material Design principles, while also leveraging the framework's responsive layout capabilities. Overall, my learning journey with React and Material UI has equipped me with a solid foundation, empowering me to create robust and visually stunning frontend applications.

EDI (Electronic Data Interchange) is highly important in the USA for its numerous benefits. It enhances efficiency by automating document exchange, reducing errors, and minimizing processing time. EDI ensures compliance, provides secure data transmission, and seamlessly integrates with existing business systems, promoting streamlined operations and increased productivity. Overall, EDI plays a vital role in improving business processes and competitiveness in the USA.

Our exploration of the 837 Professional format for EDIs has been highly educational and insightful. By studying this particular format, we have gained a comprehensive understanding of the structure and requirements for electronic data interchange in



the insurance industry. We have delved into the intricacies of the 837 Professional format, including the specific data elements, segment usage, and transaction sets involved in transmitting healthcare claims electronically. This knowledge equips us with the expertise to efficiently process and exchange healthcare claims, ensuring compliance with industry standards and facilitating seamless communication between healthcare providers, payers, and clearinghouses.

I would like to acknowledge the guidance and course corrections from the entire team in iNube and would specifically call out the following people for their guidance

1. Project Guide : Shri. Vikram Nagarajan (Chief Delivery Officer –iNube)



2. Domain Advisor : Shri. Ravichandran Mahalingam (Head Product Engineering – iNube)



I sincerely hope that the output of the project and this report helps iNube meet the project objectives and is to the liking of iNube and its customers, and the future works mentioned in the report are taken up by iNube as a part of their product roadmap.

Thanking You,

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Abstract

The X12 format, also known as ANSI X12, is a widely used standard for electronic data interchange (EDI) in the United States. It is a set of rules and guidelines that define the structure and content of business documents exchanged between trading partners. The X12 format is maintained and published by the Accredited Standards Committee (ASC) X12, which is responsible for developing and maintaining EDI standards.

The X12 format provides a standardized way to transmit various business documents, such as purchase orders, invoices, shipping notices, and payment instructions, among others. These documents are organized into different transaction sets, each with its own unique purpose and structure. The format uses a combination of alphanumeric characters and control segments to represent data elements, loops, and segments within a transaction set.

One of the key advantages of the X12 format is its flexibility and extensibility. It allows for the inclusion of optional data elements and segments, enabling trading partners to customize the information exchanged according to their specific business requirements. Additionally, the X12 format supports different versions and releases, allowing for backward compatibility and smooth migration to newer standards.

Implementing the X12 format requires organizations to develop or acquire software capable of generating, parsing, and validating X12 messages. Several commercial and open-source tools are available to facilitate X12 integration and enable seamless data exchange between business partners.

Overall, the X12 format plays a vital role in streamlining business transactions, reducing manual data entry, and enhancing the efficiency of supply chain operations. Its widespread adoption and ongoing development make it a fundamental component of EDI systems in various industries.

The X12 837 and 835 files are industry standard files used for the electronic submission of healthcare claim and payment information. The 837 files contain claim



information and are sent by healthcare providers (doctors, hospitals, etc) to payors (health insurance companies).



The Problem Statement

However, this X12 837 and X12 835 format is used for hundreds of different healthcare forms regarding general healthcare, dental, and much more. Additionally with hundreds of different healthcare providers in the US, EDI systems become exponentially harder to do.

This is why many companies exist that manually parse form data and turn them into the complex X12 format. The main reason this is so difficult is because of how many different forms can use the same format, and can only be differentiated by certain codes in certain fields. Additionally with thousands of different error codes, it is a huge undertaking to automate the entire process.

For example, if there was a problem here is an example of what could happen for one such form, the CMS 1500:

1. Initial Submission: The insured individual completes the CMS 1500 form, which is the standard claim form used for submitting healthcare insurance claims. The form contains information about the patient, the healthcare provider, and the services provided.
2. Error Identification: If an error is identified on the submitted CMS 1500 form, it could be flagged during the initial review process. Errors might include missing or inaccurate information, such as incorrect patient details, incorrect procedure codes, or incomplete documentation.
3. Notification: Once the error is identified, the insurance company or the designated claims processing entity would typically notify the insured individual about the error. This notification could be in the form of a letter, an email, or a phone call, depending on the preferred communication method specified by the insured individual.



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4. Correction Request: The notification will likely include information about the specific error(s) found on the CMS 1500 form and instructions for correcting them. The insured individual would be requested to make the necessary corrections and resubmit the form.
 5. Corrections and Resubmission: The insured individual should review the notification, identify the errors mentioned, and make the appropriate corrections on the CMS 1500 form. They might need to consult with their healthcare provider or refer to supporting documentation to ensure accurate information is provided. Once the corrections are made, the insured individual should resubmit the form to the insurance company or claims processing entity.
 6. Reevaluation: Upon receiving the corrected CMS 1500 form, the insurance company or claims processing entity will reevaluate the submission. They will review the form for accuracy and completeness and verify if the corrections have been appropriately made.
 7. Claim Processing: If the resubmitted CMS 1500 form is error-free and meets the required criteria, the insurance company or claims processing entity will process the claim. This process involves assessing the claim against the insured individual's policy coverage, determining the eligible benefits, and calculating the amount payable to the healthcare provider.
 8. Reimbursement or Denial: Based on the processed claim, the insurance company will either reimburse the healthcare provider for the covered services or provide an explanation of benefits (EOB) outlining the claim's denial or partial payment. The insured individual may receive a copy of the EOB, which will specify the reasons for denial or any patient responsibilities.

A small error can cause reimbursements and processing to take weeks longer than it needs to be and is a big hiccup in the system. By automating the process, and running all error checking quickly while the individual submits the form, this process can be sped by weeks if not months.



For our 8 week internship, we tackled one such form, the CMS 1500. This form is what is used for health insurance claims, and is the first form we were tasked with working on.



Solution

The objective of the project is to develop a comprehensive form that allows users to input data following the guidelines outlined in the CMS 1500 Health Claim Form. This form will serve as a crucial tool for gathering relevant information from users, such as medical details, patient information, and billing data. The collected data will then be transformed and translated into the X12 EDI format, which is specifically prescribed by the organization for their internal usage.

The form's design and functionality will ensure that it captures all the necessary fields and adheres to the specific data requirements set forth by the CMS 1500 Health Claim Form. By providing a user-friendly interface, the form will guide users through the process, facilitating accurate and efficient data entry.

Once the user submits the form, the system will perform the necessary data processing and transformation. The collected information will be meticulously converted into the client's prescribed X12 EDI format, following the organization's specifications and guidelines. This format ensures seamless integration and compatibility with the organization's existing systems, simplifying the subsequent processing and utilization of the data.

By implementing this form, the organization will benefit from streamlined data collection, eliminating the need for manual data entry and reducing the potential for errors. The utilization of the X12 EDI format enhances data interoperability, allowing for smooth data exchange and integration across various systems and stakeholders within the organization.

Overall, the development of this form and its integration with the CMS 1500 Health Claim Form and X12 EDI format will significantly improve the organization's data management processes, facilitating accurate data capture, efficient data transformation, and seamless data integration for enhanced operational efficiency and effectiveness.



Executive Summary

For the Frontend, the React framework was used. For the UI , Material UI was used as suggested.We converted the form input into a [JSON file , with an arbitrary format](#) as per our convenience.Then we converted this JSON into a [Stedi supported JSON format](#) as per their website.Stedi provides us with APIs and services to create scalable, in-house EDI integrations or modernize existing EDI systems. Stedi has [Guides](#) which are a layout of the data in the X12 file.

We imported one such guide titled '[X12 HIPAA 837P Health Care Claim Professional X222A2](#)'. . This was fulfilling all out requirements.After importing the Guide we used the [Mapping](#) feature to fit our JSON into a Stedi Supported JSON format .This can be automated using the “Core” product offered by Stedi.However for demo purpose we have used their UI directly for one individual file.

The mapping was done in synch with the Data provided by the client about the placeholder of the various values of the form.This JSON is converted into an X12 format , using the [API call](#).The X12 data is received as a datastream in the terminal and can be further utilised.

Github link: <https://github.com/Yas-Has/cms1500-form>



Preliminary Investigation

The core of our problem statement was to build a valid JSON to EDI converter . The format for all such EDI's was well established by the US Administration. However, while there was a wide range of documentation regarding the same , it was inconsistent.

This was our first challenge , to compile a single authentic database about the mapping of fields in the CMS 1500 form to the EDI 837P that we needed to deliver. We referred many documents (check sources) and came upon the finding that there were more than one version of the same 837P EDI format . We selected the 837P HIPAA approved version and continued on the research.

837 P stands for Professional and is used for submitting commercial Health care Claims.

After compiling this data , we started searching for ways to convert the form data into an EDI format. We started off by using JavaScript and iterating field by field basis over all the CMS1500 form fields. However this was a slow and tedious process that required a lot of code .This large size of the code incurred inefficiencies and was costing time.

Faced with this challenge we started looking for readily available products which could be used to produce the EDI required . Some of the products we came across are listed below:-

1. [IPWorks EDI](#) contains components that facilitate secure EDI messaging, as well as EDI mapping, translation and validation (X12, EDIFACT, HL7, TRADACOMS, VDA, XML & JSON).
2. Zenbridge is a platform built with the "developer experience" as the focal point. It has a robust and easy to use API network to work with EDIs



3. Concord has developed a Snowflake-based application that converts the X12 data to JSON format, which is much easier to use within interoperability standards such as FHIR.

etc...

However after weighing in the pros and cons of all of these products we used **Stedi**. It is a platform that allows you to Parse your first EDI file in minutes. Create end-to-end flows with complete visibility into your transactions. We can extend Stedi's event-driven architecture to fulfill any requirement.

Additionally, the X12 format had many different codes and abbreviations for fields on the form. As these are not readily available to the public, we used iNube's company spreadsheets to find the correct mappings. These mappings did not have everything, so we mapped as much as we could, leaving the rest to the Stedi API.



The Frontend

For the front end of our website, our goal was to create the form as close to the original form as possible. This was to make it as simple as possible for the consumer, as many of the targeted users of this product might not be very tech savvy.



The form:

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12. PATIENT'S OR AUTHORIZED PERSON'S SIGNATURE I authorize the release of any medical or other information necessary to process this claim. I also request payment of government benefits either to myself or to the party who accepts assignment below																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
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24. A. DATE(S) OF SERVICE MM DD YY To MM DD YY				B. NAME OF SERVICE EMG	C. D. PROCEDURES, SERVICES, OR SUPPLIES (e.g., Plan, Unusual Circumstances) CPT/HCPCS	E. MODIFIER	F. DIAGNOSIS CODE POINTER	G. DAYS OF UNITS	H. EPDS/T Parity No.	I. ID QUAL	J. RENDERING PROVIDER ID. #																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
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25. FEDERAL TAX I.D. NUMBER SSN EIN				26. PATIENT'S ACCOUNT NO.		27. ACCEPT ASSIGNMENT? <input type="checkbox"/> YES <input type="checkbox"/> NO		28. TOTAL CHARGE \$ 0.00		29. AMOUNT PAID \$		30. Rsvd. for NUCC Use																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
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31. SIGNATURE OF PHYSICIAN OR SUPPLIER INCLUDING DEGREES OR CREDENTIALS (I certify that the statements on the reverse apply to this bill and are made a part thereof.)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
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Our Screens:

Section 1 Select <input type="button" value="▼"/> Insurance ID Number Please select your Insurance provider Please enter your Insurance ID Number		
Section 2 Patient's Last Name <input type="text"/> Please enter patients last Name Patient's First Name <input type="text"/> Please enter patients First Name MI <input type="text"/> M. Initial	Section 3 Enter Patient's Birthday <input type="text" value="07/06/2023"/> Enter Patient's Gender <input type="button" value="Gender ▼"/>	Section 4 Insured's Last Name <input type="text"/> Please enter Insured's Last Name Insured's First Name <input type="text"/> Please enter Insured's First Name MI <input type="text"/> M. Initial
Section 5 Enter Patient's Address: Address <input type="text"/> City <input type="text"/> State <input type="text"/> Zip ... <input type="text"/> Phone Number <input type="text"/>	Section 6 Please select your relationship to the patient: <input type="button" value="Select ▼"/> Section 8 Reserved for NUC use <input type="text"/> Reserved for NUC use	Section 7 Enter Insured's Information: Address <input type="text"/> City <input type="text"/> State <input type="text"/> Zip ... <input type="text"/> Phone Number <input type="text"/>
Section 9 Other Insured's Name <input type="text"/> Please enter the name of the other insured Other Insured's Policy or Group Number <input type="text"/> Please enter the policy or group number of the other insured Reserved for NUCC use <input type="text"/> Please enter the reserved for NUCC use Reserved for NUCC use <input type="text"/> Please enter the reserved for NUCC use Insurance plan or program name <input type="text"/> Please enter the insurance plan or program name	Section 10 Is patient's condition related to: Employment? <input type="button" value="▼"/> Auto Accident? <input type="text"/> Place(state) <input type="text"/> Other? <input type="button" value="▼"/> CLAIM CODES(Desi... <input type="text"/>	Section 11 Insured's Policy Group or FECA # <input type="text"/> Insured's Date of Birth <input type="text" value="07/06/2023"/> Enter Insured's Gender <input type="button" value="Gender ▼"/> OTHER CLAIM ID (Designated by NUCC) <input type="text"/> Insurance Plan Name or Progra... <input type="text"/> Is there another health benefit plan? <input type="button" value="Yes or No ▼"/>
<input type="button" value="Submit"/>		



Dashboard

Draft: 726 | Submitted: 726 | Validation Response: 726

Form Details

Form No.	Submitted By	Names	Mobile number	Status
1020010221	John Doe	William Bradley Pitt	+91-742-873-0894	Draft
1020010221	John Doe	Angelina Jolie Voight	+91-385-915-9817	Draft
1020010221	John Doe	Leonardo Wilhelm DiCaprio	+91-981-234-5678	Submitted
1020010221	John Doe	Margot Elise Robbie	+91-981-234-5679	Draft
1020010221	John Doe	Robert John Downey Jr.	+91-981-234-5680	Rejected
1020010221	John Doe	Dwayne Douglas Johnson	+91-981-234-5681	Submitted
1020010221	John Doe	Jennifer Joanna Aniston	+91-981-234-5682	Rejected
1020010221	John Doe	Bradley Charles Cooper	+91-981-234-5683	Submitted

HEALTH INSURANCE CLAIM FORM

APPROVED BY NATIONAL UNIFORM CLAIM COMMITTEE (NUCC)

1. MEDICARE MEDICAD TRICARE CHAMPVA GROUP HEALTH PLAN FECA BLK LUNG OTHER

2. PATIENT'S NAME (Last Name, First Name, Middle Initial)

3. PATIENT'S BIRTH DATE MM DD YYYY M F

4. INSURED'S NAME (Last Name, First Name, Middle Initial)

5. PATIENT'S ADDRESS (No,Street)

6. PATIENT'S RELATIONSHIP TO INSURED Self Spouse Child Other

7. INSURED'S ADDRESS (No,Street)

8. RESERVED FOR NUCC USE

9. OTHER INSURED'S NAME (Last Name, First Name, Middle Initial)

10. IS PATIENT CONDITION RELATED TO

a. EMPLOYMENT? (Current or Previous) YES No

b. AUTO ACCIDENT? PLACE (state) YES No

c. OTHER ACCIDENT? YES No

d. INSURANCE PLAN NAME OR PROGRAM NAME

10d. CLAIM CODES (Designated by NUCC)

11. INSURED'S POLICY GROUP OR FECA NUMBER

a. INSURED'S DATE OF BIRTH MM DD YYYY M F

b. OTHER CLAIM ID (Designated by NUCC)

c. INSURANCE PLAN NAME OR PROGRAM NAME

d. IS THERE ANOTHER HEALTH BENEFIT PLAN? YES NO if yes, complete sections 9,9a and 9d

12. PATIENT'S OR AUTHORIZED PERSON'S SIGNATURE I authorize the release of any medical or other information necessary to process this claim. I also request payment of government benefits either to myself or to the party who accepts assignment below

Click here to add Signature

DATE

13. INSURED'S OR AUTHORIZED PERSON'S SIGNATURE I authorize payment of medical benefits to the undersigned physician or supplier for services described below

Click here to add Signature



Summer Internship 2023 Write-Up



Project Setup and Dependencies

We kickstarted our front-end development by creating a new React app using the command 'npx create-react-app [name]'. We then installed the necessary libraries, including Material UI and Axios, to leverage their functionalities within our application. By utilizing the Material UI components, we were able to seamlessly integrate form fields that closely resembled the CMS-1500 form.

Modular Structure and Code Organization

To maintain code readability and manageability, we adopted a modular approach. Each section of the CMS-1500 form was separated into its own file and folder within the project structure. This organization facilitated easy navigation and focused development efforts on specific sections.

Material UI Integration

Our front-end application utilizes the Material UI library, which provides a rich set of pre-designed and customizable UI components. By referring to the Material UI documentation, we implemented various input fields, such as text fields and select fields, ensuring that they closely resembled the corresponding fields on the CMS-1500 form. This approach allowed healthcare professionals to interact with the application intuitively, as they were already familiar with the physical form.

Real-Time Data Updates with useState

To ensure that the application stays updated with user input in real-time, we employed React's useState function. By utilizing the useState hook, we maintained individual state variables within each section file. Whenever a user interacted with a text field, the onChange event triggered a function that updated the respective state variable with the latest value. This approach allowed for dynamic data management and immediate response to user input.

Data Handling with useEffect

React's useEffect function played a crucial role in handling data synchronization and passing it to the main 'App.js' file. Whenever a user clicked a button within a text field, the useEffect hook triggered a function to send the updated data to the main file. This



mechanism ensured that the data from each section was collected and compiled in the 'App.js' file until the submit button was clicked.

Data Collection and Submission

In the main 'App.js' file, we integrated the individual sections using custom components and passed a prop function to handle data changes. When a change occurred in a particular section, the prop function received the updated data. This function then processed and stored the data appropriately, preparing it for submission or further processing.

- Time savings: The digital form entry and automatic conversion eliminate manual data entry, saving valuable time for healthcare professionals.
- Error reduction: Real-time validation and data integrity checks minimize human errors, resulting in more accurate information.
- Scalability: The app's modular structure allows for easy expansion and incorporation of additional features, catering to evolving needs and regulations.
- Integration potential: The standardized X12 format facilitates seamless integration with existing healthcare systems, ensuring smooth data exchange.



The Backend

Introduction

During the development process, we employed a series of steps to ensure the seamless conversion of the form input data into the desired X12 EDI format. Firstly, we converted the user-submitted form input into a JSON file. This JSON file had an arbitrary format that we defined based on our convenience and the requirements of the project.

Using Stedi

To further align the JSON file with the specifications supported by Stedi, a service provider for scalable, in-house EDI integrations, we transformed the JSON file into a Stedi supported JSON format. Stedi offers APIs and services that facilitate the creation of EDI integrations or the modernization of existing EDI systems. To achieve this, we referred to the documentation and guides provided by Stedi, which offer detailed layouts of the data in the X12 files.

The screenshot shows the Stedi EDI Specification interface. At the top, there's a navigation bar with icons for back, forward, search, and download. The URL is stedi.com/app/guides/view/hipaa/health-care-claim-professional-x222a2/01GRYB6EJ999Y6... . Below the URL are buttons for 'Specification' and 'EDI Inspector'. On the right, there are 'Share' and 'Import' buttons. The main content area has a header 'X12 HIPAA / Health Care Claim: Professional (X222A2)'. Below it, it says 'X12 Release 5010 Revised March 4, 2023'. There's a 'Print' button. The main text describes the X12 Transaction Set, mentioning its use for submitting health care claim billing information. It details the environment (EDI), participants (payers, providers, clearinghouses), and various entities involved like insurance companies, HMOs, PPOs, Medicare, Medicaid, etc. It also explains the roles of payers, administrators, and regulatory agencies. A note specifies that providers may include physicians, hospitals, medical facilities, suppliers, dentists, and pharmacies. The text continues to describe the hierarchical nature of the transaction set, mentioning loops like 1000A and 1000B, and specific segments like NM1 and PRV. A legend at the bottom defines symbols: Delimiters (~), Segment (*), Element (>), Component (^), and Repetition (^). The right side of the interface displays a detailed tree view of the transaction structure, with sections for Overview, HEADING, and DETAIL, each listing specific segments and their descriptions.



The screenshot shows the Stedi EDI Inspector interface. At the top, there's a navigation bar with icons for back, forward, search, and other tools, followed by the URL 'stedi.com/app/guides/view/hipaa/health-care-claim-professional-x222a2/01GRYB6EJ999Y6MZ53ZB...'. Below the URL are buttons for 'Specification' and 'EDI Inspector'. To the right are 'Share', 'Import', 'Valid' (with a checkmark), 'Reset', 'Rich', and 'JSON' buttons.

In the center, there are two panes. The left pane displays the X12 HIPAA file content with line numbers from 1 to 27. The right pane shows the corresponding JSON mapping with line numbers from 47 to 75. A 'Format' button is located between the two panes.

```
1 ST*837*0021*005010X222A2~  
2 BHT*0019*00*244579*20061015*1023*CH~  
3 NM1*41*2*PREMIER BILLING SERVICE*****46*TGJ23~  
4 PER*IC*JERRY*TE*3055552222*EX*231~  
5 NM1*40*2*KEY INSURANCE COMPANY*****46*66783JJT~  
6 HL*1*20*1~  
7 PRV*BI*PXC*203BF0100Y~  
8 NM1*85*2*BEN KILDARE SERVICE*****XX*9876543210~  
9 N3*234 SEAWAY ST~  
10 N4*MIAMI*FL*33111~  
11 REF*EI*587654321~  
12 NM1*87*2~  
13 N3*2345 OCEAN BLVD~  
14 N4*MIAMI*FL*33111~  
15 HL*2*1*22*1~  
16 SBR*P**2222-SJ*****CI~  
17 NM1*IL*1*SMITH*JANE***MI*JS00111223333~  
18 DMG*D8*19430501*F~  
19 NM1*PR*2*KEY INSURANCE COMPANY*****PI*999996666~  
20 REF*G2*KA6663~  
21 HL*3*2*23*0~  
22 PAT*19~  
23 NM1*QC*1*SMITH*TED~  
24 N3*236 N MAIN ST~  
25 N4*MIAMI*FL*33413~  
26 DMG*D8*19730501*M~  
27 CLM*26463774*100***11>B>1*Y*A*Y*I~
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47 },  
48 "detail": {  
49   "billing_provider_hierarchical_level_HL_loop": [  
50     {  
51       "billing_provider_specialty_information_PRV": {  
52         "provider_code_01": "BI",  
53         "reference_identificationQualifier_02": "PXC",  
54         "provider_taxonomy_code_03": "203BF0100Y"  
55       },  
56       "billing_provider_name_NM1_loop": {  
57         "billing_provider_name_NM1": {  
58           "entityIdentifierCode_01": "85",  
59           "entityTypeQualifier_02": "2",  
60           "billingProviderLastOrOrganizationalName_03": "BE",  
61           "identificationCodeQualifier_08": "XX",  
62           "billingProviderIdentifier_09": "9876543210"  
63         },  
64         "billing_provider_address_N3": {  
65           "billing_provider_address_line_01": "234 SEAWAY ST"  
66         },  
67         "billing_provider_cityStateZipCode_N4": {  
68           "billing_provider_cityName_01": "MIAMI",  
69           "billing_provider_stateOrProvinceCode_02": "FL",  
70           "billing_provider_postalZoneOrZipCode_03": "33111"  
71         },  
72         "billing_provider_taxIdentification_REF": {  
73           "referenceIdentificationQualifier_01": "EI",  
74           "billingProviderTaxIdentificationNumber_02": "587654321~  
75     }
```

Guides

Specifically, we imported a guide titled 'X12 HIPAA 837P Health Care Claim Professional X222A2', which fulfilled all our requirements for the project. This guide served as a reference for the structure and organization of the X12 file. Once the guide was imported, we utilized the Mapping feature provided by Stedi to map and align our JSON data with the Stedi supported JSON format. Stedi's "Core" product offers automation capabilities for this mapping process, but for the purposes of the demo, we manually used Stedi's user interface (UI) to map a single individual file.



The screenshot shows the Stedi Mappings interface. On the left, the 'Source' section contains a hierarchical tree of data sections like 'section_three', 'section_four', 'section_five', etc., with specific field values such as 'dob' and 'zip'. In the center, the 'Target' section shows how these fields are mapped to X12 segments. A red box highlights the 'section_five' section in the source, and a red arrow points from it to the corresponding mapping in the target. The 'Output' section on the right displays the generated JSON/X12 code, which includes segments like 'communication_number_06', 'pay_to_address_name_NM1', and 'pay_to_address_address_N3'. Another red box highlights a portion of the output JSON.

```
JSON Output (highlighted area):
"communication_number_06": "XX",
"communication_number_qualifier_07": "TE",
"communication_number_08": "XXXXXX"
}
],
},
"pay_to_address_name_NM1_loop": [
  "pay_to_address_name_NM1": {
    "entity_identifier_code_01": "87",
    "entity_typeQualifier_02": "2"
  }
],
"pay_to_address_address_N3": {
  "pay_to_address_line_01": "100 Clown Avenue",
  "pay_to_address_line_02": "XX"
},
"pay_to_address_city_state_zip_code_N4": {
  "pay_to_address_city_name_01": "Nevada",
  "pay_to_address_state_code_02": "Los Angeles",
  "pay_to_address_postal_zone_or_zip_code_03": "82801",
  "country_code_04": "+02 477900982"
},
"subscriber_hierarchical_level_HL_loop": [
  {
    "subscriber_information_SBR": {
      "payer_responsibility_sequence_number_code_01": "P",
      "individual_relationship_code_02": "Wife"
    }
  }
],
```

Mapping to Stedi Supported format

The mapping process was performed in synchrony with the data provided by the client, specifically the placeholder values of the various form fields. This ensured that the JSON data was accurately mapped to the corresponding fields in the X12 format. After successful mapping, the JSON data was converted into an X12 format using an API call provided by Stedi.(refer index)



```
1  var express = require('express');
2  var fs = require('fs')
3  var app = express();
4  var cors = require('cors');
5  app.use(cors());
6  app.use(express.json());
7  const {adjustData} = require('./handleData.js');
8  // const dt = require('./x12/data.js')
9  // const apiKey = `I5voCCM.0NXUF8YqWjzkXAc6FrAiEDEb`
10 // const guideId = `01H3XNQPDW5QTFQSQ1SRANPSAZ`
11 const axios = require('axios')

12

13

14 app.post('/tofile', function(request, response){
15     console.log(request.body);      // your JSON
16     const changedData = adjustData(request.body)
17     const filedata = JSON.stringify(changedData)
18     fs.writeFileSync('data1.json', filedata);
19     response.send('Saved');      // echo the result back
20 });
21

22 app.get('/toform',function(request, response){
23     var obj = {};
24     fs.readFile('data.json', 'utf8', function (err, data) {
25         if (err) throw err;
26         obj = JSON.parse(data);
27         response.json(data);
28     });
29 })
30
```

Making the API call

Upon making the API call, the X12 data was received as a datastream in the terminal by the following process:



1. It retrieves the necessary data from a file (data.js) that contains information in a specific JSON format.
2. It uses an API key (apiKey) to authenticate and gain access to a service called Stedi, which helps with translating data into a different format.
3. The code specifies the guide ID (guideId), which is like a predefined template that tells Stedi how to convert the JSON data into a specific format called X12. This format is commonly used for exchanging information in the healthcare industry.
4. It utilizes the axios library to send a request to the Stedi API, providing the guide ID, the JSON data from the file, and other necessary information.
5. The Stedi API then takes the provided JSON data and performs the necessary conversion, transforming it into the X12 format based on the guide's specifications.
6. Once the conversion is complete, the Stedi API sends back the converted data as a response.
7. Finally, the code logs the response data, which represents the JSON data converted into the X12 format.

The code takes JSON data, uses Stedi's service to convert it into a different format (X12), and logs the resulting converted data for further use.

This X12 datastream can be further utilized and integrated within the organization's systems for processing, storage, or transmission to other stakeholders involved in the claim processing workflow.

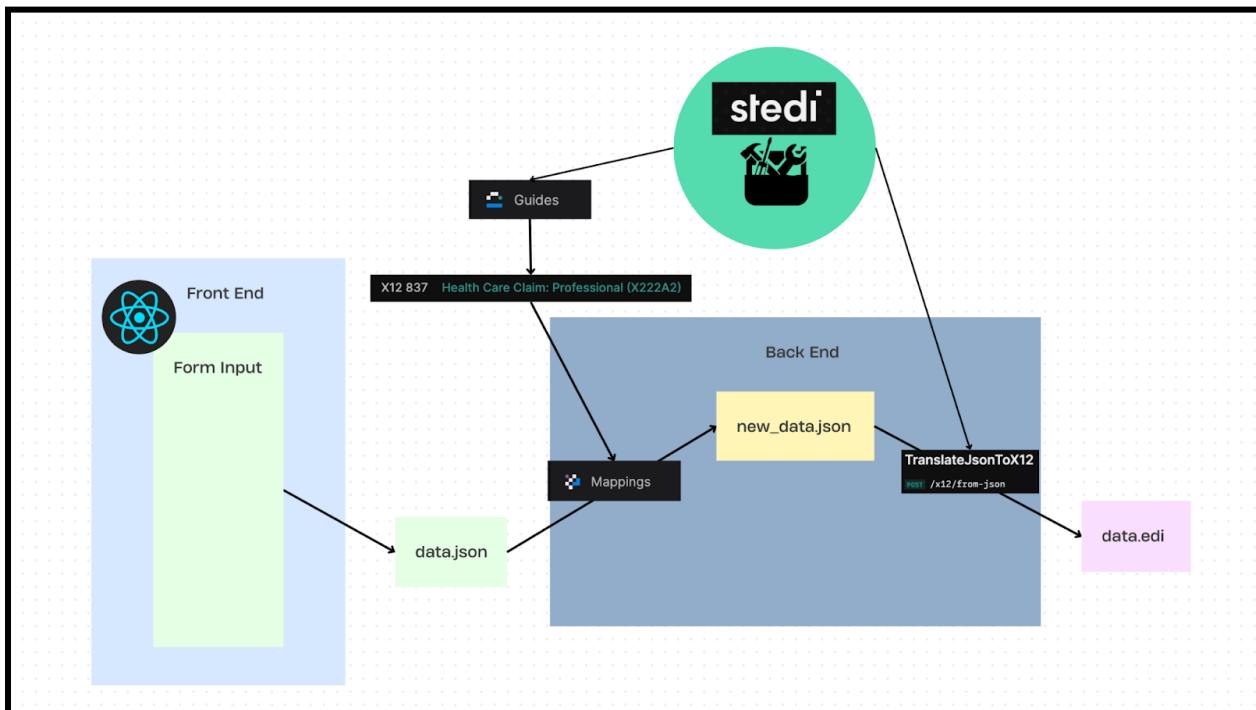




PROBLEMS DEBUG CONSOLE OUTPUT GITLENS TERMINAL

source /Users/priyangshumazumder/Projects/djanproj/venv/bin/activate
● priyangshumazumder@Priyangshus-MacBook-Air x12 % source /Users/priyangshumazumder/Projects/djanproj/venv/bin/activate

● (venv) priyangshumazumder@Priyangshus-MacBook-Air x12 % node server.js
done
{
 output: 'ISA*00* *00* *ZZ*ME *ZZ*YOU *220815+1320*~*00501*000000012*0*P*~>G
S*PO*ME*YOUR DEPT*20220815+132052*00000001*X*005010X222A2~ST*837*0001*005010X222A2~BHT*0019*00*XXXX*20230627*0505*31~
NM1*40*2*X*****46*XXXX~NM1*41*2*X*XXXXXX*XXX**46*XXX~PER*IC*XXX~EM*XX~TE*XXXXX~EM*XXXXX~HL*1*20*1~PRV*BI*PXC*MC~CUR*
85*XXX~NM1*85*1*X*XXXX*XXXXXX*XX*XXX~N3*XXXXX*XXX~N4*XXXXXX*XX*XXX~REF*EI*XXXXXX~REF*0B*XX~PER*IC*XXXXXX~
FX*XX~FX*XX~TE*XXXXXX~NM1*87*2~N3*100 Clown Avenue*XX~N4*Nevada*LA*82801*LA~NM1*PE*2*XXX*~~*PI*XXXX~N3*XX*XXXXXX~N4*
XXXX*XX*XXXX*XX~REF*2U*X~REF*EI*XXX~HL*2*1*22*1~SBR*P*18*X*XXXXX*12*~~*MC~PAT*~~*DB*XXXXXX*01*0*Y~NM1*PR*2*XXXX*~~*P
I*XXXXXX~N3*X*XXXX~N4*XXXXX*XX*XXXXXX*XX~REF*LU*XXX~REF*FY*XX~NM1*IL*2*X*Madonna*XXX*~Ganbootin*II*XXXXXX~N3*100 C
lawn Avenue*XXXXXX~N4*Nevada*LA*82801*LA~DMG*D8*XXXX~M~REF*Y*4*XXXX~REF*SY*XXXXXX~PER*IC*XXX~TE*XXXX~EX*XXXX~CLM*XX*0*
XX>B>X*N*A+N*Y*P*AA>XXX>>XX*03***8~DTP*439*D8*XXXX~DTP*453*D8*XXXX~DTP*435*D8*XXXX~DTP*090*D8*XXXX~DTP*296*D8*
XXXX~DTP*314*RDB*XXXXXX~DTP*096*D8*XXX~DTP*471*D8*XXX~DTP*454*D8*XXXX~DTP*484*D8*XX~DTP*304*D8*XXXX~DTP*297*D8*XXXX
~DTP*455*D8*XXXX~DTP*431*D8*XXXXXX~DTP*444*D8*X~DTP*050*D8*XXXX~PKW*RR*FT***AC*XX~CN1*05*0*0*XXXX*0*XXX~AMT*F5*0~REF*
9C*XXXX~REF*1J*XX~REF*D9*XX~REF*X4*XX~REF*P4*XX~REF*LX*X~REF*EW*X~REF*F5*XXXX~REF*EA*XXX~REF*F8*XXXX~REF*G1*XXX~REF*
9F*XX~REF*9A*XXX~REF*4N*XXXXXX~K3*X~NTE*TP0*XXXX~CR1*LB*0**E*DH*0**~XXX*XXXXXX~CR2*~~~~*G*XXXXXX*XX~CRC*07*Y*12*XXX
*XX*XX*XXX~CRC*Z*Y*ST*XX*XXX~CRC*75*Y*IH~CRC*E1*N*L1*XXX*XX*XXX~HI*B>XXXXXX~B0>XXXX~HI~B>X*BG>XXXXXX~B>X*BG>XXXX
X*BG>XXXXXX~BG>XX*BG>XX*BG>XXXXXX~BG>X*BG>XXXXXX~BG>XXX~HI~B>XXXX~ABF>XXXX~BF>XXX~ABF>XXXXXX~BF>XXXX~BF>XX~ABF
>XX~BF>XXXXXX~BF>XXXXXX~BF>X*BF>XX~ABF>XXXX~HCP*05*0*0*XXXX*0*XXXX*0*0*XXXX*0*0*XXXX*0*0*XXXX*0*0*XXXX*0*0*XXXX
XX*XXX~NM1*PW*2~N3*XXXXXX*XXXXXX~N4*XXXXXX*XX*XXX~NM1*P3*1*XXXXXX*XXXX*0*XXX*XX~XX~REF*1G*XXX~NM1*82*2*X*XX~XXXXXX
**XXXX*XX~XXXX~PRV*PE*PXC*XX~REF*1G*XXXXXX~NM1*77*2*X*~~*XX*XXXXXX~N3*XX~XX~N4*XXXXXX*XX*XXX~XX~REF*G2*XXXXXX~PER*IC*
XX~TE*XXX~EX*XXX~NM1*DQ*1*XXXXXX*XXXX*XXXXXX*XX*XXXXXX~REF*1G*XXXX~SBR*D39*XXXXXX*XX*15*~~*CH~CAS*C0*XXXX*0*0*X
XXX*0*0*XXXX*0*0*X*0*0*X*0*0~AMT*D0*0~AMT*A8*0~AMT*EAF*0~0I***W*P*Y~M0A*0*0*X*XX*XXXX*XXXXXX*0*0~NM1*85*2
~REF*LU*XXX~NM1*PR*2*X*XX*~~*PI*XX~NM1*X*XXXX~N4*XXXXXX*XX*XXXXXX*XX~DTP*573*D8*XXXX~REF*T4*X~REF*F8*XXXX~REF*G1*XXX
XXX~REF*9F*XXXX~REF*NF*XX~NM1*DN*1~REF*0B*XX~NM1*82*1~REF*1G*XXXXXX~NM1*77*2~REF*0B*X~NM1*DQ*1~REF*LU*XXX~NM1*IL*2*X*XX
*XX~XX*XXXXXX~II*XXXX~N3*XXXXXX*XXXXXX~N4*XX*XXX*XXXX~REF*SY*XXXX~LX*0~SV1*ER>XXXX~XX>XX>XX~XXXXXX*0*UN*0*X*0*0~
>0>0**Y*Y*Y*Y*~0~SV5*HC>XXXXXX~DA*0*0*0*1~PKW*CT~NS~PKW*RT~EL***AC*XXXXXX~CR1*LB*0**A*DH*0*0*X*XXXXXX~CR3*I*M0*0~CRC*07
*Y*04*X*XX*XXX*XXX~CRC*09*Y*ZV*XXX~CRC*70*N*65~DTP*463*D8*XX~DTP*607*D8*XX~DTP*454*D8*XX~DTP*461*D8*X~DTP*304*D8*XX~D
TP*455*D8*XX~DTP*471*D8*XXX~DTP*472*D8*XXX~DTP*011*D8*X~DTP*739*D8*XXXX~QTY*PT*0~QTY*FL*0~MEA*0G*R3*0~CN1*06*0*0*XX
XX*0*XXXXXX~REF*9D*XXXXXX~REF*F4*XXXXXX~REF*BT*XXXXXX~REF*6R*XX~REF*EW*XXXX~REF*G1*X*2*U>XX~REF*9F*XX*2*U>XX~REF*F4*XX~R
EF*9F*XX~AMT*F4*0~AMT*T~0~K3*XXXXXX~NTE*DCP*X~NTE*TP0*X~PS1*XXXXXX~REF*H0*0*0*XXXXXX*0*~PKW*XXXXXX~REF*W*XXXXXX~REF*0*T5*3*
~LIN~N4*XXXX~CTP*~~*0*ME*REF*FY*XXXX~NM1*45*2*XXXXXX~N3*XXX~XX~N4*XXX~XX*XXXX~XX~REF*G2*XXXX~*2*U>X~PER*IC*XXXX~TE*X*EM*XXXX~FX
*XXXX~NM1*QB*1*~~*XX*XXXXXX~REF*0B*XX*2*U>X~NM1*DN*1*X*XXXXXX~XX*XX*XXXX~XX~REF*G2*XXXX~*2*U>XX~NM1*82*1*X*XXXXXX~
XXXXXX~XX*XXXXXX~XX*XXXXXX~PRV*PE*PXC*X~REF*G2*XXX*2*U>XXXX~NM1*77*2*X*~~*XX*XXXXXX~N3*XX*XXXX~N4*XXXXXX~XX*XXX~R



Conclusion

Overall, by leveraging Stedi's services, guides, and APIs, we were able to seamlessly convert the form input data into the required X12 EDI format, ensuring compliance with industry standards and facilitating efficient integration with existing systems.





Conclusion

Our React-based front-end application revolutionizes the conversion of CMS-1500 forms to the X12 format by providing a user-friendly interface and leveraging the power of React's useState and useEffect functions. By closely mimicking the structure of the CMS-1500 form through the Material UI library, we ensure familiarity and ease of use for healthcare professionals. Through real-time data updates and efficient data handling, our application streamlines the data collection process and sets the stage for accurate CMS-1500 to X12 conversions.

Our backend system, powered by the STEDI API, revolutionizes the conversion of CMS-1500 forms to the X12 format by streamlining the complex data transformation process. By leveraging STEDI's mapping tool and conversion mechanisms, we provide healthcare professionals with a reliable, efficient, and accurate solution. Through seamless integration, our backend system simplifies the conversion workflow, enabling healthcare organizations to enhance data management, streamline processes, and ensure compliance with industry standards.

Integration with STEDI API:

Our backend system relies on seamless integration with the STEDI API to leverage its powerful features. By utilizing the API's capabilities, we benefit from a proven and reliable solution for healthcare data transformation. This integration allows us to efficiently harness STEDI's mapping tool and conversion mechanisms, enabling a smooth and automated conversion process.

Benefits and Future Enhancements:

Our backend system, powered by the STEDI API, offers numerous benefits for healthcare professionals and organizations, including:

1. Streamlined conversion process: By automating the transformation from CMS-1500 to X12, our backend system eliminates the need for manual data entry and complex mapping, saving time and reducing errors.



2. Enhanced accuracy and compliance: The STEDI mapping tool ensures precise alignment of data between the CMS-1500 and X12 formats, enhancing accuracy and compliance with industry standards.
3. Scalability and flexibility: The modular design of our backend system allows for easy scalability, accommodating evolving data requirements and future enhancements.
4. Integration possibilities: The backend system can be seamlessly integrated with other healthcare systems and data sources, facilitating efficient data exchange and interoperability.

However , we can also empower our backend in the future iterations to mimic the functionalities offered by STEDI API and develop a backend workflow independent of the API.

Further , we plan to enhance our backend system by incorporating additional validation checks, expanding support for various data formats, and integrating with external systems, bolstering its functionality and usability.



Credits and Sources

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3. <https://www.stedi.com/docs/api>
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5. <https://www.nsoftware.com/ipworksedi/>

For the X12 Docs :

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2. https://www.superiorhealthplan.com/content/dam/centene/Superior/Provider/PDFs/SHP_20161520-Transaction-Standards-Companion-Guide-P-05162016.pdf
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