IBM Cloud Pak for Business Automation Demos and Labs 2022

Capture

IBM Automation Document Processing

V22.0.2

Lab Automation Document Processing

V 2.0

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1. Overview

1.1 Getting HELP during the lab

- Slack channel on #cp4ba-tech-jam-capture.
- For internal IBM, another good resources the Archive slack channel for questions: #cp4ba-adp-lab or https://ibm-cloud.slack.com/archives/C01LVVBMWPN
- For external participants besides the Slack channel, use the Webex chat if you are in a webex event or just speak up
- For others, email bakercl@us.ibm.com. This method will be slower and will be best effort. It may require jumping on a Webex meeting to provide help.
- Getting help after lab reach out to the following:
    - bakercl@us.ibm.com
    - krishkirsh@us.ibm.com
    - rmsparks@us.ibm.com

1.2 Abstract

Set up a capture solution in minutes. Introduce technical sellers to IBM Automation Document Processing. In this session, students will configure their own capture project. They will learn how to use machine learning classification for their sample documents, define fields for extraction, create validation rules, and use deep learning* (subject to environment configuration) to automate data extraction.

1.3 Introduction

Welcome to the Automation Document Processing lab. This lab will introduce you to Document Processing and provide you with an understanding how you can configure it for your customer opportunities.

Automation Document Processing provides a tailored solution that reads your documents (in English, French, Spanish, German, Dutch, Portuguese), extracts data, and refines and stores the data for use.

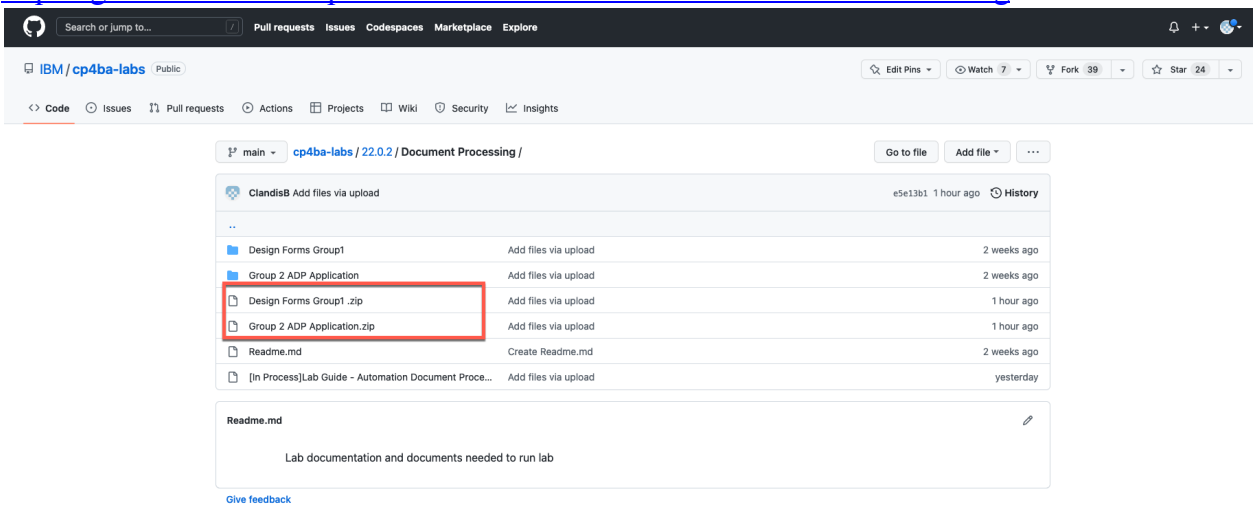
With the right business knowledge, you can design deep learning models without being a data scientist. The Document Processing Designer includes pre-trained deep learning models that you can use as a base for your own model. The pre-trained document types include bills of lading, invoices, and utility bills.

You can extract text, check boxes, forms, tables, barcodes, signature detection and even free text. With no or low code options, you can create an application that processes documents, extracts data, flags issues, and stores your documents and data. And the data enrichment capabilities ensure that the extracted data is standardized and ready for use in downstream integrations.

This lab will not cover all the available functionality available due to time constraints. Additional labs will be created in the next few months to add to your knowledge and understanding of Document Processing.

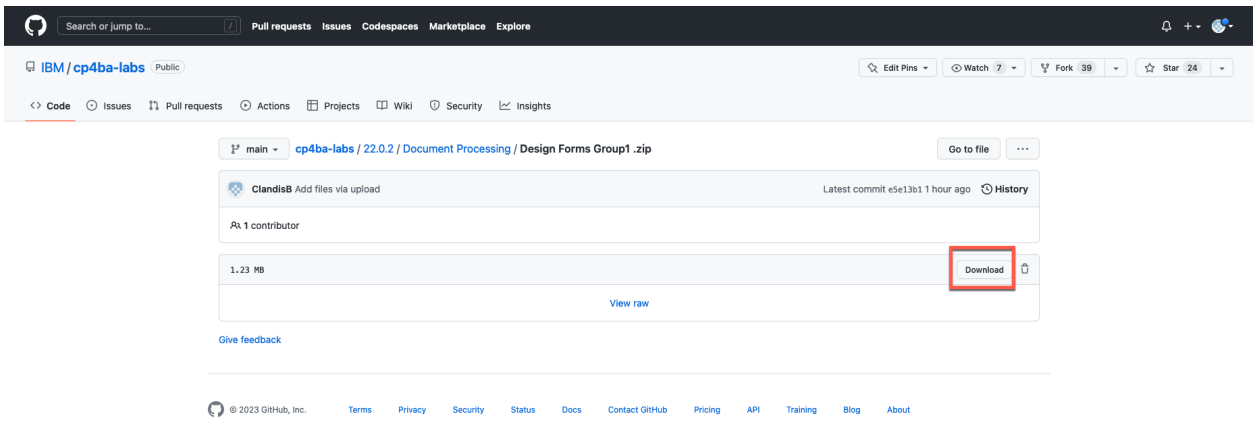
2 Getting started

Download the sample documents in the zip file. You can find them here:
https://github.com/IBM/cp4ba-labs/tree/main/22.0.2/Document%20Processing



_1. **Click** on “Design forms Group1.zip”.

_2. Then **Click** on **Download**



_3. **Repeat** above steps **“Group 2 ADP Application.zip”**

You will notice the images are in various folders that will be referenced in the lab later on.

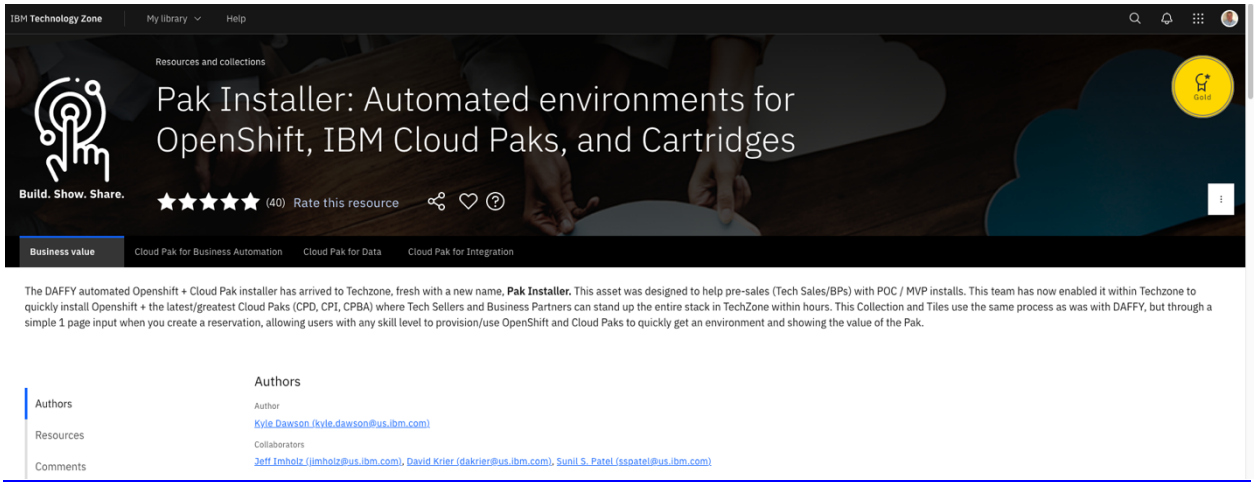
2.1 IBM TechZone – Reserve the environment.

What is IBM TechZone?
IBM Technology Zone (techzone.ibm.com) enables IBM teams and IBM Business Partners to provision technical “Show Me” live environments, Proof-of-Technologies, prototypes, and

Minimum Viable Prototypes, which can be customized, shared with peers and clients to experience IBM Technology.
Learn more: https://techzone.ibm.com/collection/onboarding#tab-1

2.1.1 Credentials

_1. Navigate to https://techzone.ibm.com/collection/63457fcba311ed0018ca2442

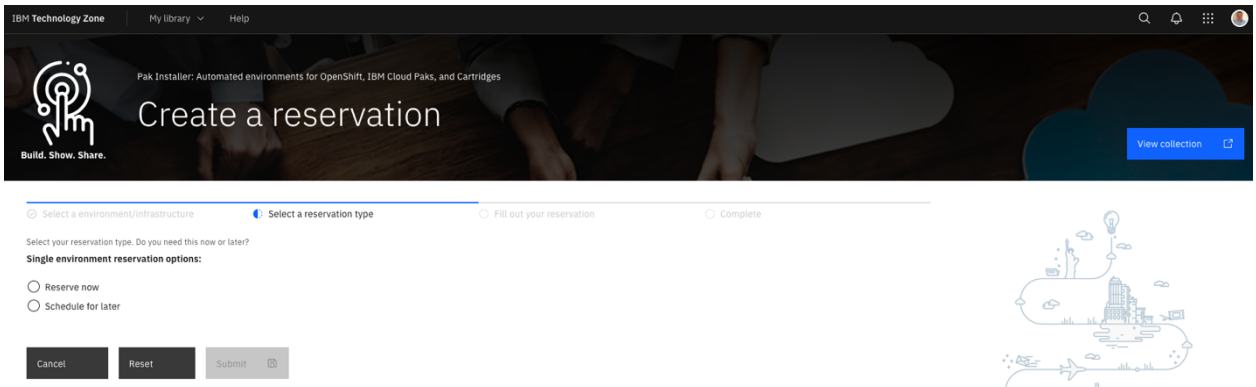


Note: This environment is built with Daffy by Kyle Dawson with the latest releases. This environment can also be used at a customer site with same tool and framework of Daffy.

_2. **Click Cloud Pak for Business Automation** tab and **scroll down** to the "Cloud Pak for Business Automation 22.01/22.0.2 – VMWare tile.

_3. **Click** on **Reserve**

_4. On Create a reservation screen **select option** for when to start



_5. Create a Reservation

Based on the reservation type you are making, provide the required information

Customer Demo : Need a short customer-facing demonstration

Practice/Self-Education: Need to gain experience

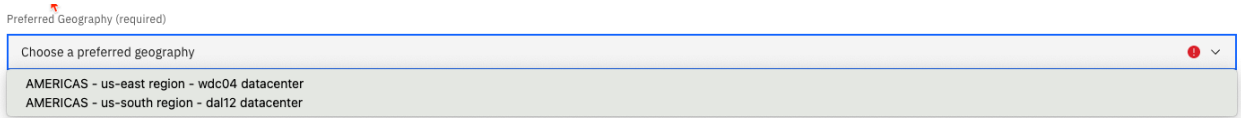
Standard proof of concept; Need an environment for a standard product use case.

Custom Proof of concept: Need a complex, customized environment.

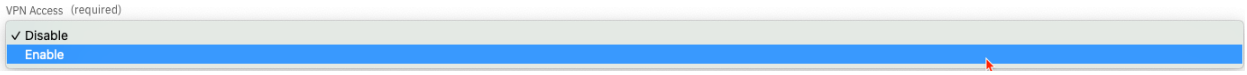
T*esting*: Need to test a specific function, configuration, or customization.

_6. For this lab **Testing** will give you 3 days plus the option to extend it for another week. Otherwise, you will need a legitimate opportunity to leverage another reservation type.

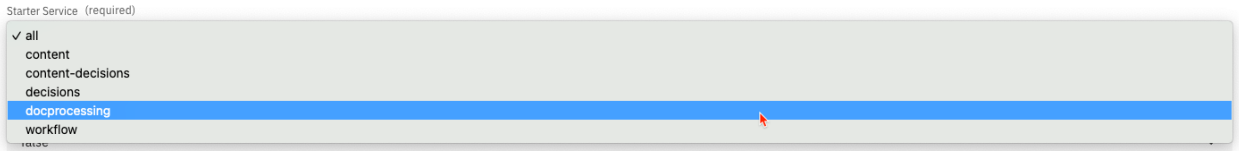
_7. For Preferred Geography (required) select your preferred data center location



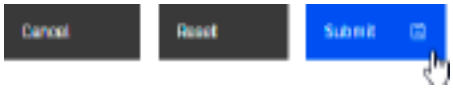
_8. For VPN Access **choose Enable**



_9. For Starter Service **choose docprocessing**



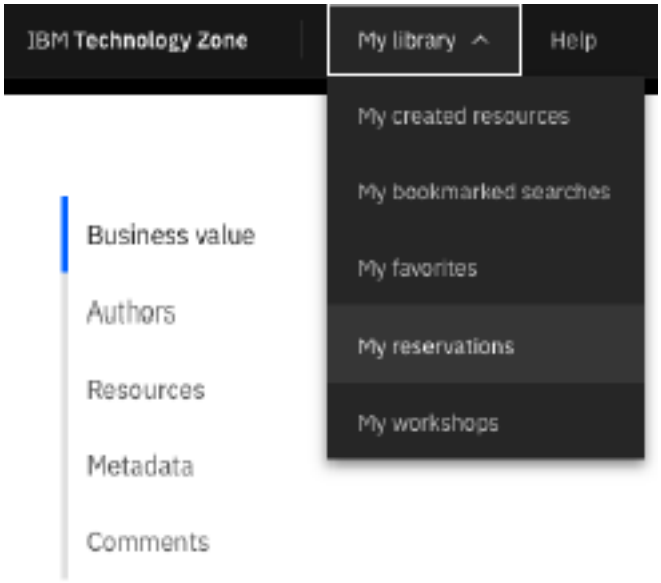
_10. **Click Submit**



Upon receiving the Your environment is ready email, please allow up to 1 hour for the start-up services to fully complete. If after receiving email and a few hours have passed and your environment is not up, check Appendix A – Trouble Shooting for possible fix. Once the start-up process is complete you can click on the links identified in the email. However, it is recommended that you review your reservation information from the IBM Technology Zone – My reservation site.

_11. **Click My reservations**

_12. Once you get the email from the IBM Technology Zone site, you can access your environment reservation(s) by **clicking** on the **My library** then **My Reservations**

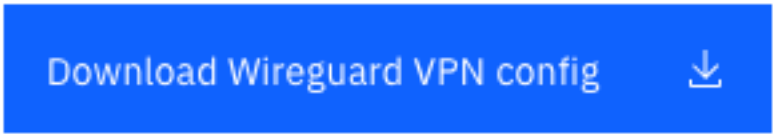


You can also access directly using the link below
https://techzone.ibm.com/my/reservations

2.2 Set up WireGuard VPN

_4. **Open** your reservation tile and scroll to bottom.

_5. **Click Download WireGuard VPN config** button to download conf_wg_download.conf to your local workstation

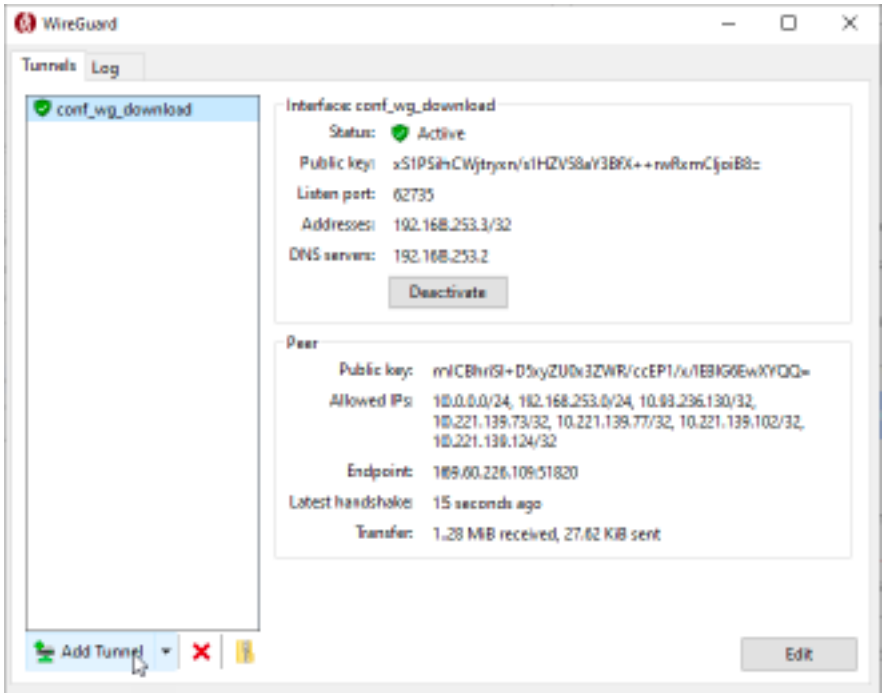


_6. On your local workstation, install WireGuard by accessing https://www.wireguard.com/install/

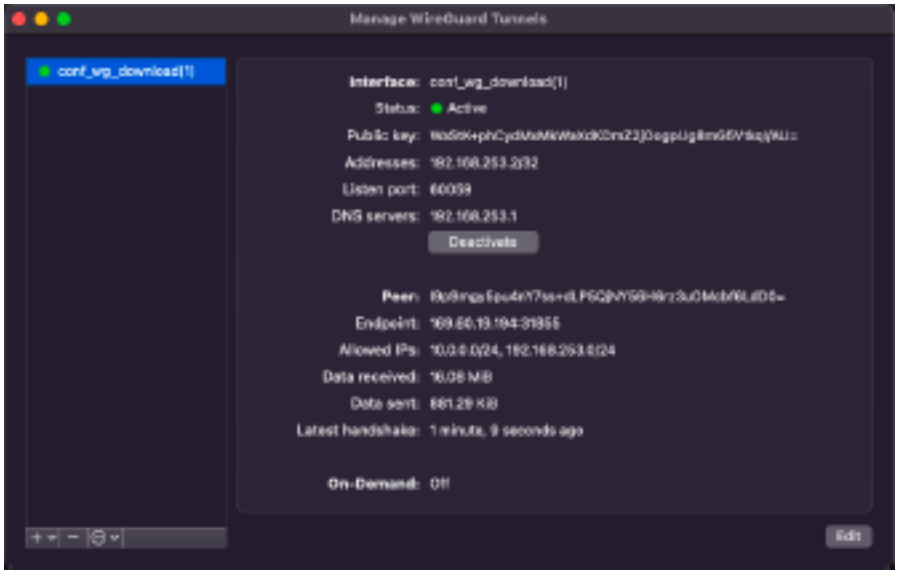
_7. **Launch** WireGuard

_8. **Click Add Tunnel** and load the **conf_wg_download.conf** file.

WireGuard on Microsoft Windows

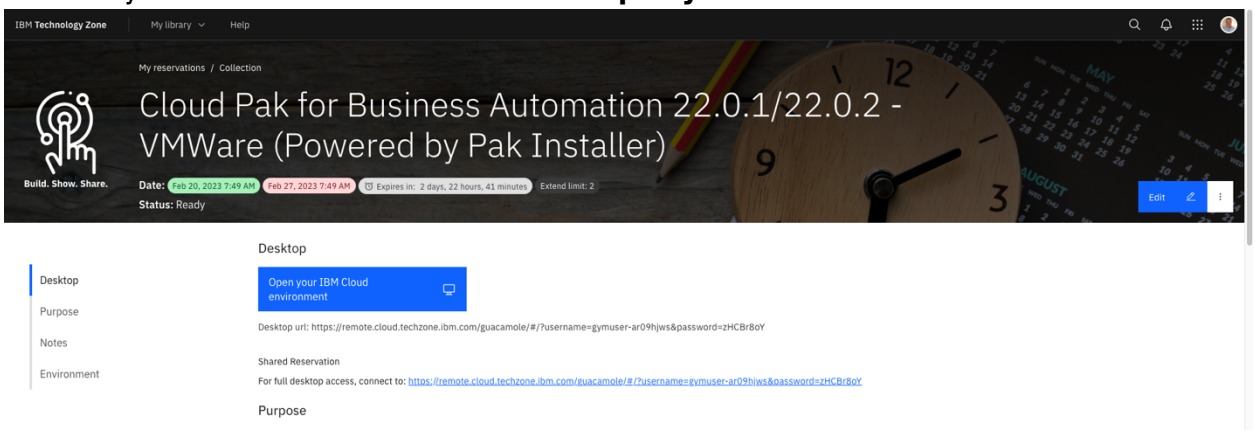


WireGuard on Mac

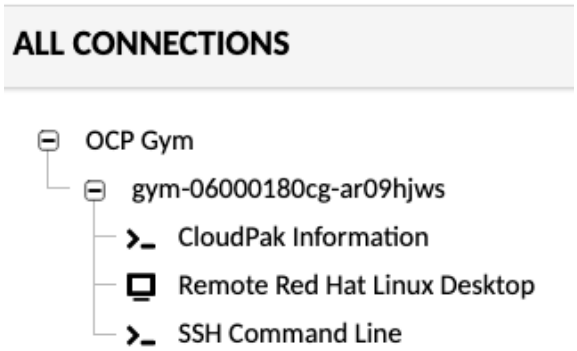


2.3 Open your IBM Cloud Environment

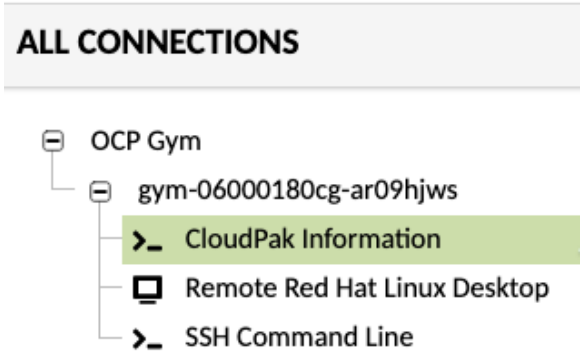
_1. Back on your reservation screen **Click** on **Open your IBM Cloud environment**



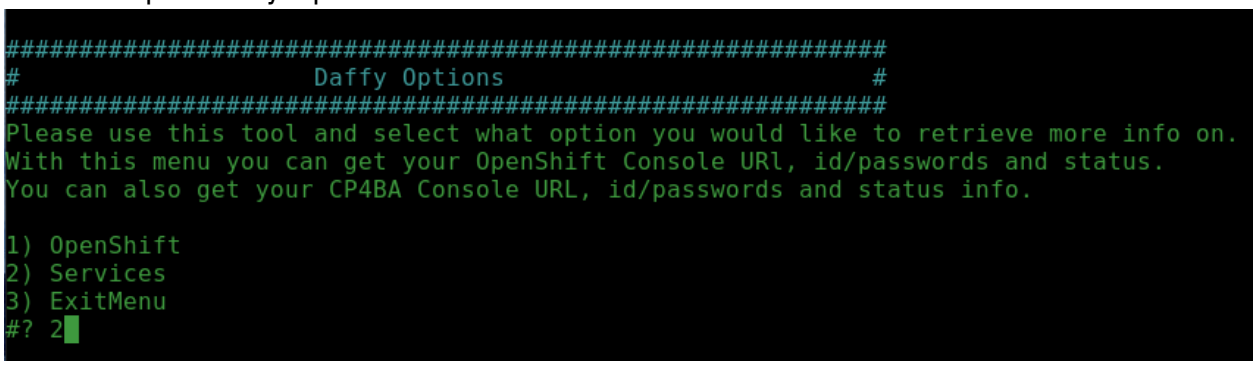
_2. **Expand OCP Gym** under All Connections



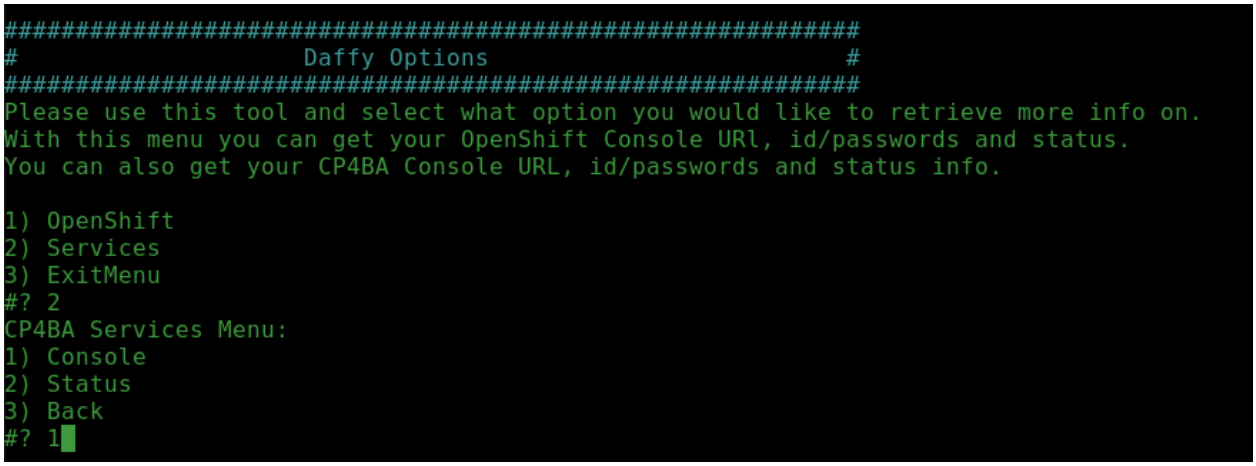
_3. **Select CloudPak Information**



_4. This will open Daffy Options window. **Enter 2** for Services



_5. **Enter 1** for Console information



_6. **Locate Username and Password** and copy and paste these to notepad. You will need to login into your environment.
Note: Controls for copy and paste in guacamole.
For Mac users:
CONTROL_OPTION_SHIFT
For Windows users:
CTRL_ALT_SHIFT

_7. Back on your Reservation tile **copy** the **link Cloud Pak Dashboard URL** to your favorite browser.

Cloud Pak Dashboard URL

https://cpd-cp4ba-starter.apps.ocpinstall.gym.lan

You may get a Your connection is not private, if click advance then click Proceed. This may occur twice.

_8. Login with user/password from step 6 above.

3 Lab Overview

The lab will focus on the design time tasks for Automation Document Processing (ADP). Despite the push for the digitization of content for many years, there are still a lot of paper documents that require workers to read and interpret the information – whether it is structured data, such as tax forms, or semi-structured data, such as invoices, utility bills, and so on. This lab describes how to set up and automated document processing pipeline using ADP.

3.1 How does ADP work?

Document Processing Designer

You use the Designer interface to create a set of document types and related fields that comprise your Document Processing project. Document Processing Designer combines an intuitive interface with a set of AI and deep learning tools that identify and learn the document types that matter to your organization. For each document type, you designate which pieces of information to extract as data for that document to be used by downstream applications. You can also apply tools to clean up and standardize the data as it is extracted.

Deployment tools

After you build the Document Processing project in the Designer, you deploy the project to make it available for building your document processing application. The deployment process is also used to configure the repository to receive the processed documents from your end-user application.

Application templates and toolkits

You use the no- or low-code application building capabilities of Application Designer, customized templates and toolkits, and the AI model of your Document Processing project to create a document processing end-user application. This application recognizes your documents, extracts your relevant data, and presents issues to fix before sending the documents to storage and using the data in other systems.

Document processing application and document management

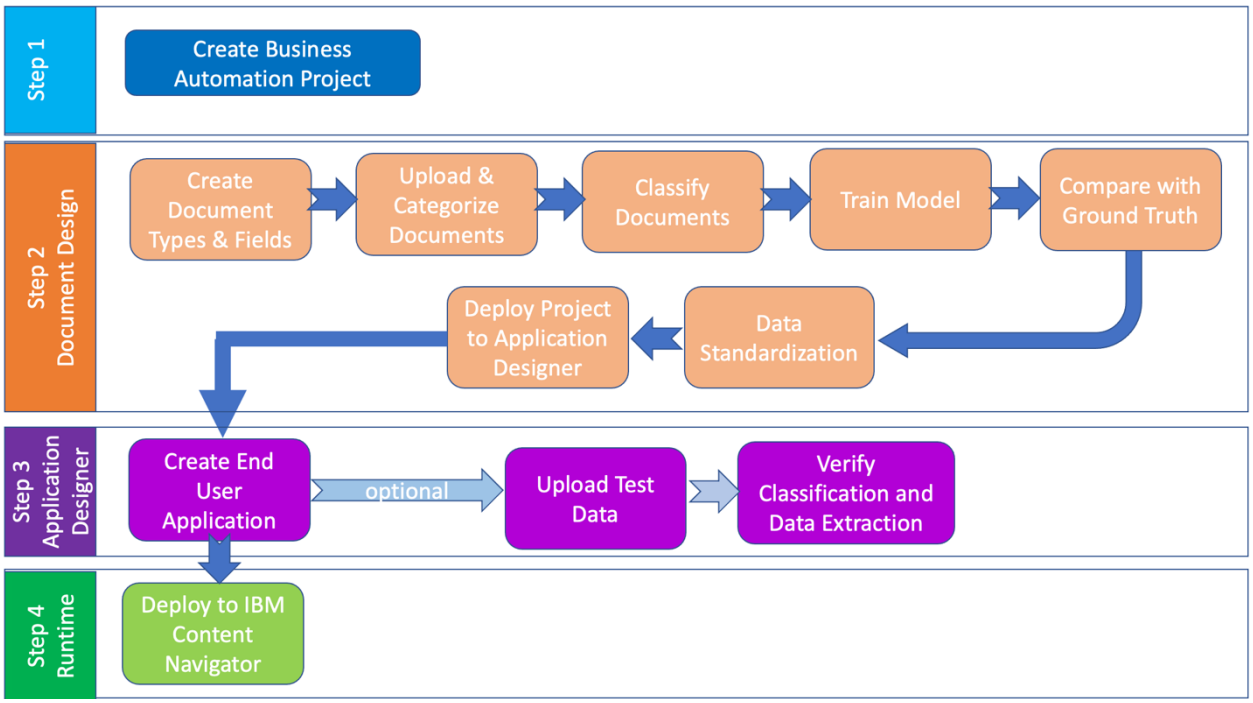
The application that you build uses the AI and deep learning to automatically detect, extract, and standardize the data in all your documents. Any anomalies are flagged according to your customized model and the priority that you set so that your document processing user can correct issues before the documents are finalized.

When you deploy your document processing application, you connect it to a content repository that manages the document types and the extracted data for each document. The solution is fully integrated with IBM FileNet® Content Manager, simplifying document and data storage by applying your existing filing architecture and business rules to each processed document. The content and metadata are automatically saved in FileNet within the appropriate document class.

End result

Your document types are stored in the content repository, with appropriate retention and access controls. An associated JSON file reflects all the extracted data for the document. Properties are set on the document with the data definition-controlled values. Your extracted data is cleaned, standardized, and ready for use in other applications.

The following diagram shows the tasks required to configure and deploy a new ADP project.



Step1 – Create Business Automation Project

Each document processing project requires a separate repository in your Git organization. Coordinate with your Git administrator to create the repository for your project.

Step 2 – Document Design

This step shows the high-level tasks that will be needed to complete to train the system to recognize document types, successfully extract fields and tables, configure the fields in FileNet and finally deploying your content project to the application designer so you can configure the end-user interfaces.

Step 3 – Application Designer

The application designer is where you would configure end-user interfaces such as the classification and verification screens. The lab will not go in a lot of details on how to configure the interfaces. It will instead show you how to create an application, and test processing a batch of documents through the system

Step 4 – Runtime

End-users would be using the runtime IBM Content Navigator interface to process documents or batches, classify document and verify extracted field data in the verification screen.

4 Create Document Processing Project

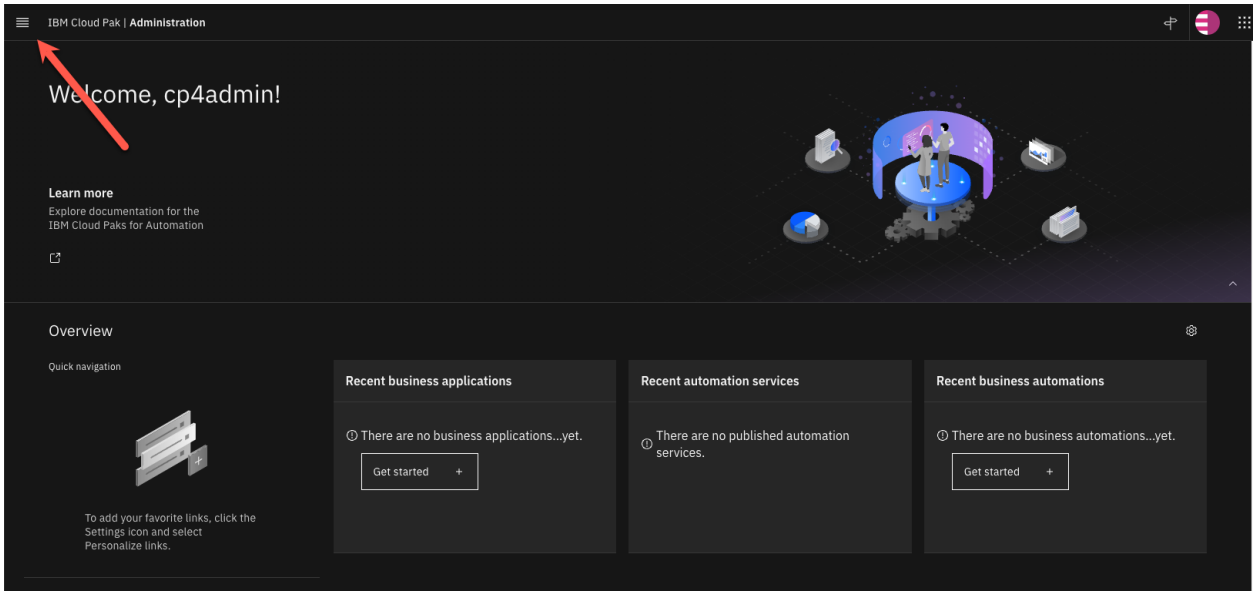
Step 1

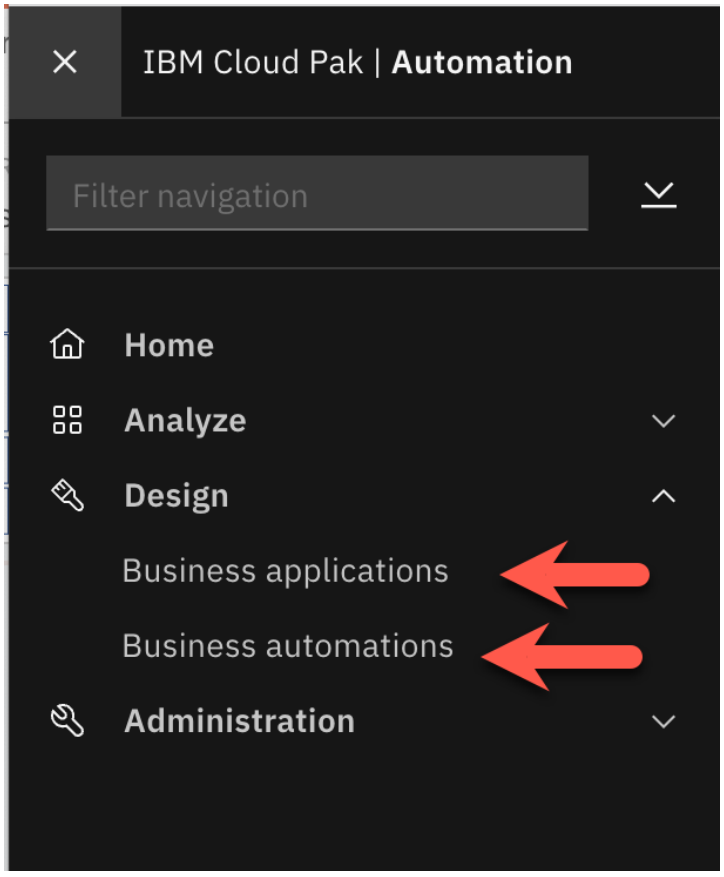
Create Business Automation Project

IBM Business Automation Studio is the single authoring and development environment for the IBM Cloud Pak for Automation platform that accelerates digital transformation. Business Automation Studio provides an entry point to various designers to help you reach your goals.

There are two distinct parts to the Business Automation Studio configuration.

_1. **Click** on the hamburger menu at the top left next to IBM Automation.





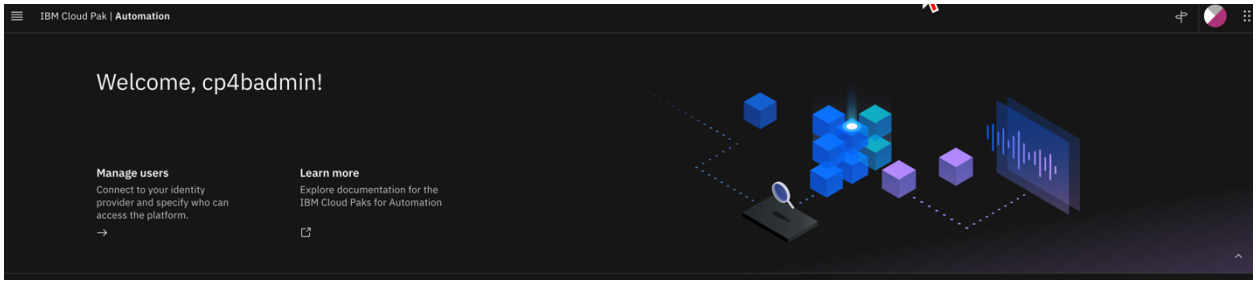
Business Automations provides the Document Processing configuration of the document classes, and the ***Business Applications*** provides the user interfaces.

Within the Business Automations you can create or reuse automations. An automation is a collection of artifacts that fulfills a business purpose. You can publish some automation artifacts as automation services that you can call and reuse in a consistent way. Also in Business Automation, you use the ***Document Designer*** interface within Automations to create a set of document types and related fields that comprise your Document Processing project.

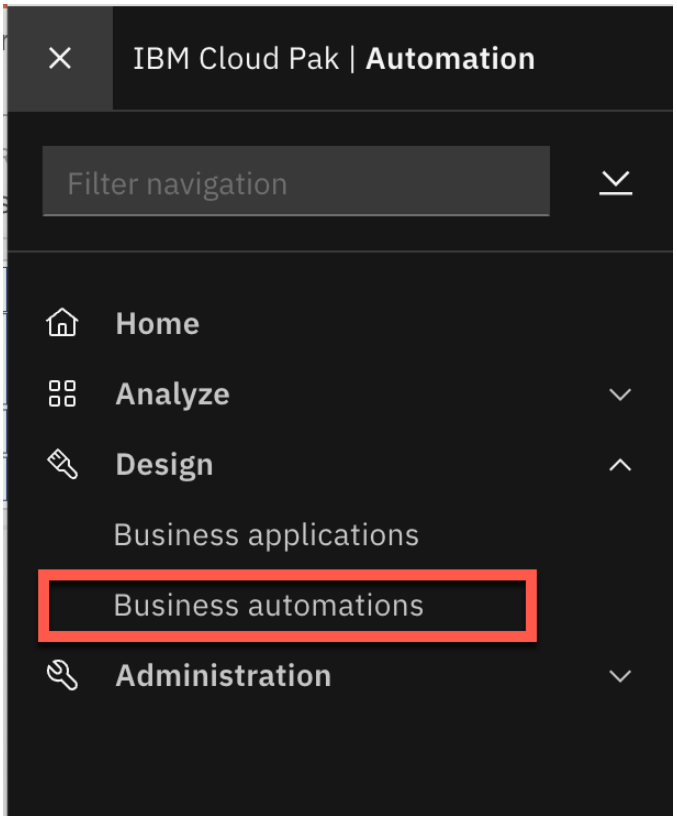
The Document Processing Designer combines an intuitive interface with a set of AI and deep learning tools that identify and learn the document types that matter to an organization. For each document type, you designate which pieces of information to extract as data for that document to be used by downstream applications. You can also apply tools to clean up and standardize the data as it is extracted.

Within *Business Applications* you can quickly create user interfaces that integrate tasks, data, and automations. You can start with a template to ensure consistency. You can also use toolkits to share artifacts from existing applications.

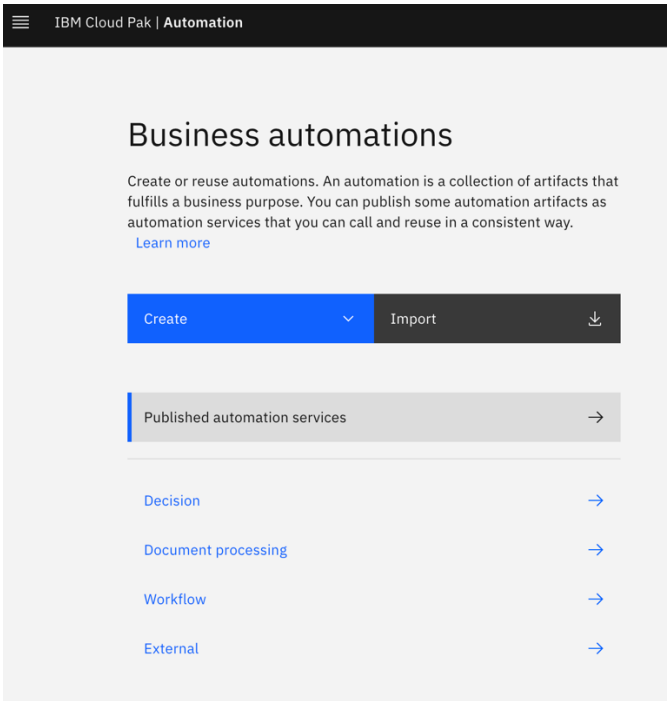
We will start with the Business Automations.
Once logged in to the IBM Automation Server, you should see the Welcome screen.



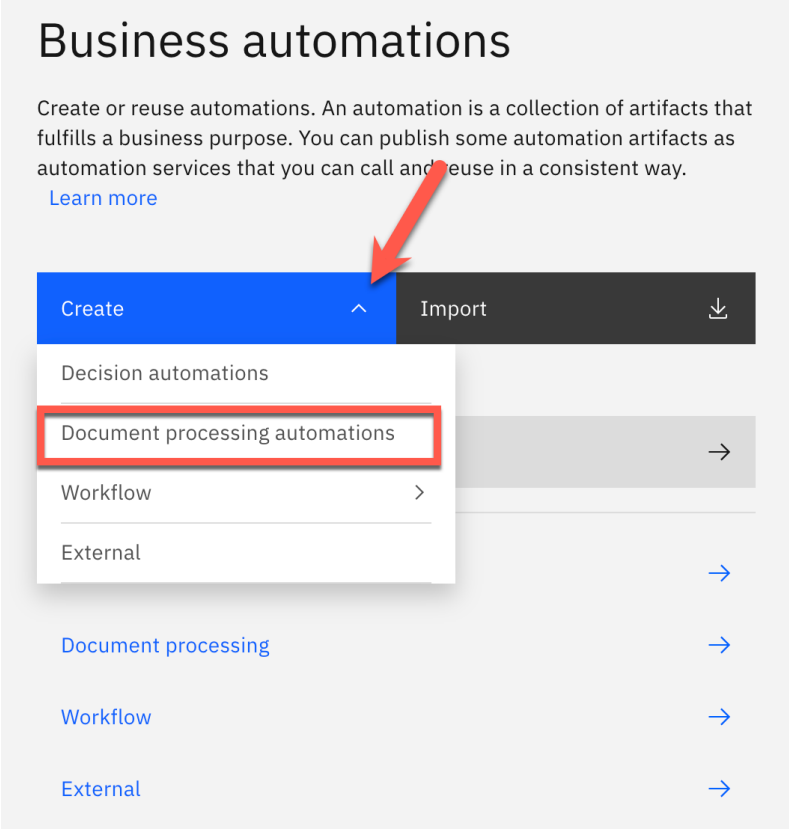
_2. **Click** on **Drop down arrow** next to Design then **Select Business Automations**.



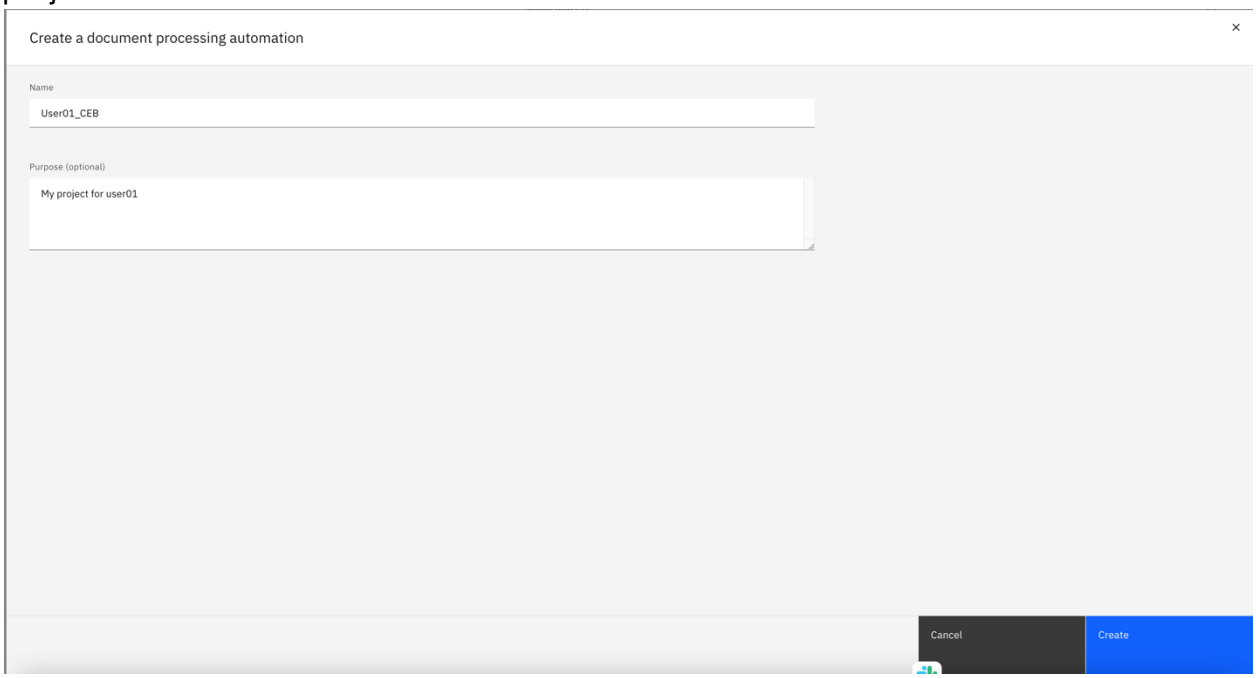
You may be presented with an overview screen. **Select Maybe Later**. Then following screen appears.



_9. **Click** on the **Create twisty** and **select Document processing automations**.

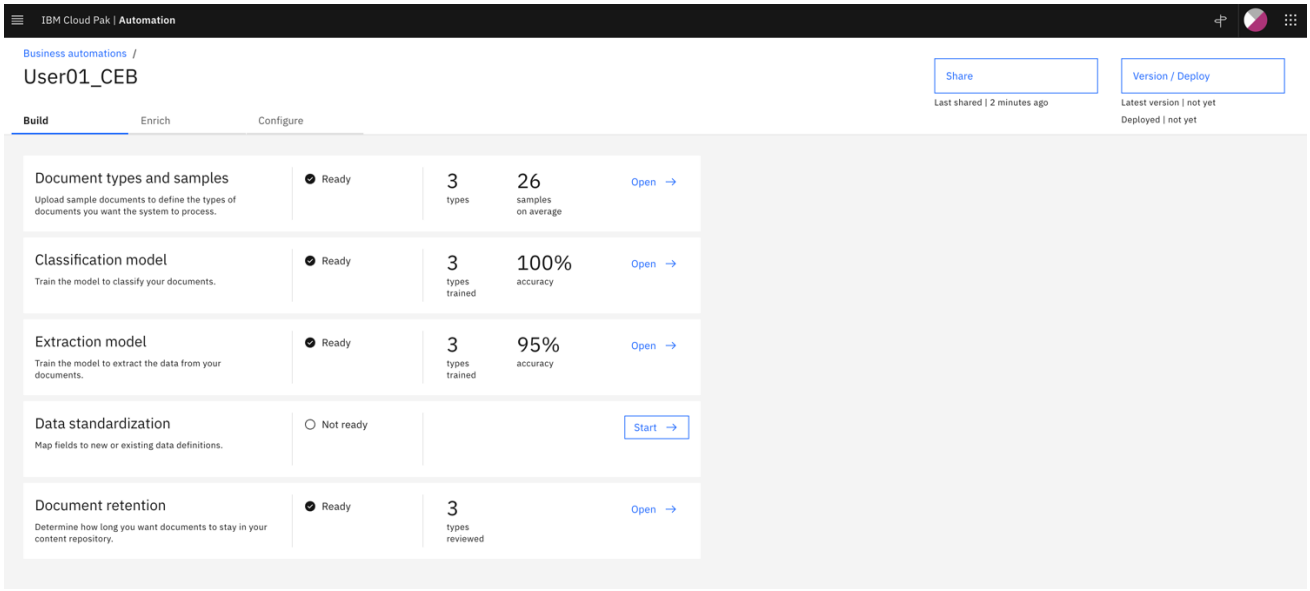


_10. In the Create a document processing automation window **enter a name** for the project.

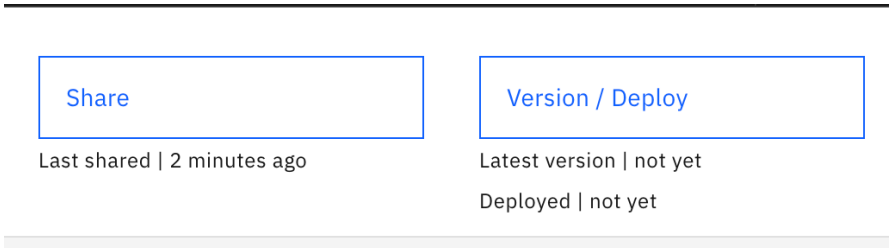


_11. **Click** on **Create** in the lower right-hand corner.

4.1 Reviewing the interface.



Upon opening the project, there are three major sections: **Build tab, Enrich tab, and Configure tab.**
On the top right, you find the SHARE and VERSION/ DEPLOY buttons.



The SHARE button is used to save your configuration to your GitHub repository.
The VERSION / DEPLOY button is used to create a snapshot, or version of your configuration. Like the SHARE button, the VERSION button will save your configuration, but will also create a version of it while retaining your previous version.
Once you have created a version of your configuration, you can also use this button to DEPLOY your version to the Business Applications area of ADP. You need to do this before you can go into the Business Application tile and configure your user interfaces.

4.1.1 Build Tab

This is what we will be spending most of our time on. The BUILD tab shows the guided configuration for building a Document Processing project. It shows the five steps required.

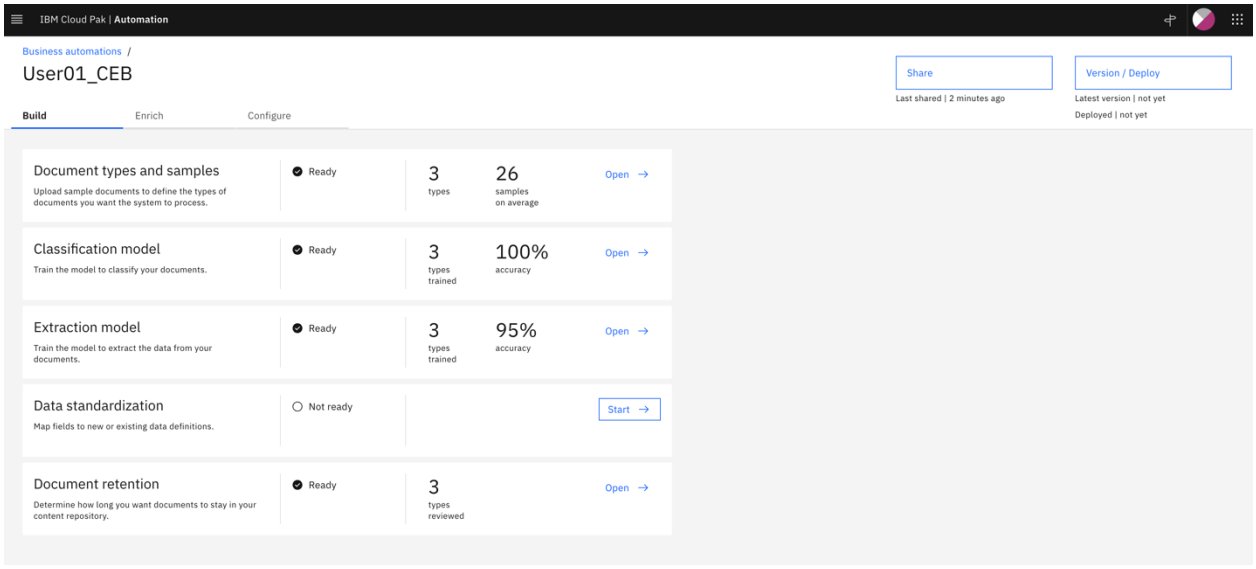
Document types and samples: Here we will define the document types that can be recognized by this automation and upload sample documents for training. By default, any project will be pre-populated with three pre-trained document types (Bill of Lading, Invoice, and Utility Bill).

Classification model: classification: Here we will teach the system how to recognize the different document types.

Extraction model: Here we will teach the system how to extract information for each document type based on the classification.

Data Standardization: This allows further refinement of the extracted information. For example, we want to standardize all dates to be formatted as YYYY/MM/DD. Having a standardized data format will help with any subsequent automation process.

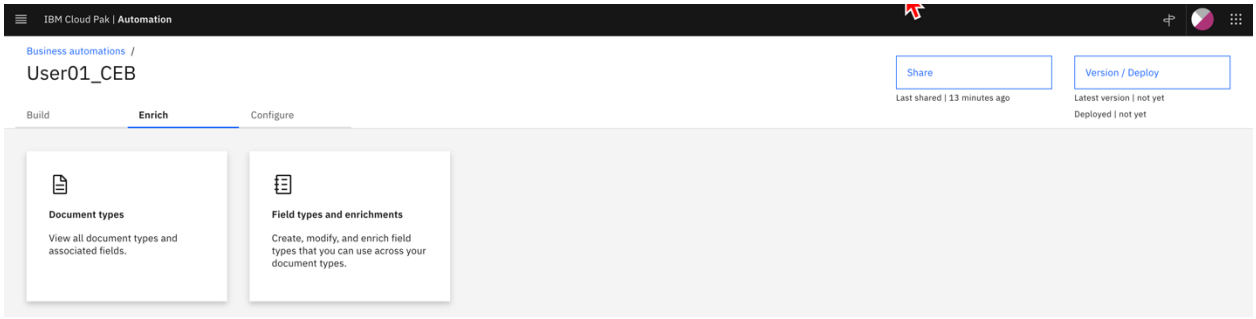
Document retention: This allows us to define how long we want our documents to be kept in the system. Documents that have exceeded the retention period will be automatically expunged. This could be important for regulatory compliance or for managing the overall storage size.



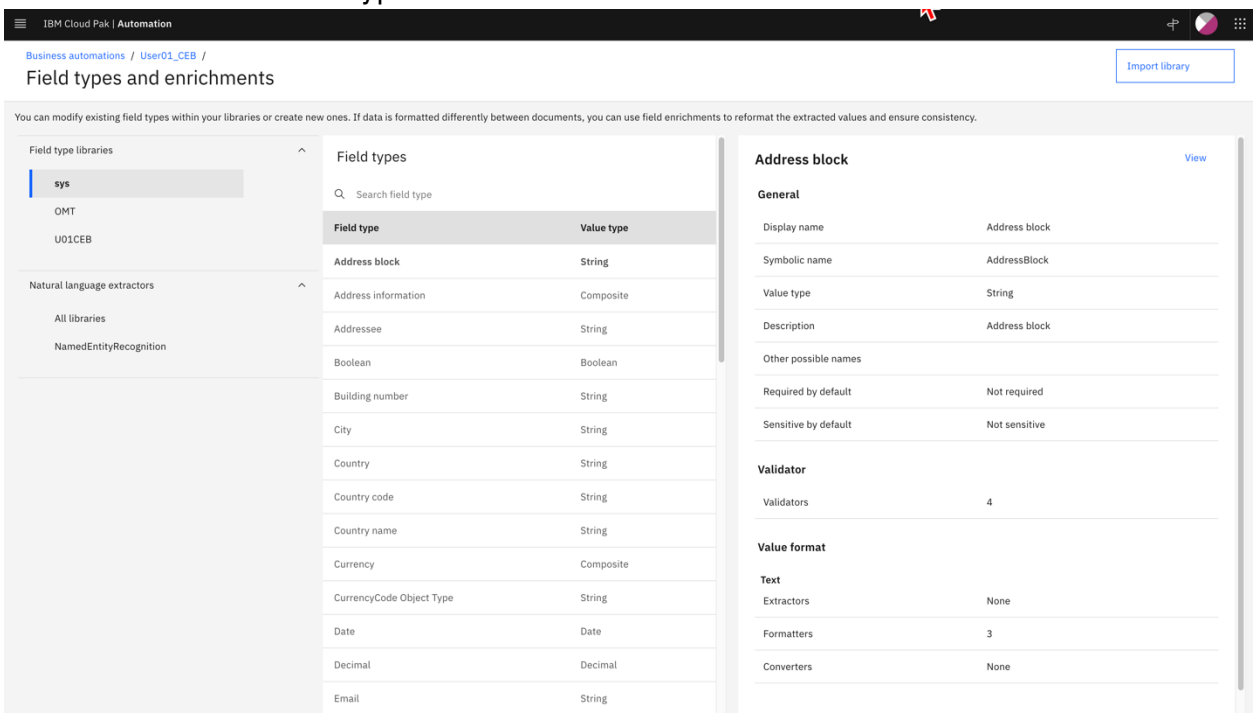
4.1.2 Enrich Tab

_1. **Click** on the **ENRICH** tab.

Enrich provides a quick way to define your document types and the fields you wish to extract. In this section, we can define additional enrich rules. An example of an enrich rule is to specify the expected format for an invoice number (all numerical) or a driver's license. The more we can tell document processing about how different data will be formatted, the higher the chance it will recognize the information.



_2. **Click** on **FIELD TYPES AND ENRICHMENTS** to begin. In this tile, you will see some of the pre-configured fields in the *SYSTEM LIBRARY*. Customers can use these fields in their document type field definitions as needed**.**

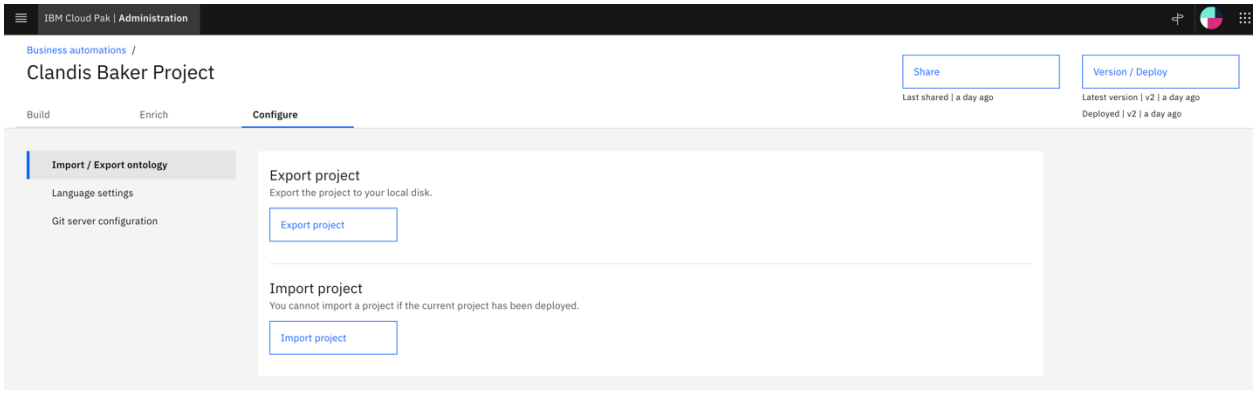


_3. **Click** on <***your project name***> in the bread crumb trail at the top.

4.1.3 Configure Tab

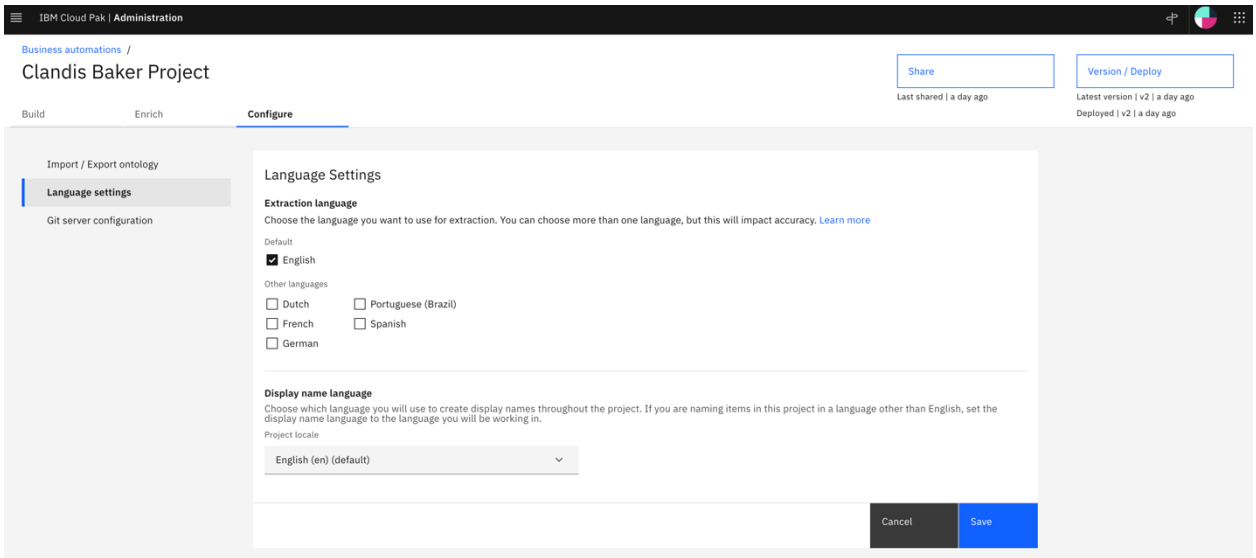
_4. **Click** on **Configure Tab**

This is where we can configure other operational aspects of the project, The export project creates a .zip file that contains the document types, field types and enrichments, which you can use to start training with new sample files. You can also decide to include the training model and the sample training files in your export if you want to move your entire project to a new instance of Document Processing for example. To import a project, select the .zip file to import. When you import a .zip file you have two options: overwrite the existing project or merge the existing project. If you merge the existing project, document types, field types, enrichments, and sample training files are imported unless there is a conflict. Models are not imported.

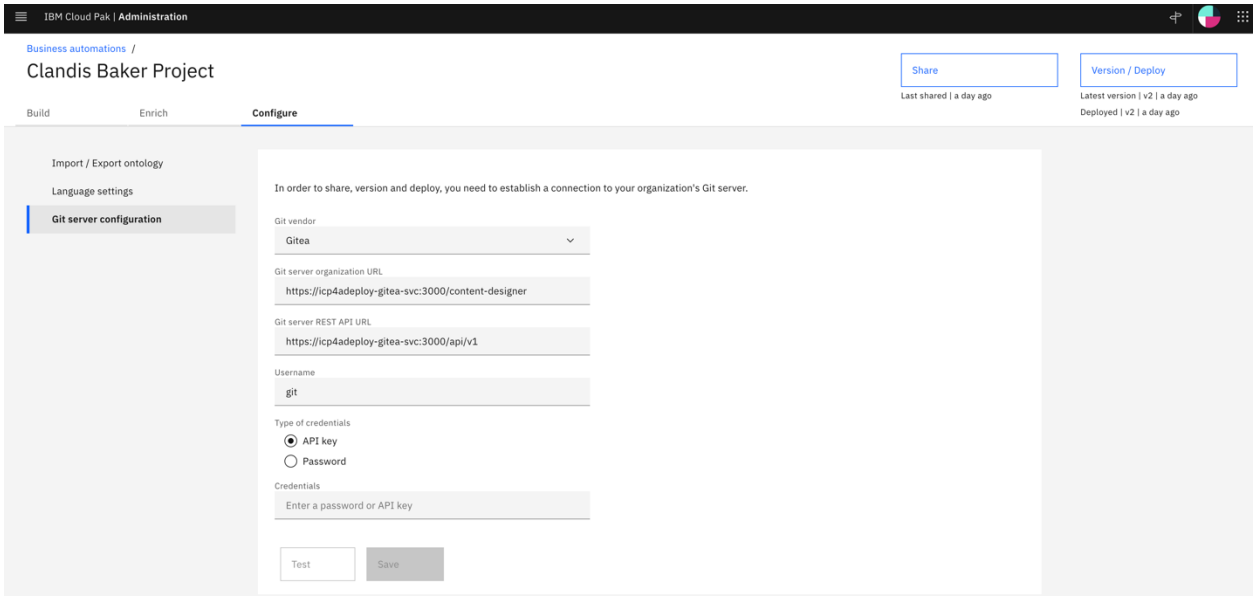


In Extraction language, select which languages are used in the documents that you plan to process. You can choose English, Dutch, French, German, Brazilian Portuguese, or Spanish. Make sure to choose only the language or languages that are likely to be used in your document sets. Choosing more than one language can affect the accuracy of your document processing model.

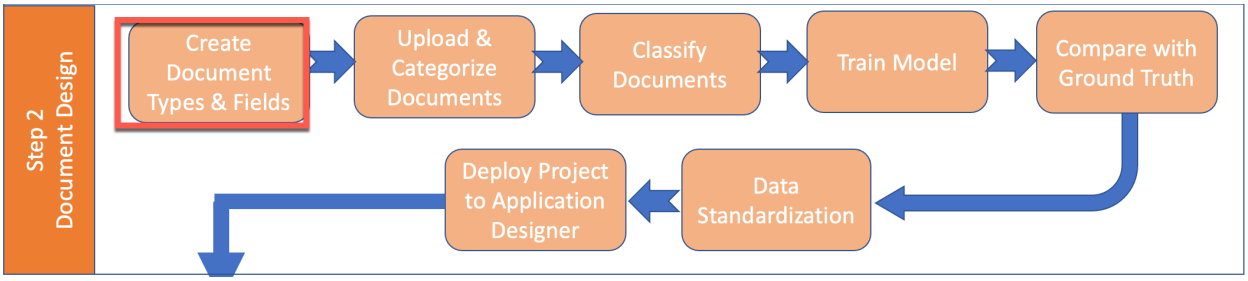
In Display name language, select the language that you use to enter display names for fields and document types. These are the names that are displayed in the Designer and in the applications. The display name language is also used in the Content Engine as the localized string locale setting for document classes and properties. Document Processing project deployment supports only one language per project. If your organization has multiple projects with different language settings, these projects cannot be deployed to the same Content Engine server if they share common properties. For example, when you define data definitions during data standardization, you cannot map a field to an existing data definition that was created in a different language.



The Git server configuration is where you create a connection t the Git server for the first project that you create in Document Processing Designer. This setting applies t all subsequent projects that you create.


IBM Cloud Pak | Administration
Business automations /
Clandis Baker Project
Share
Last shared | a day ago
Version / Deploy
Latest version | v2 | a day ago
Deployed | v2 | a day ago
Build
Enrich
Configure
Import / Export ontology
Language settings
Git server configuration
In order to share, version and deploy, you need to establish a connection to your organization's Git server.
Git vendor
Gitea
Git server organization URL
https://icp4adeploy-gitea-svc:3000/content-designer
Git server REST API URL
https://icp4adeploy-gitea-svc:3000/api/v1
Username
git
Type of credentials
API key
Password
Credentials
Enter a password or API key
Test
Save

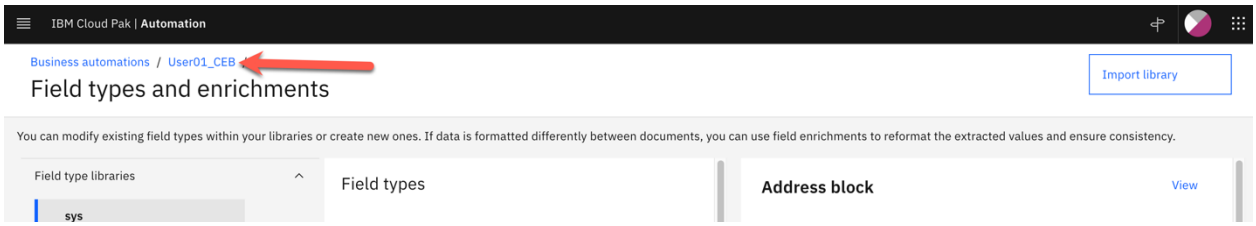
5 Configure a Wage and Tax document type.



Before we use the guided configuration, you will configure some additional document types and fields used to extract data prior to uploading sample documents.
To do this lab, we will use the ENRICH tab to add fields to a newly created Wage and Tax document type.

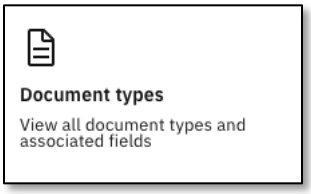
5.1 Create Wage and Tax document type.

_1. **Click** on ***<your project name>*** in the breadcrumb trail to return to the start page. In the example below our project was called <User01_CEB> if not already on the Project page



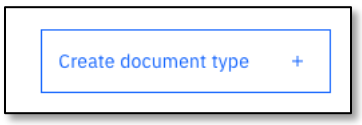
_2. **Click** on the **ENRICH tab**

_3. Click on DOCUMENT TYPES



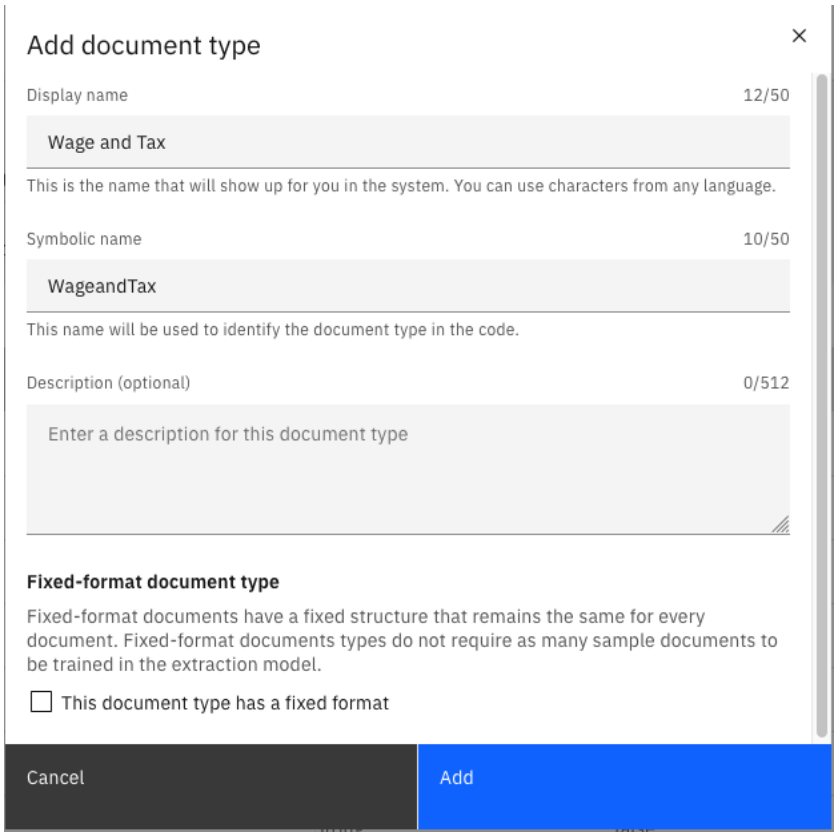
We will now create a document type for Wage and Tax documents and fields to extract data from them.

_4. Click on the CREATE DOCUMENT TYPE button in the top right corner.



_5. The Add document type window pops up. Enter Wage and Tax for the display name. There is no need to enter a symbolic name ADP will use the display name a

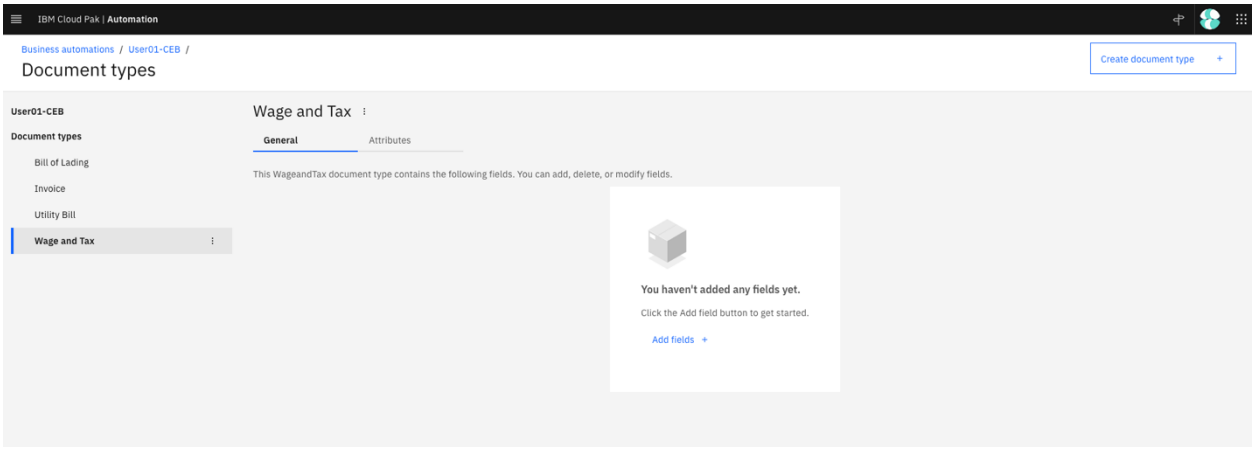
base. There's no need to add description in this lab unless you want to.



Note: Notice the option for "Fixed-format document type". If your form is static in nature or has a fixed structure that does not change, select this option so you will not have to provide as many samples. In our use case Wage and Tax documents have a variety of formats and are not static.

_6. Click the ADD button.

You should now see your new document type (class) in the list of classes on the left.

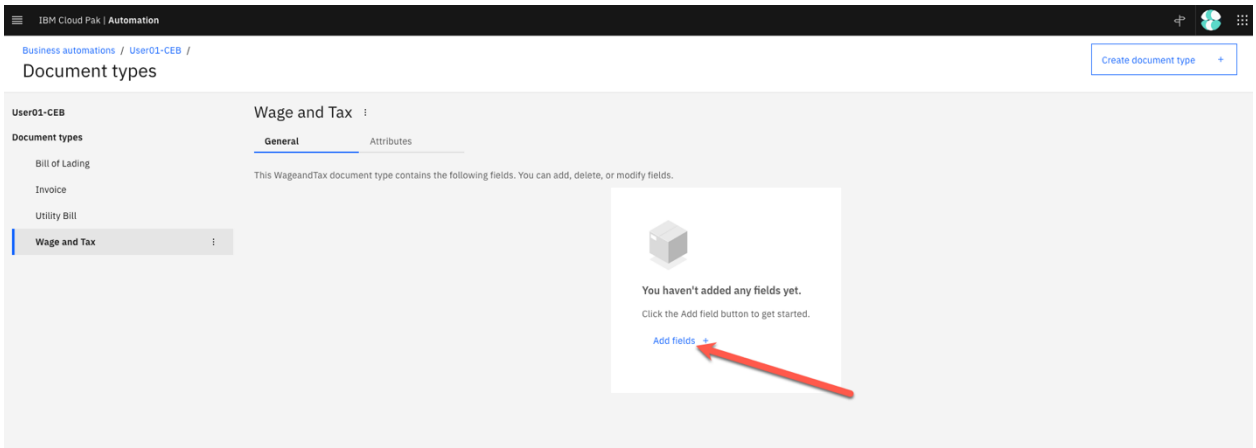


_7. Select your Wage and Tax type. On the right, you should see an empty table of fields.

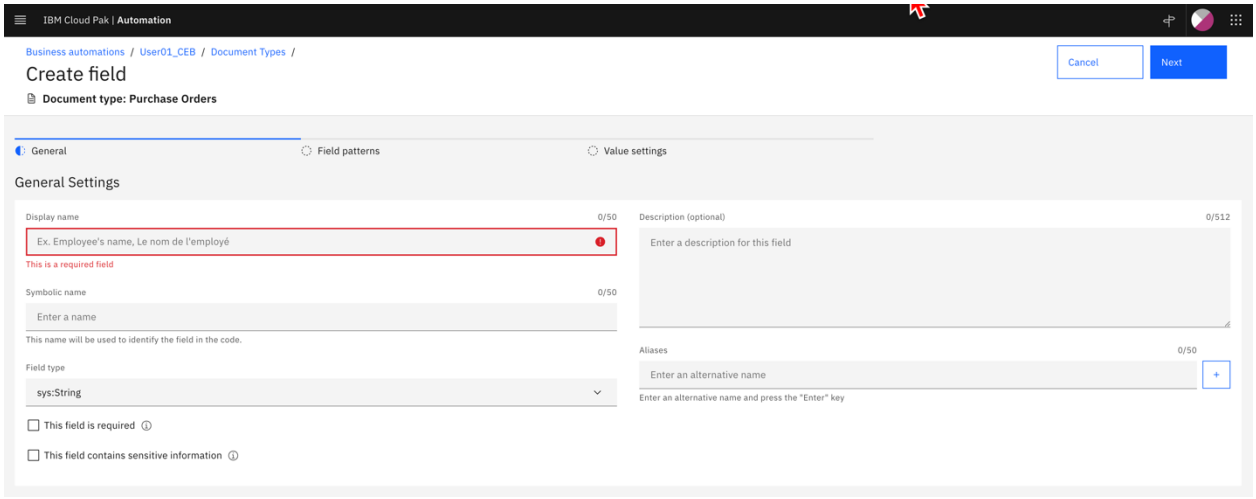
5.2 Create Field

We can now add some fields to the class.

_1. **Click ADD FIELDS**

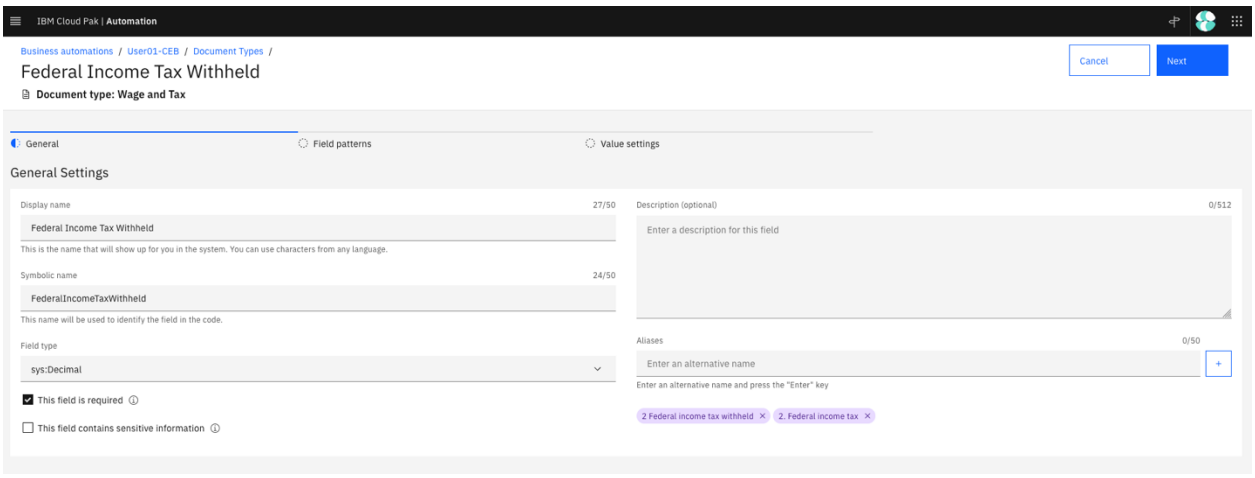


_2. Enter the following values under the GENERAL Settings header



- Field Name: **Federal Income Tax Withheld**
- Field Type:
  - **Sys:Decimal**
- Is this field required: **Yes**
- In Aliases enter other possible names. Case and punctuation are very import when creating aliases. Enter the alias listed below. **Press** the **"+"** after entering each one or **press Enter** key:
  - **2 Federal income tax withheld**
  - **2. Federal income tax** *(note: the number two has a period after it)*

You should now see the following:

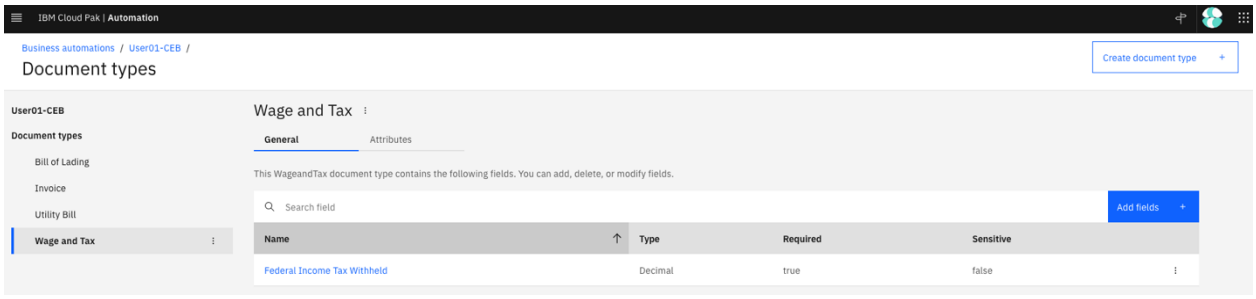


_3. **Click** the **NEXT** button.

_4. **Click NEXT** again on the Field patterns screen. You will not be adding patterns in this lab. Patterns are regular expressions that can be used as an alternative to aliases.

You should now be on the **VALUE SETTINGS** page. This is where you can set up validators, formatters, and converters.

_5. **Click Create** your screen should look like this with your first field created.



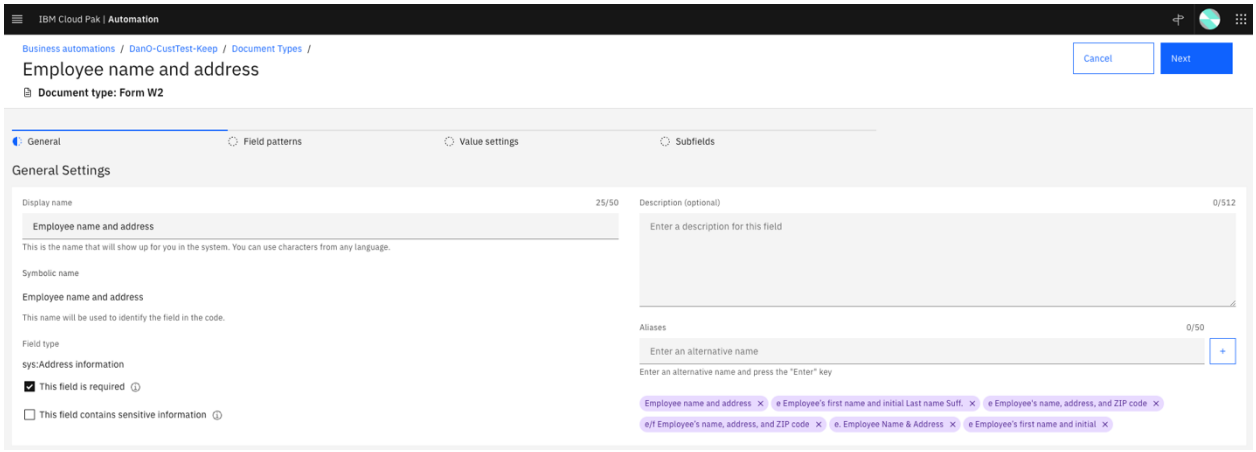
5.3 Create the Employee Name Address field.

_1. **Click Add fields.**

Give it the following parameters:

- Field name: **Employee Name and Address**
- Field Type = **sys:Address information**
- Required = **yes**
- Enter the following other possible names (aliases):
  - ***Employee name and address***
  - ***e Employee's first name and initial Last name Suff***
  - **e Employee's name, address, and ZIP code**
  - **e/f Employee's name, address, and ZIP code**
  - **e. Employee Name & Address**
  - **e Employee's first name and initial**

By default, the system will use the field name as an alias. So, you do not have to add it. For example, below, Employee Name and Address (field name), would be automatically used as an alias even if you do not add it to the list



_2. **Click Next** no field patterns will be created.

_3. **Click Next** no value settings will be created.

_4. **Click Create** to finish creating the Employee Name and Address.

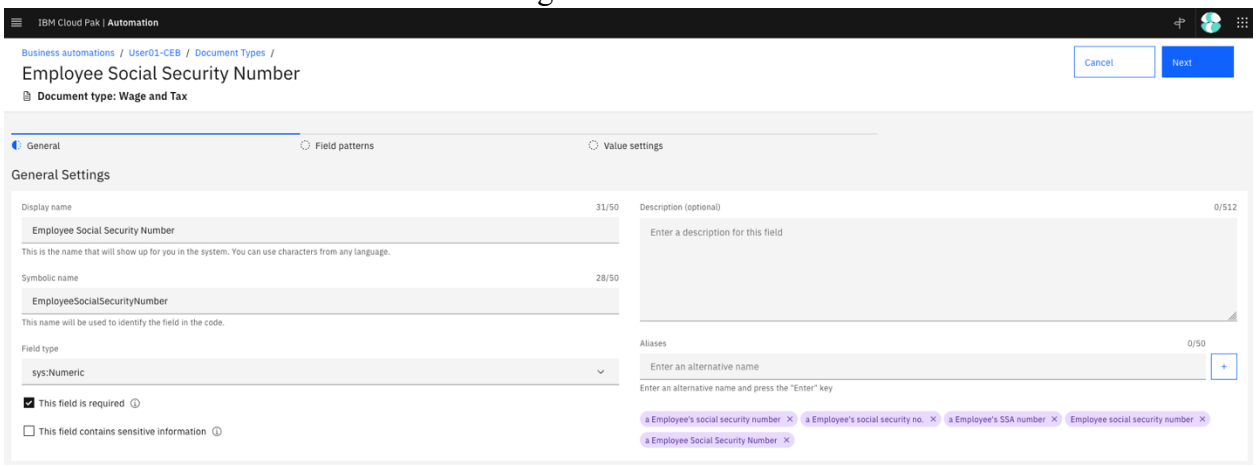
5.4 Create Employee Social Security Number Field

_1. Click on ADD FIELDS

Enter the following values in the GENERAL page.

- Field Name: **Employee Social Security Number**
- Field Type: **sys:Social Security Number**
- Is value required: **Yes**
- Other possible names (aliases). Remember, press RETURN on your keyboard between each entry:
  - **a Employee's social security number**
  - **a Employee's social security no.**
  - **a Employee's SSA number**
  - **a. Employee Social Security Number**
  - **Employee social security number**

Your screen should now look like the image below:



_2. **Click NEXT**

_3. **Click NEXT** again on the Field Patterns screen.

_4. **Click Create** on the Value settings.

_5. Create the following additional Fields.

The following table contains the values to use when adding the additional fields.

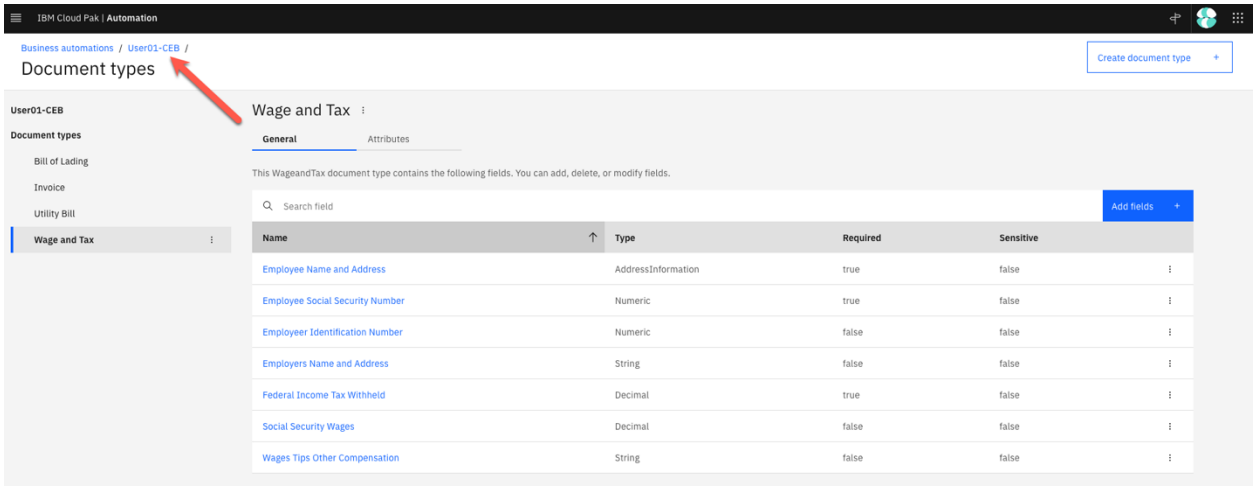
Follow the steps from the previous section to add the following fields

Field Name	Description	Type	Mandatory	Aliases
Employer Identification Number		sys:String	N	• b Employer identification number (EIN) • b Employer's FED ID number • b. Employer ID number • Employer identification number
Employers Name and Address		sys:String	N	• c Employer's name, address, and ZIP code • c Employer's Name & Address • Employers name and address
Social Security Wages		sys:Decimal	N	• Social security wages • 3 Social security wages
Wages Tips Other Compensation		Sys:Decimal	N	• 1 Wages, tips, other compensation • Wages, tips, other comp. • 1 Wages, tips, other comp. • 1. Wages tips, other comp • Wages tips other compensation

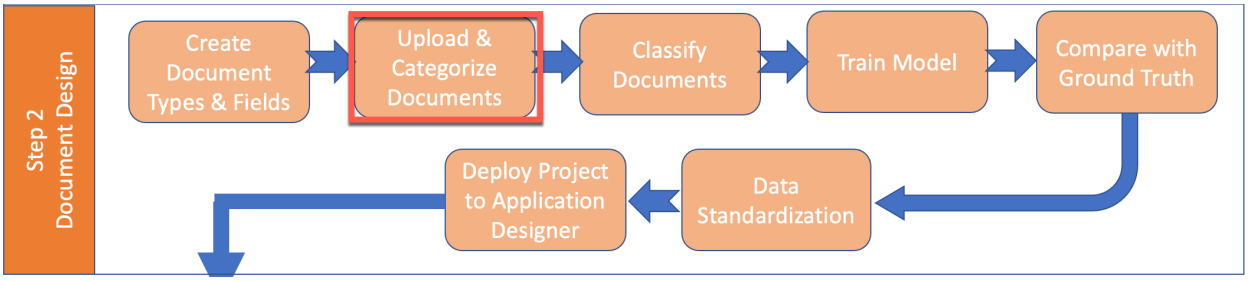
Reference for various field types:

> *Note: The basic default field types included in ADP are found here in the documentation*
>
> *https://www.ibm.com/docs/en/cloud-paks/cp-biz-automation/22.0.1?topic=enrichments-field-types-document-processing*

_6. **Click** on the ***<name of your project>*** in the breadcrumb link in the top left of your screen. In the following example the name of the project is <User01_CEB>.



6 Document Types and Samples Overview

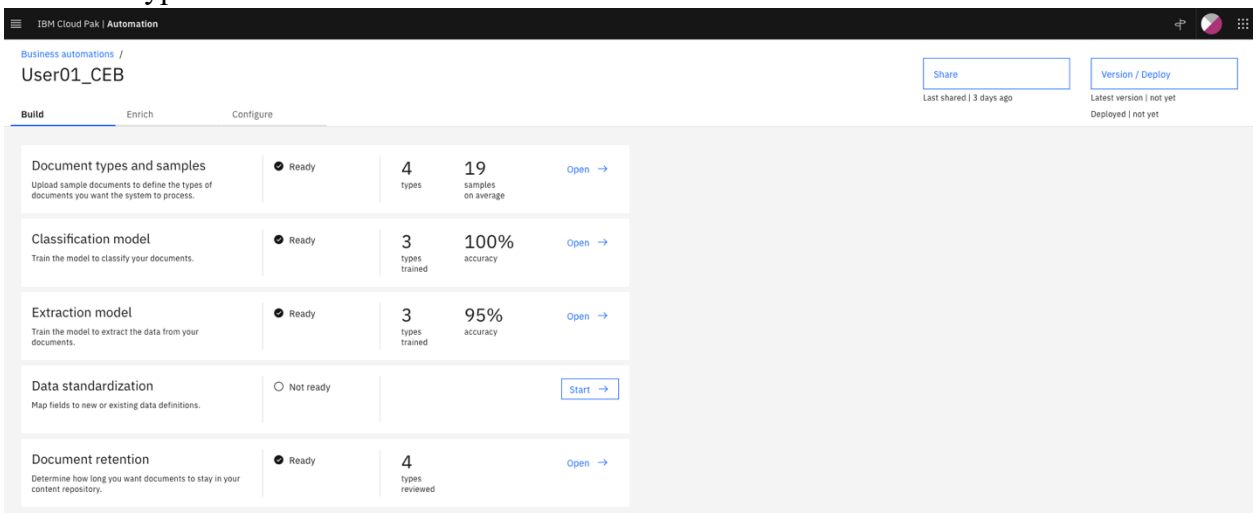


At this point in the process, we have created a new document type and configured the field names we want to extract off the document. For the system to know what to extract from your documents, it needs to be able to classify the documents. In this lab, we will teach the system to recognize the various document types on your system.

In the first part of the classification lab, you will explore the system's ability to automatically group similar documents together. This can be used to discover document types in a file share for example. You can also upload documents and have the system tell you what it finds. You would then use this information to create document types so you can classify the documents and data extract fields.

The project template comes pre-loaded with three document types: Bill of Lading, Invoice, and Utility Bill. In the last step we added a new document type Wages and Tax. In the BUILD tab of your project, you should now be seeing 4 document types. The three pre-loaded documents already have documents in them. You will be adding documents to the Wage and Tax document type. Your actual screen may vary from the following screen shot.

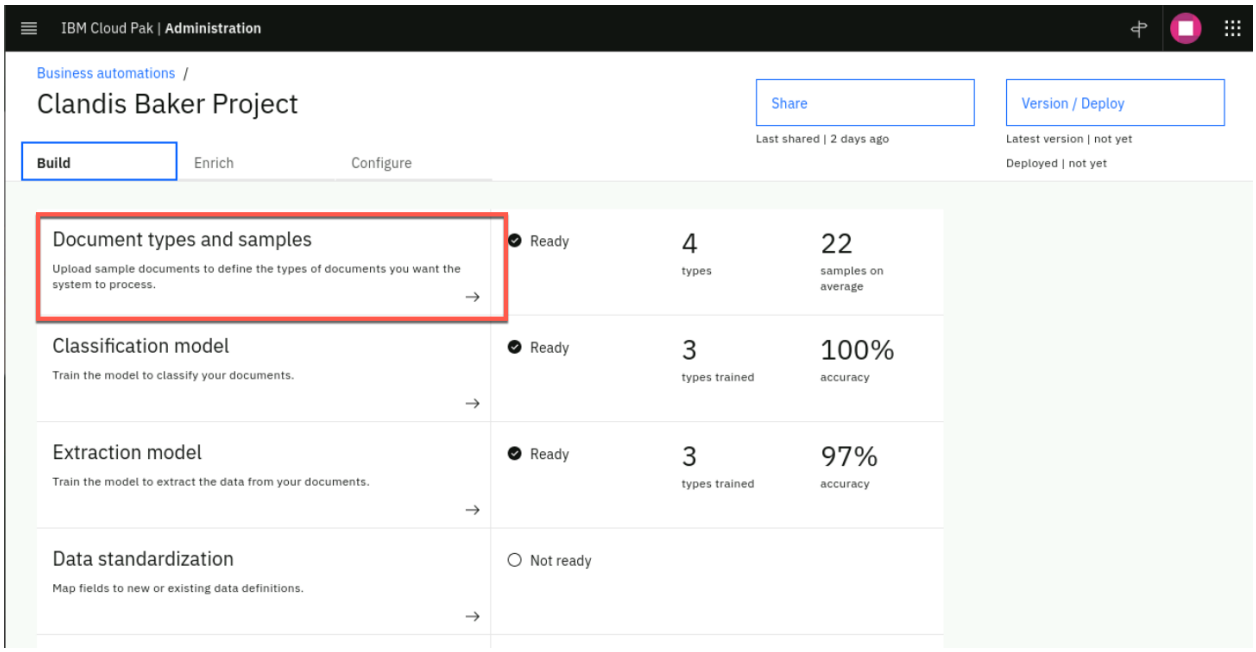
You will be asked to review the document categories the system finds and create the appropriate document types as needed.



6.1 Categorize documents.

For categorizing, we will have the system help us group similar documents together.
To get started,

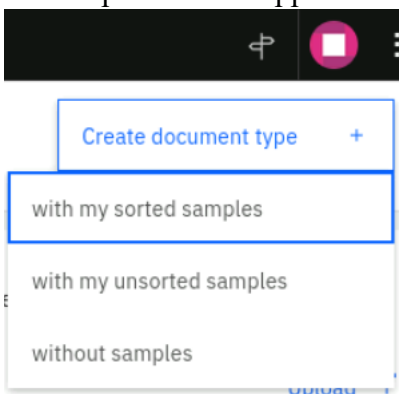
_1. **Click anywhere** in the Document types and samples box.



The CATEGORIZE feature analyzes each document and tries to find similarities between them. Based on these similarities, the system will divide the samples into categories for you to review. You can add documents or entire categories into either an existing document class or create new classes as needed.
Let's see what that looks like.

_2. **Click** on **CREATE DOCUMENT TYPE** in the top right of the screen.

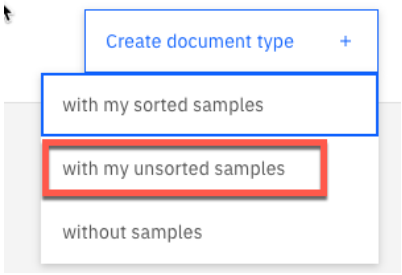
The drop down that appears:



If you have the same document types already separated into folders, you can choose the first option, *with my sorted samples*. The system would simply ingest the documents from each folder into a different group.

For this exercise, we will select the second option, *with my unsorted samples* and let the system sort the documents for us. Use this option when you don't know how many different document types there are.

_3. **Select** the second option titled **with my unsorted samples.**



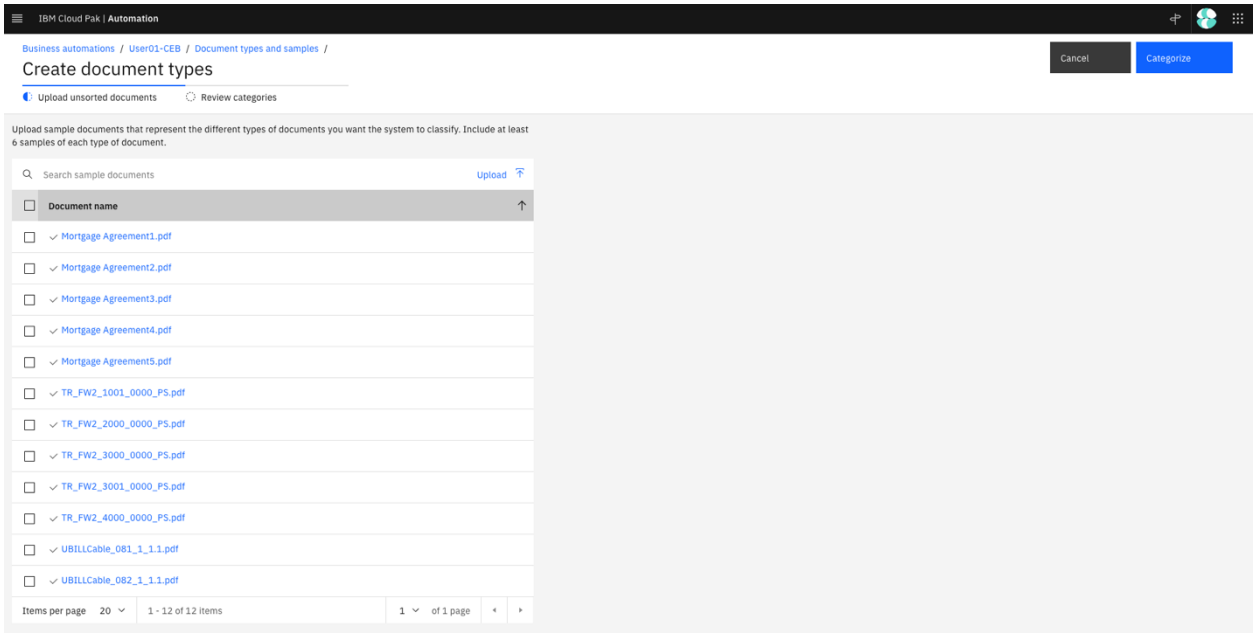
You should have already downloaded the files from Section 3 to your laptop. You can either drag the folder to the window or select upload and grab all the files from where they were downloaded to on your laptop.

_4. **Click Upload** to get document samples.

From the downloaded sample documents open the folder name *Design Forms Group1*

> *Note: this will take several minutes (approximately 10 minutes), good time for some coffee or a stretch. Make sure to check ALL documents have been uploaded there are two pages or 12 items to verify.*

_5. **Click** on the **CATEGORIZE** button.



> *Note: The results may vary based on the documents uploaded, what the system already has learned, the version of ADP and more. Please look at this lab exercise from a high level. The categories you will be presented are the system's best guess on how they should be separated.*

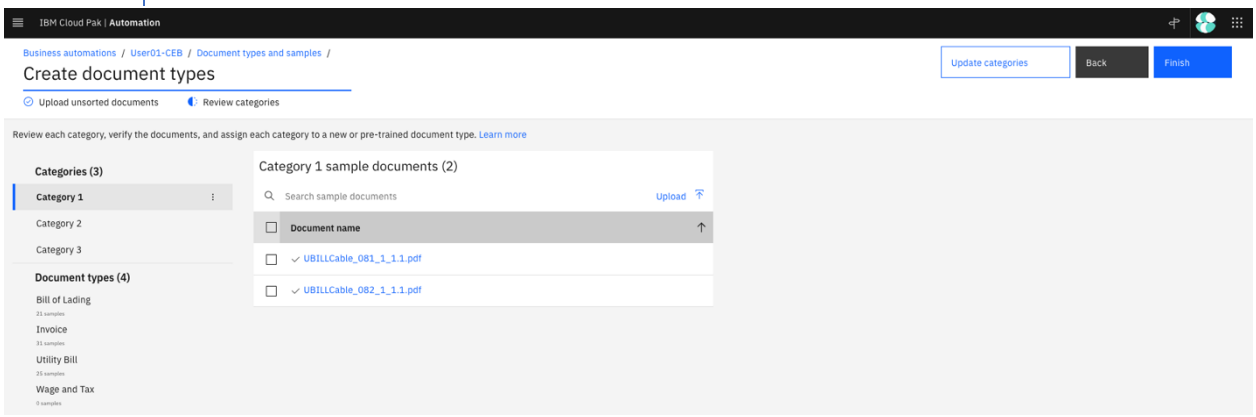
You will need to:

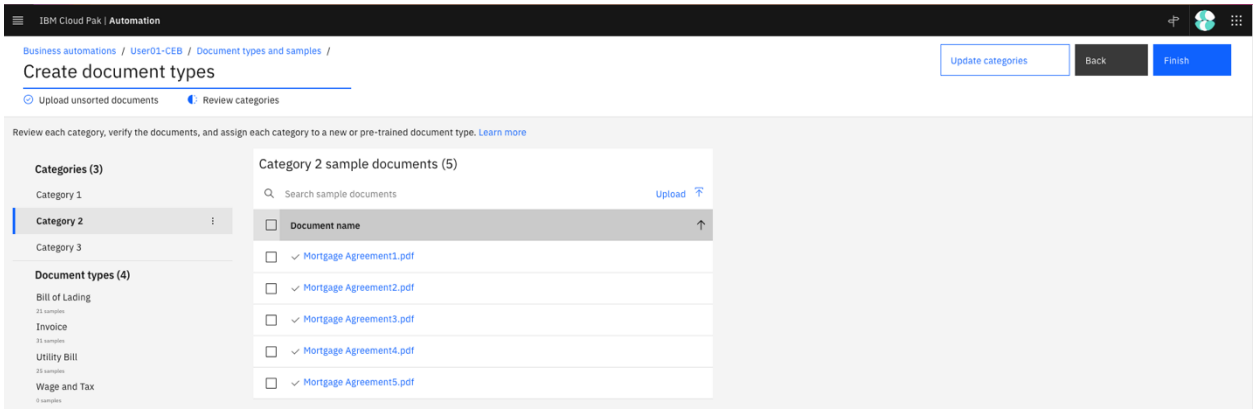
- Review the categories to see if the documents were separated correctly.
- Move documents into either a NEW document type or into an EXISTING document type.
- There should be 3 types in the samples you were provided.
  - Wage and Tax
  - Utility bills
  - Mortgage Agreements
- You will need to assign either an entire category (i.e., all sample documents) or individual documents in each category to the Wage and Tax and Utility bills document types which already exist on your system.
- You will need to create a new document type for Mortgage Agreements.

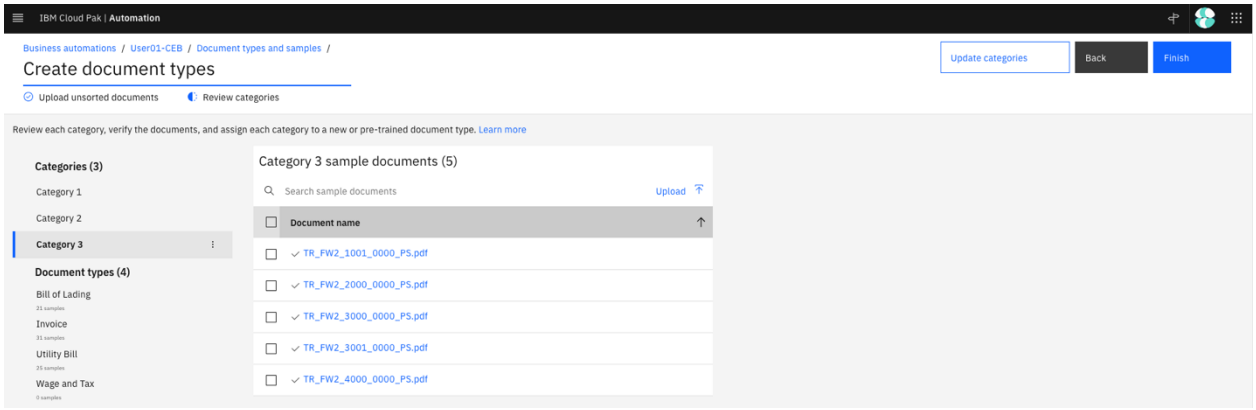
After a few seconds, the system will mark the documents with a status of ready as seen in the above image.

_6. **Click** on **each of the categories** to see what was grouped together as shown below.

NOTE: The names of the files are not used in any way in this process. The files were merely named this way to make it easier for you to quickly ascertain whether the documents were grouped correctly.

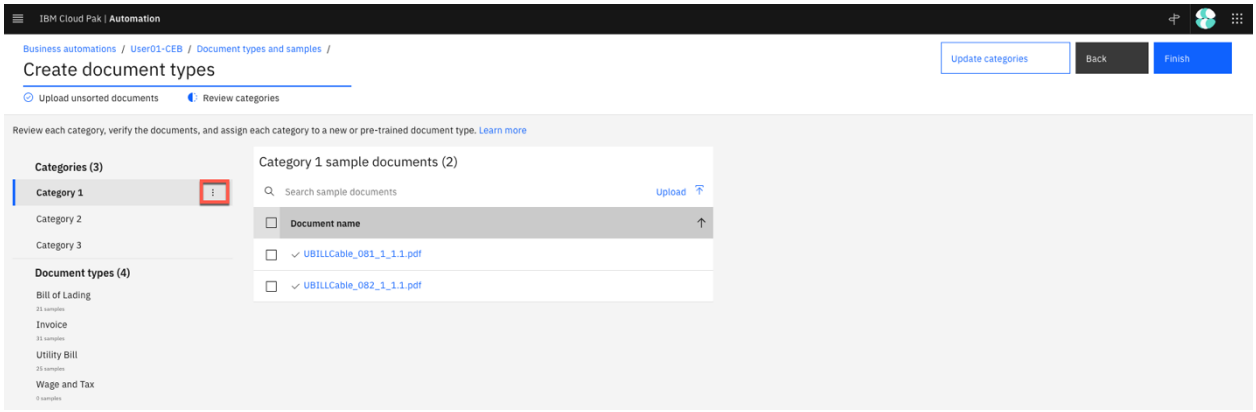




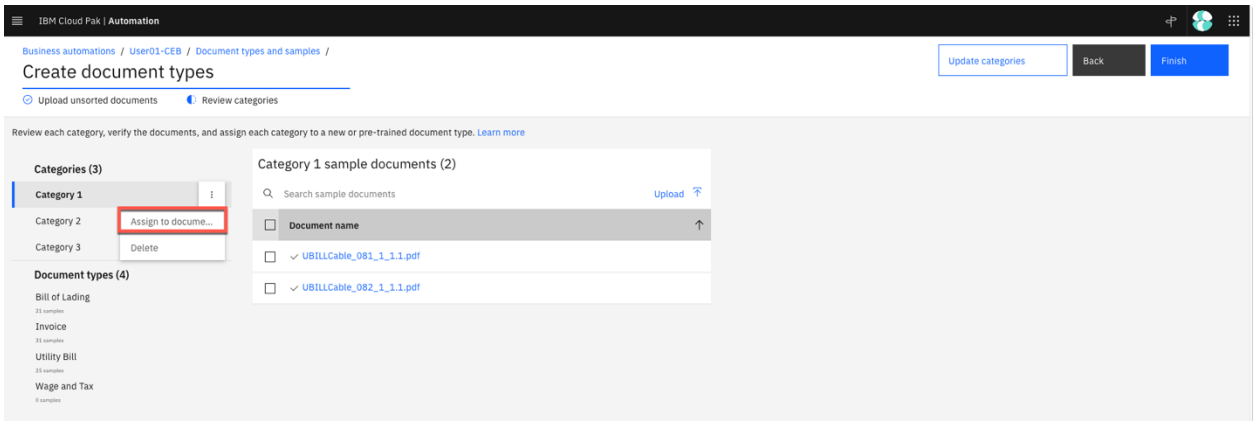


At the time of writing this documentation ADP was able to categorize the sample set into each category. This is not always the case, sometimes document types will be combined into one category, so it's very important to look at each category and verify documents.

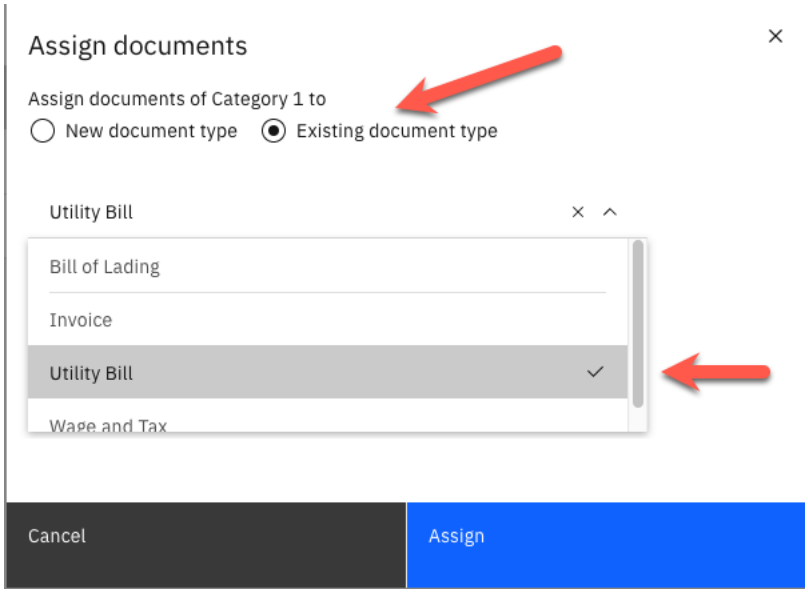
_7. If all documents within a category are correct as illustrated in the following screen shot, hover over the category name and **Click** on the **3 dots** at the end of the category name.



_8. **Select ASSIGN TO DOCUMENT TYPE**



_9. **Select Existing Document type** then the appropriate **document type** from the drop-down list.



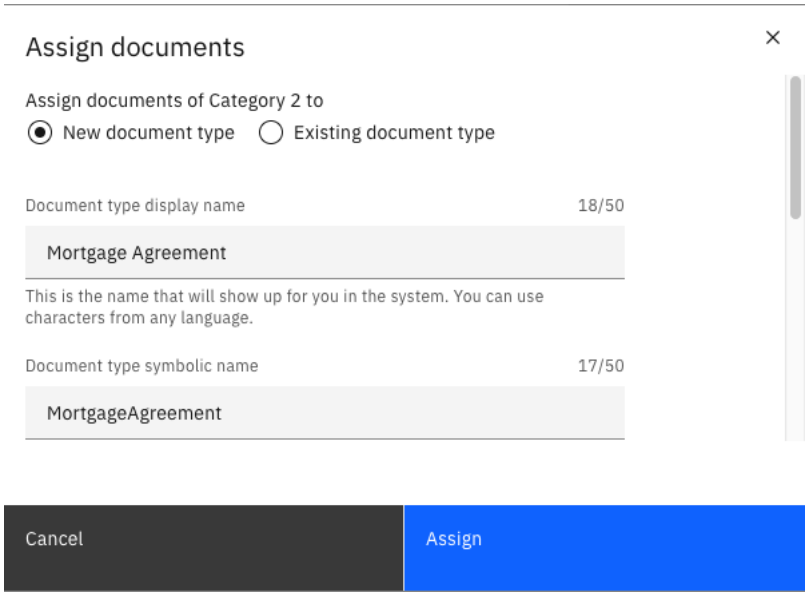
_10. **Click Assign** to close the dialog box

You can Click on any document to see a preview of it. This will help ensure the documents are correctly grouped.

_11. **Select** the next Category 2 and **Click** on the 3 dots and **Select Assign these documents** to a document class.

_12. This time **Select** a **New Document Type.** Since we have not defined a mortgage agreement document type yet.

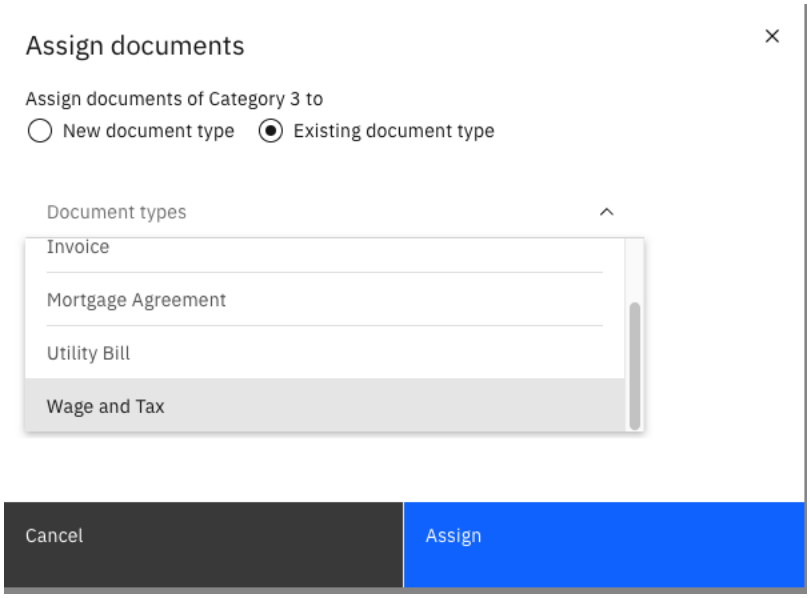
_13. **Enter** *Mortgage Agreement* in the field



_14. **Click Assign** to have the system automatically rename and move the category into the Document Types section.

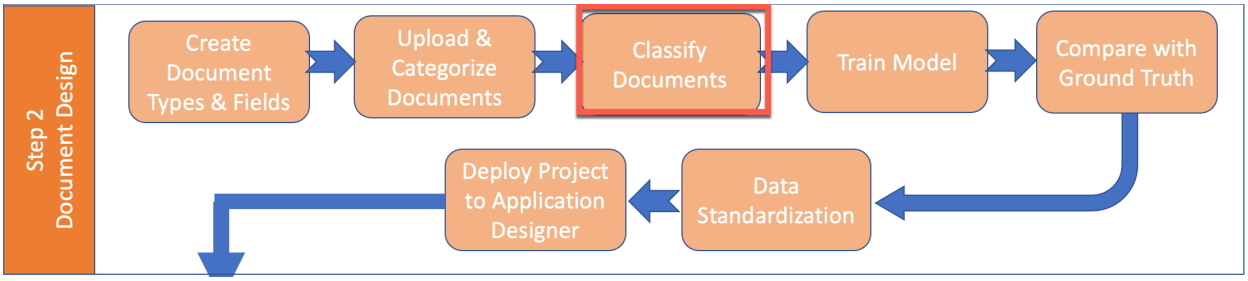
_15. Now for Category 3, **Click** on **3 dots** and Select Assign Document type.

_16. Select Existing Document Type and Click Wage and Tax from the drop down and then Click on Assign.



_17. Once you confirmed all documents are correctly classified into the correct document type, **Click Finish**

7 Train classification



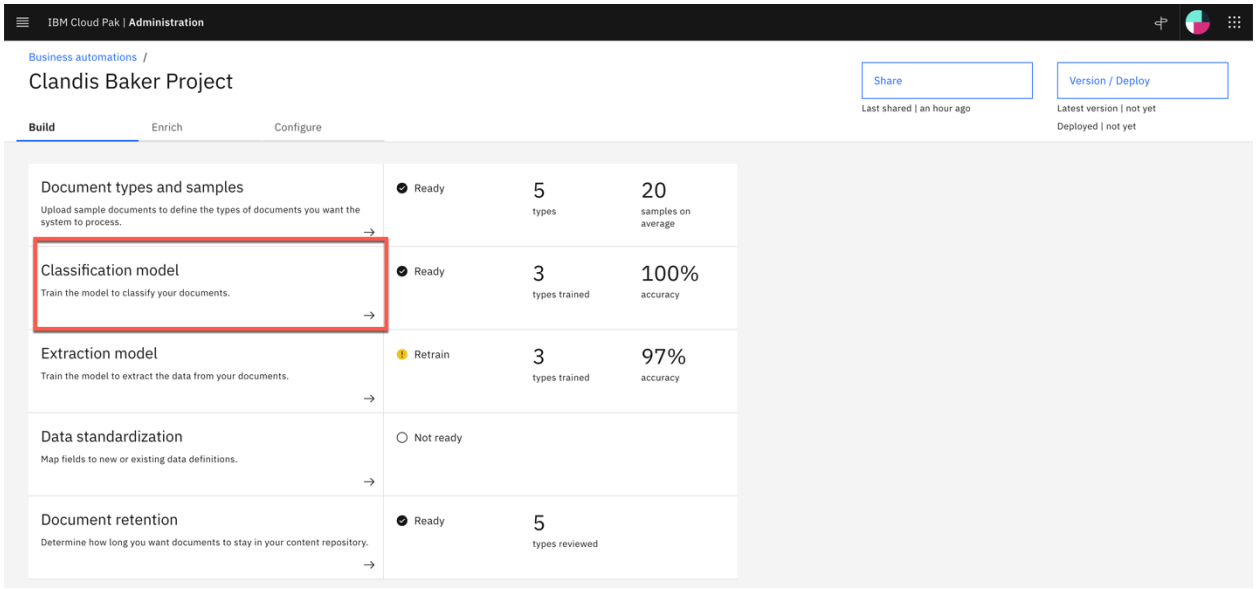
Now that we have documents uploaded in the system, we are ready to train the classification. Note that although you don't need a ton of document samples to train (minimum of 5), you are going to get better accuracy if the system has a deeper understanding of the documents, so more could be better.
In this lab, we curated some documents samples for you. In normal circumstances, you would need to do this yourself. Make sure the documents you upload to train classification are good documents.

- Clean documents
- High resolution
- Representative of the document type(s)
- Accurately grouped and uploaded to Document Processing

This is NOT the time to try and trick the system. Uploading a document that doesn't recognize well would not help the system recognize the types of words, phrases, and concepts it needs to learn to classify documents correctly.
The most common error is introducing a sample document into the incorrect document type, usually by uploading them to the wrong document type. If that happens, you are introducing conflict into the classification. For example, an invoice added to Tax Forms may confuse the system and result in it thinking invoices are tax forms and vice versa. Once that happens, you need to clean your documents and retrain the system.

_1. **Click** on ***<your project name>*** in the cookie trail to return to the start page. In the example below our project was called <User01_CEB>

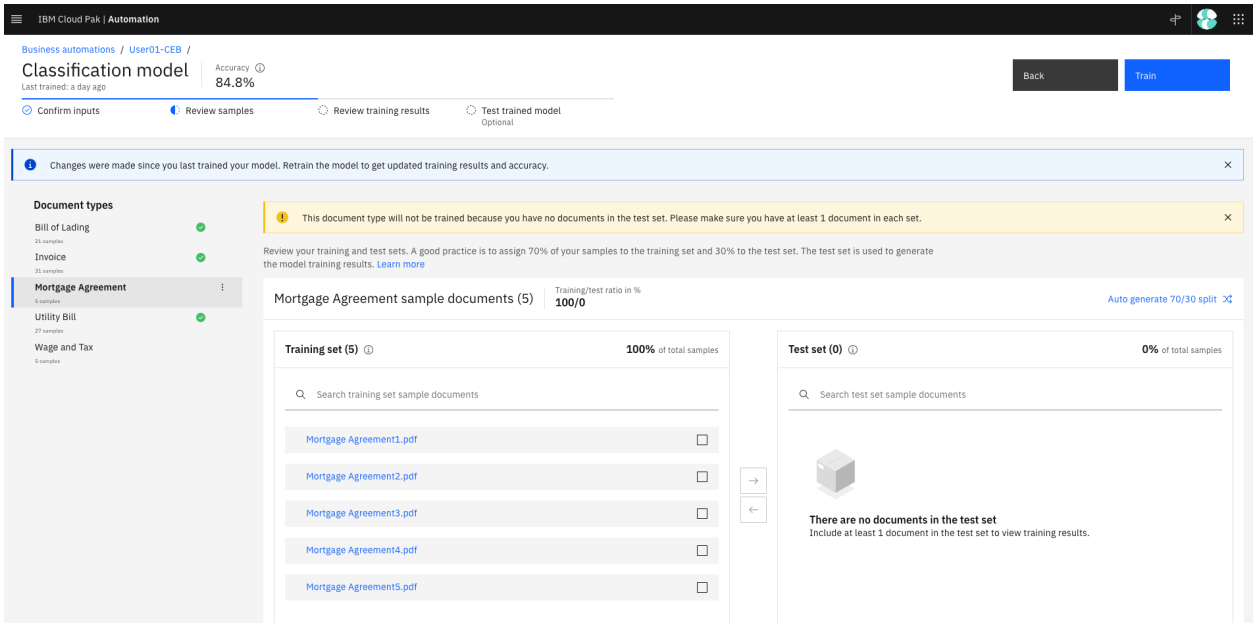
_2. **Click** anywhere in the **CLASSIFICATION MODEL** line



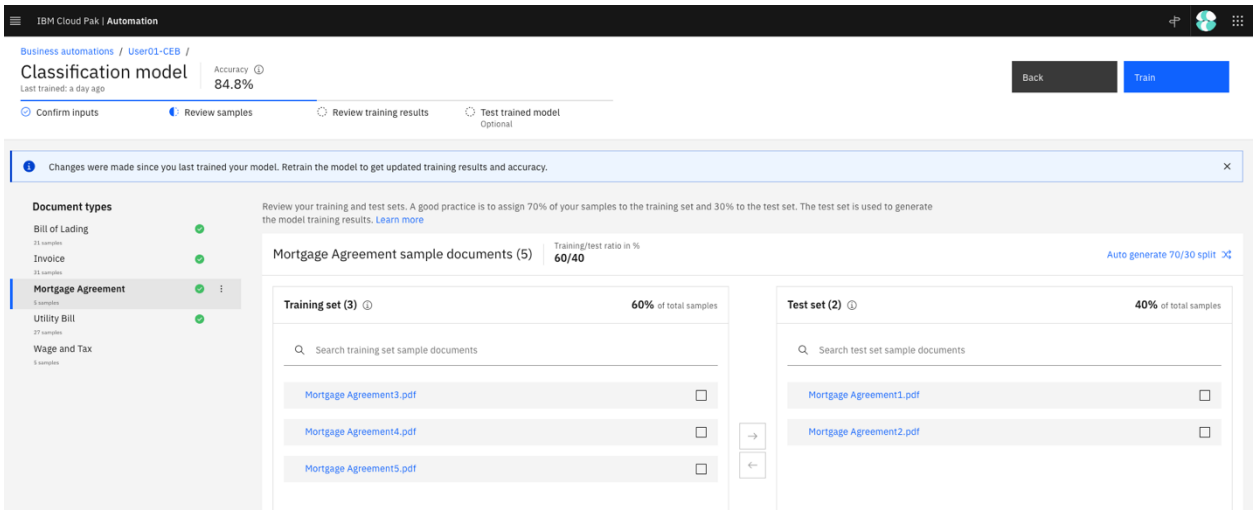
Once we open the classification model, we will be presented with details on how to perform the retraining. There are four basic steps – Confirm inputs, Review Samples, Review Training Results, and Test Trained model.

On the Confirm inputs screen here we can confirm all the documents that will be used in this training exercise. We can also use the opportunity to remove documents that are no longer relevant or upload additional documents.

_3. **Click Next** this will move from the Confirm inputs to the **Review Samples** step. Notice three documents have green icons next to them. These green icons show these documents have test samples already assigned. The new document types (Mortgage Agreement and Wage and Tax) do not have any test samples assigned yet therefore there's no green icons since we haven't assigned test sets yet.

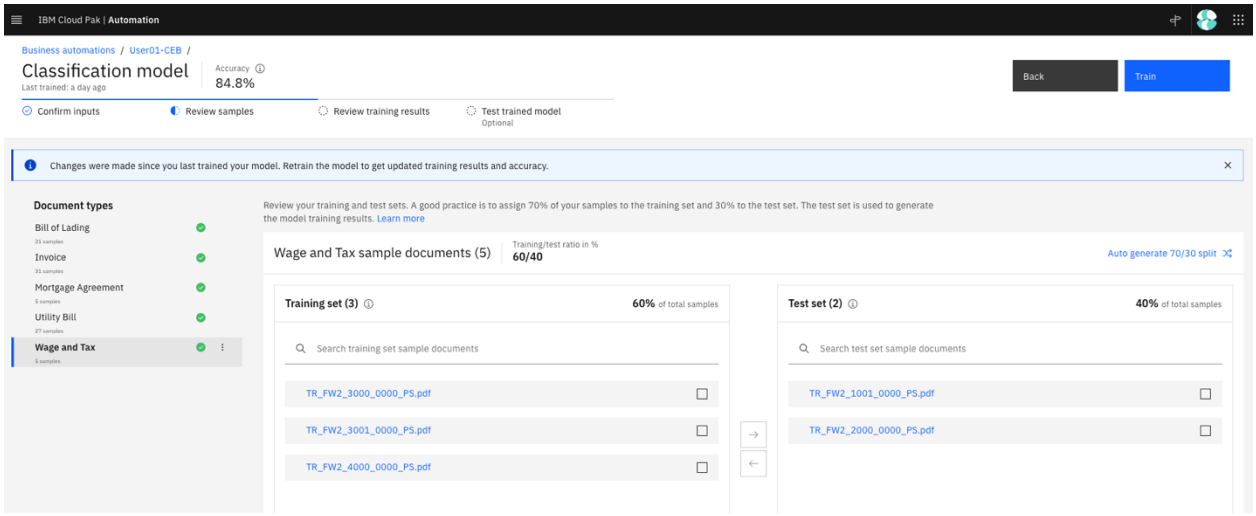


_4. For the Mortgage Agreement move two documents to the Test set by **checking** and **clicking on the arrow**.

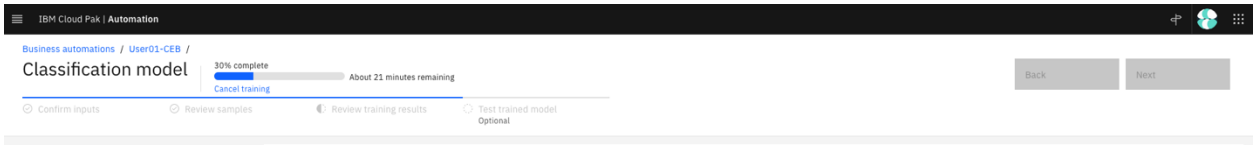


_5. **Select Wage and Tax** on the Document types and move 2 documents over to the test set.

The suggested split is 70/30 – that is, 70% of the available sample documents should be used for training, and we will validate the training results with 30% of the sample documents. This split is only a suggestion, and we can adjust it, but 70/30 is a good starting point.



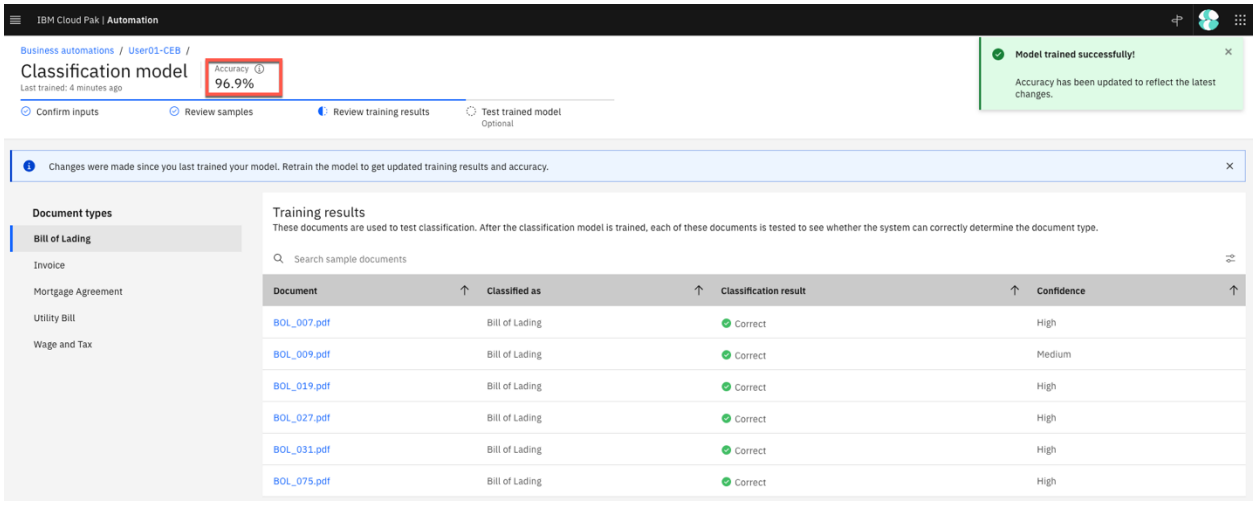
_6. **Select TRAIN** to launch the training. This may take a several minutes. You will see a progress bar has training progresses.



Once complete, you will be able to see the training results.

What's happening: The samples are run through multiple machine learning algorithms. These machine learning algorithms learn from the ground truth, the association between the sample documents (the OCR text) and the document types. The yielding models are then evaluated with the documents in test set. The model-predicted document types on these documents are compared with the human-provided answers to compute the accuracy. The top three accurate models are presented to the user, with the most accurate one being selected by default.

You should see something like the following:



_7. **Click** on each of the document types. Notice the confidence levels. The both the Mortgage Agreement and Wage and Tax have a confidence of low (this will be pointed out even later after we deploy).

You can easily see where the system may be struggling. You should look for document types that don't match the actual file or have a low confidence. Remember the more documents you give to train, the better the results.

_8. **Click** on **Next**. This is the Test trained model. Here you can try and test other documents to see if they classified correctly. This step is optional but would be useful to try out the AI model to determine whether additional samples are necessary.

_9. **Click Done**

7.1 How do I improve my results?

Option 1 – Add more samples.
Option 2 – review all uploaded samples.

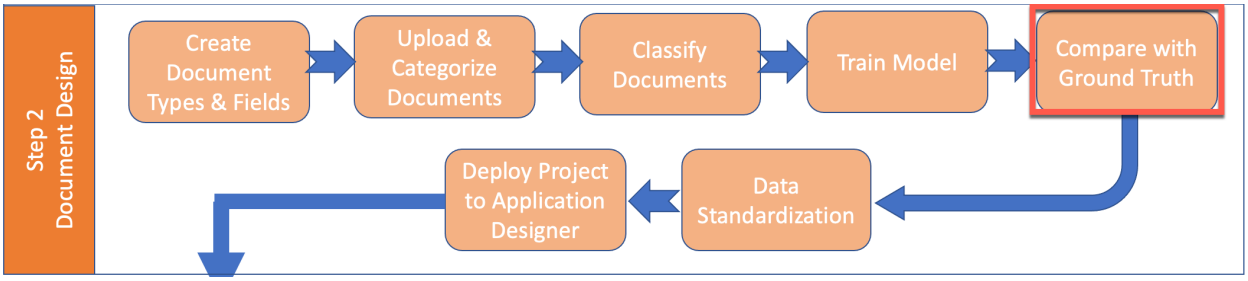
- remove those that are not a clear representation.
- remove those that are poor quality documents.
- carefully confirm that none of the samples contain multiple document types in the file. This is a common occurrence. A document is listed as a Purchase Order, but in the back pages, also contains other document types in that same file. This confuses the system.

To improve results, you would normally want to add more samples of the document ensuring they are clean and representative document to improve the system's understanding of the document.

Optional step add some more Wage and Tax documents from the Extra folder.

.

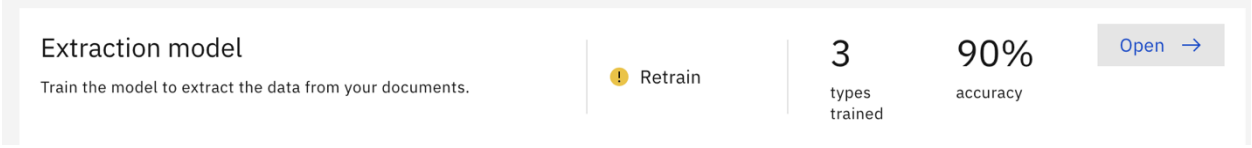
8 Data extraction



At this point, we have defined a document type, told the system which fields we want off the document and trained the system on how to recognize (classify)the document. In the Data Extraction portion of the lab, we will upload new Wage and Tax documents to Document Processing and see how our earlier configuration of the document type and related fields are working. This is comparing a new document extracted elements with the ground truth.
Once we open Extraction model, we will be presented with details on how to perform the retraining. There are five basic steps – Review samples, Add fields, Teach the model, Review the trained model, and Test the model.

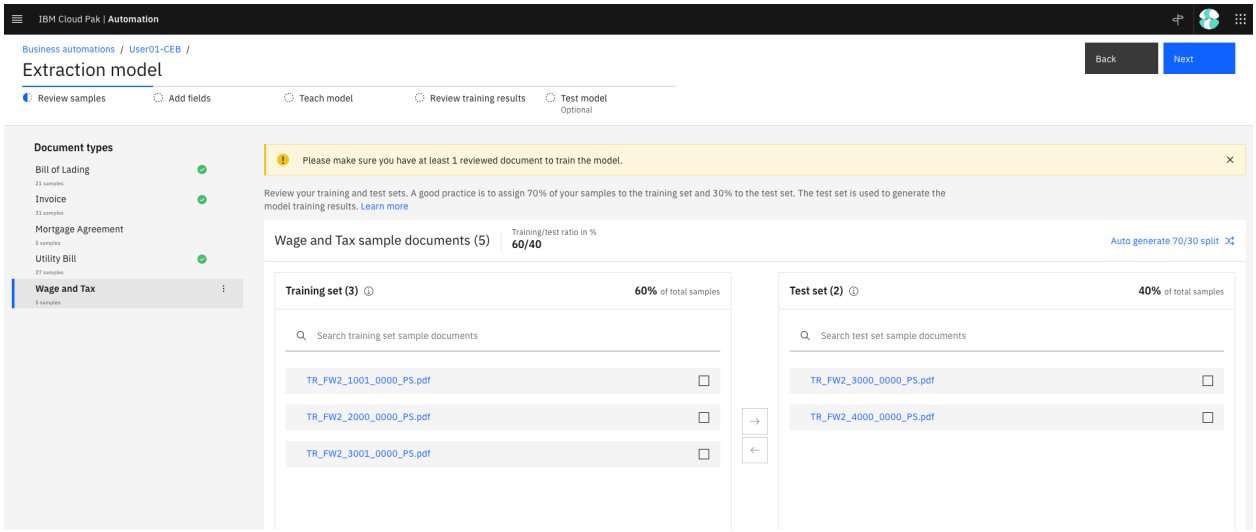
_1. From the guided configuration screen, **Click** anywhere in the **Extraction model** box.

> *Note: the status will reset to Retrain if it detects something may have changed. This is just a reminder that if you indeed changed something, you may benefit from retraining the model.*



_2. Next **Click** on the **Wage and Tax** document type under the Document Types section.

Like in the classification step, ADP needs to have the documents divided into a training and test sets. In general, *deep learning*-based AI requires a larger number of sample documents to achieve a reasonable result. But since our environment does not have GPU deep learning is not turned on.
You should have something that looks like what you see in the following screen shot.

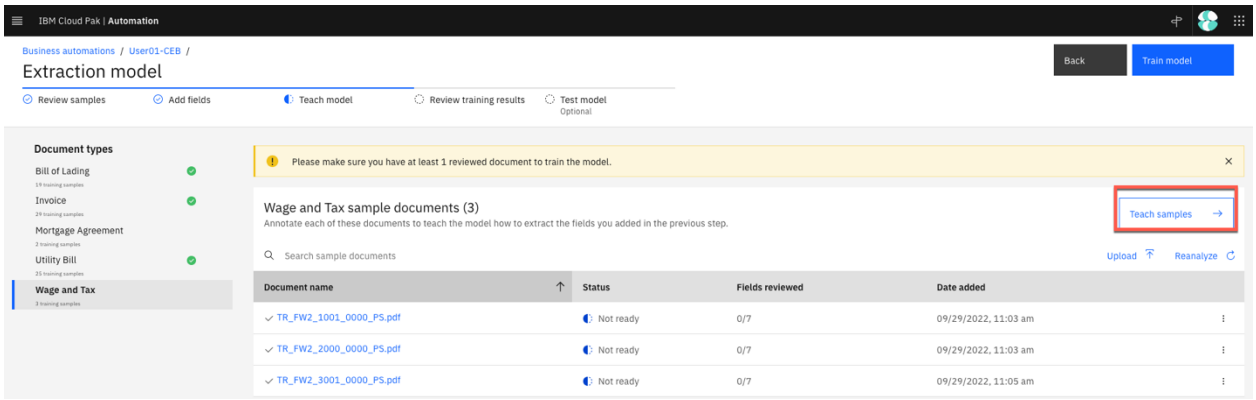


_3. **Click** on the **NEXT** button at the top.

You will now be on the Add fields bread crumb. If there were more fields to add we could do it here. But since we have already added all the fields needed, proceed to the next step.

_4. **Click** the **Next** button. You are now at the "Teach model" bread crumb. Teach the model is where you will spend most of your time. We can see that our documents are "not ready" so we'll need to teach the model with new documents.

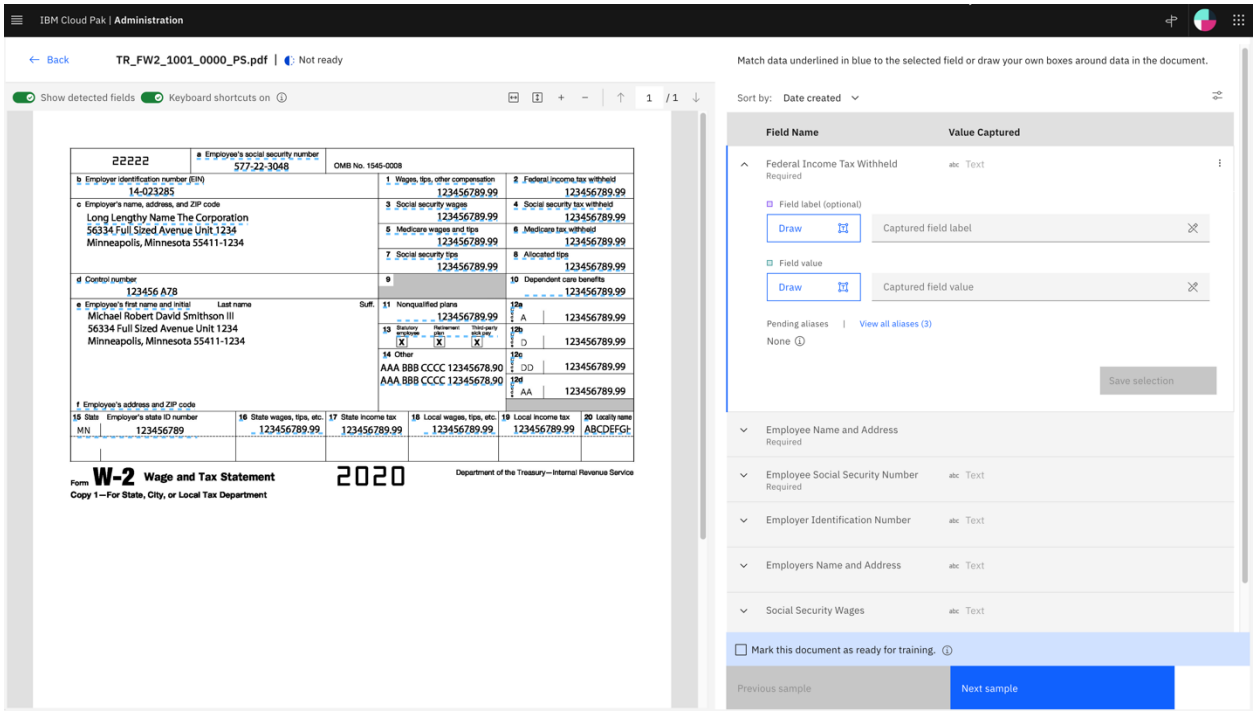
_5. **Click** on **Teach Samples**.



Note: Your individual results may vary based on the exact documents you upload, how you configure your fields etc. Therefore, general guidance is given here versus exact step by step instructions.

_6. We will now review the fields that were extracted, correct any that may be wrong and add others.

You should now see the field data extracted by the system. Nothing has been trained yet. All it is doing is using the aliases we entered when we created the document class to locate data. Now, you need to correct and improve the model.



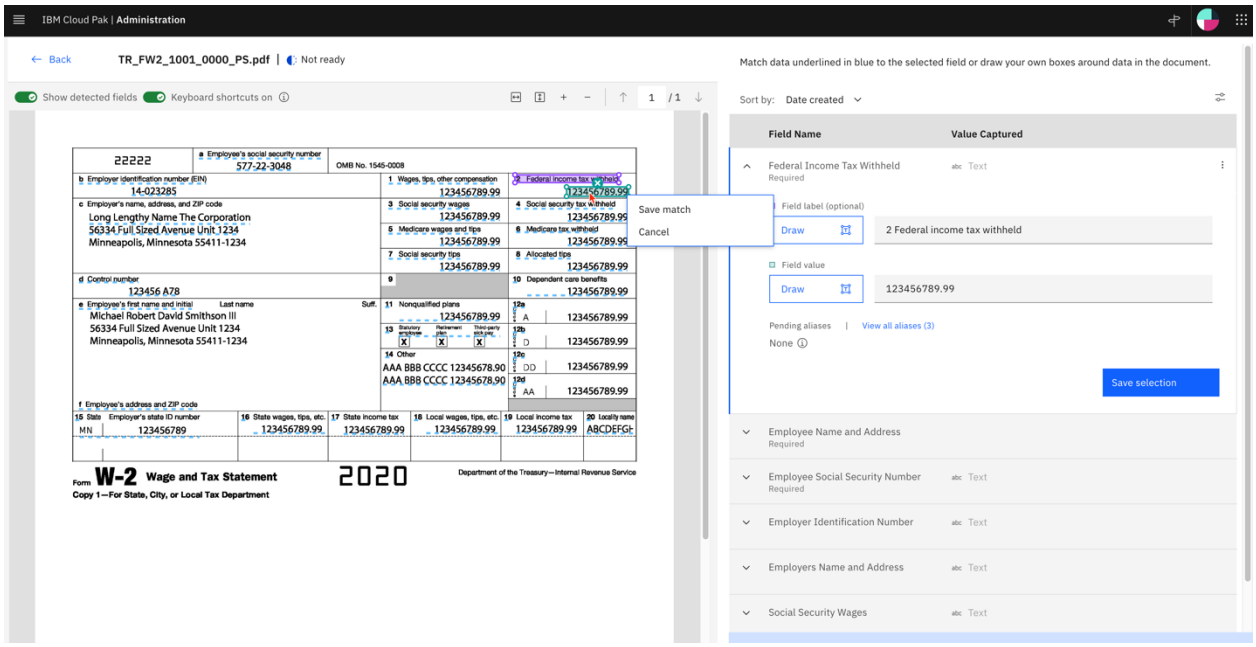
Note: You may see different results than shown on the image above.

Let's spend some time showing how to go about correcting these issues to help the system learn how to extract the values accurately.

8.1 Correcting extracted values

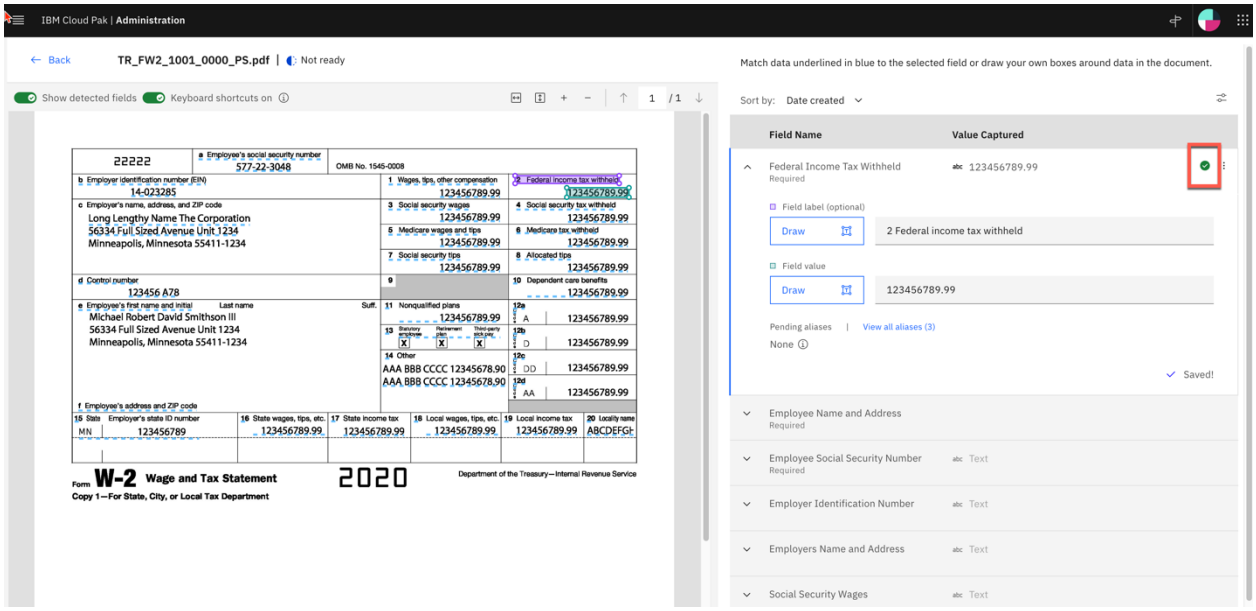
Let's start with the Federal Income Tax withheld field (i.e., The first one in the 'Fields to extract' list). You will see that there are a series of blue underlines below all the characters found. We are interested in getting the "Federal Income tax withheld" data.

_1. **Click** on the **number** below the heading **“Federal Income tax withheld”** in the image.



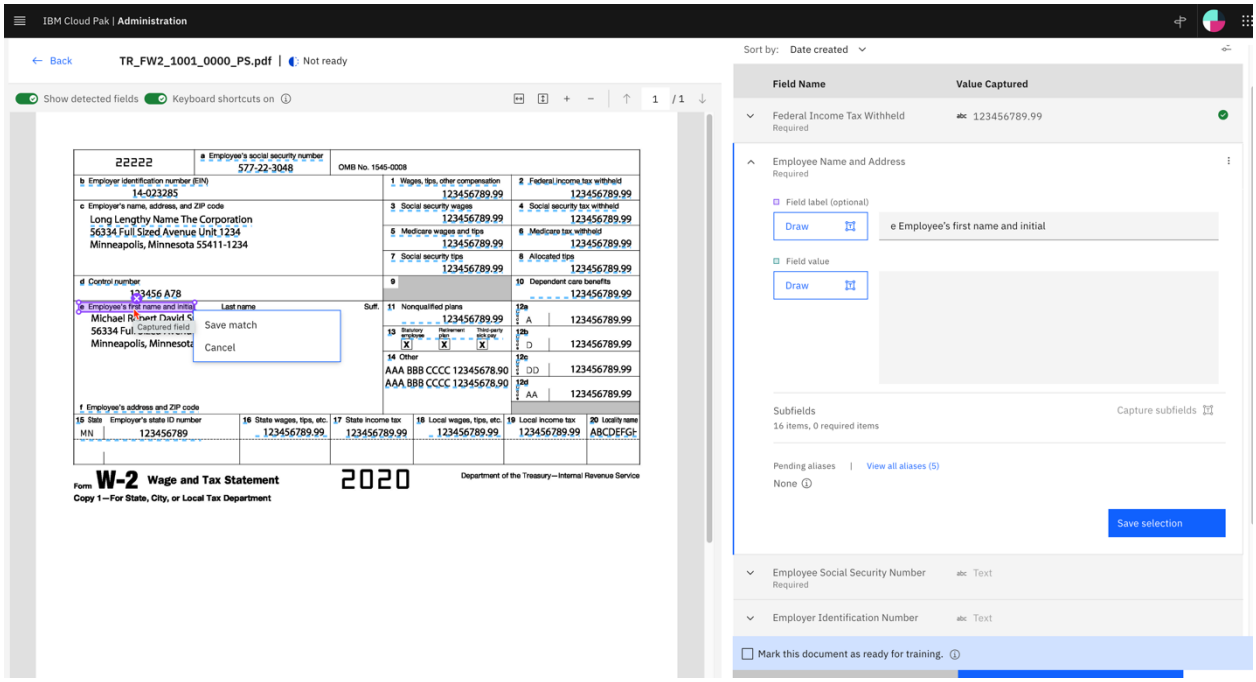
_2. A pop-up window will ask if you want to save match of value captured along with the field label. **Select Save match**

Notice a green check mark signifies this field is complete.



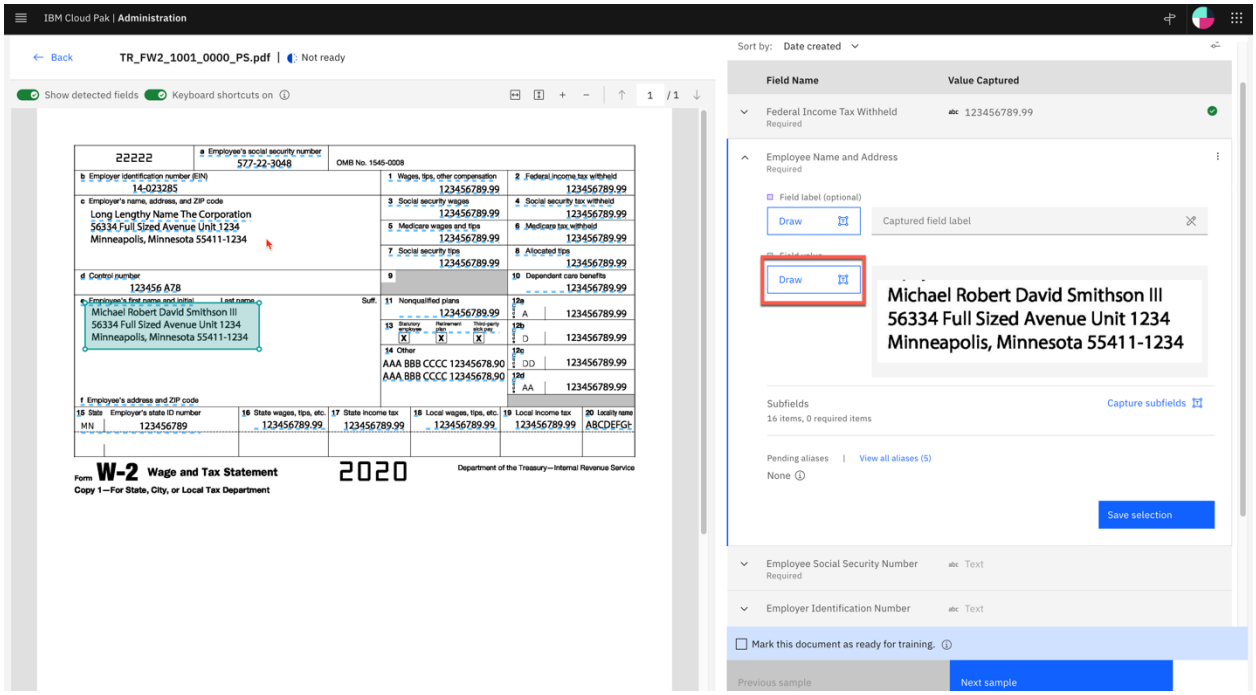
The 3 ellipses next the green check mark allow you to clear the data or update ADP to there is no field with this data in the current view.

_3. Moving to Employee Name and Address field. Notice there are no blue lines under the actual name but there are blue lines for the Field label. **Click** on the field label (“**Employee’s first name and initial**”). Again, **Click** on **Save match**



The field label has been populated but we still need the field value.

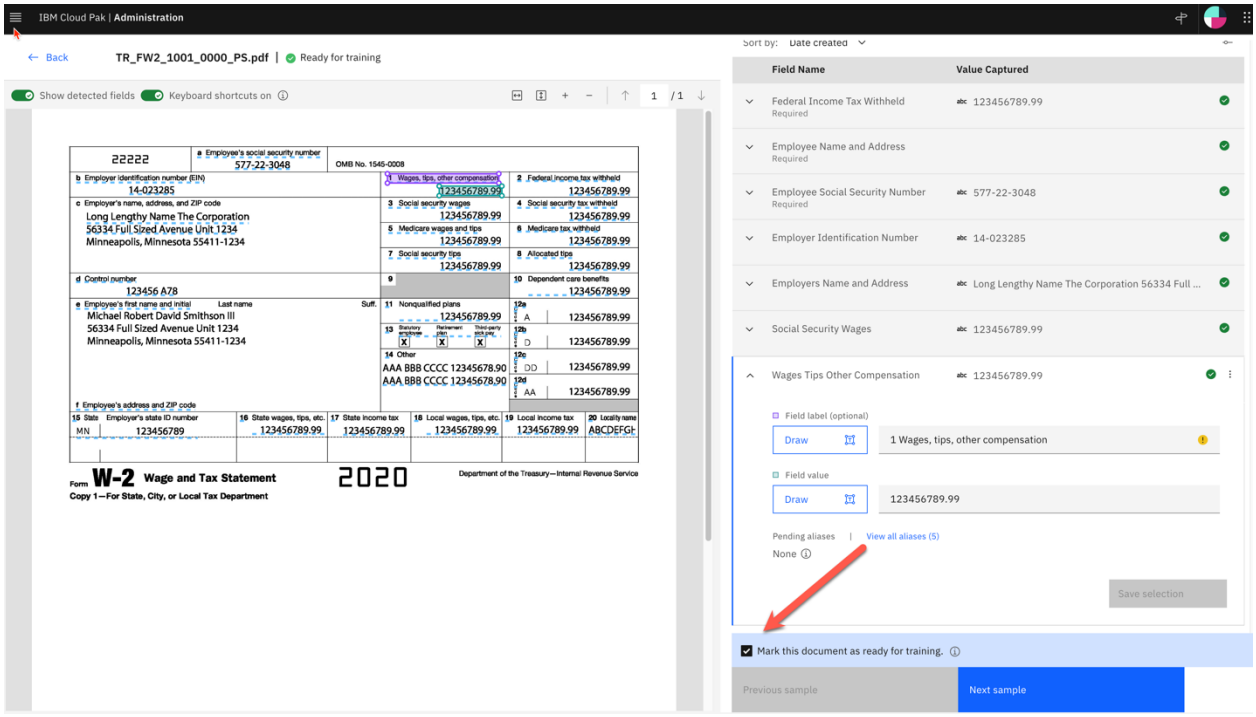
_4. For the field value **Click** on the Draw button under Field value. Using your mouse **select** the Name and address (green box), then **Select Save selection**



_5. For the Employee Social Security field **Click** on the **number** then **Select Save selection**.

_6. Continue to process for the remaining fields, using either method as described above, clicking on the blue lines or drawing a box around needed value.

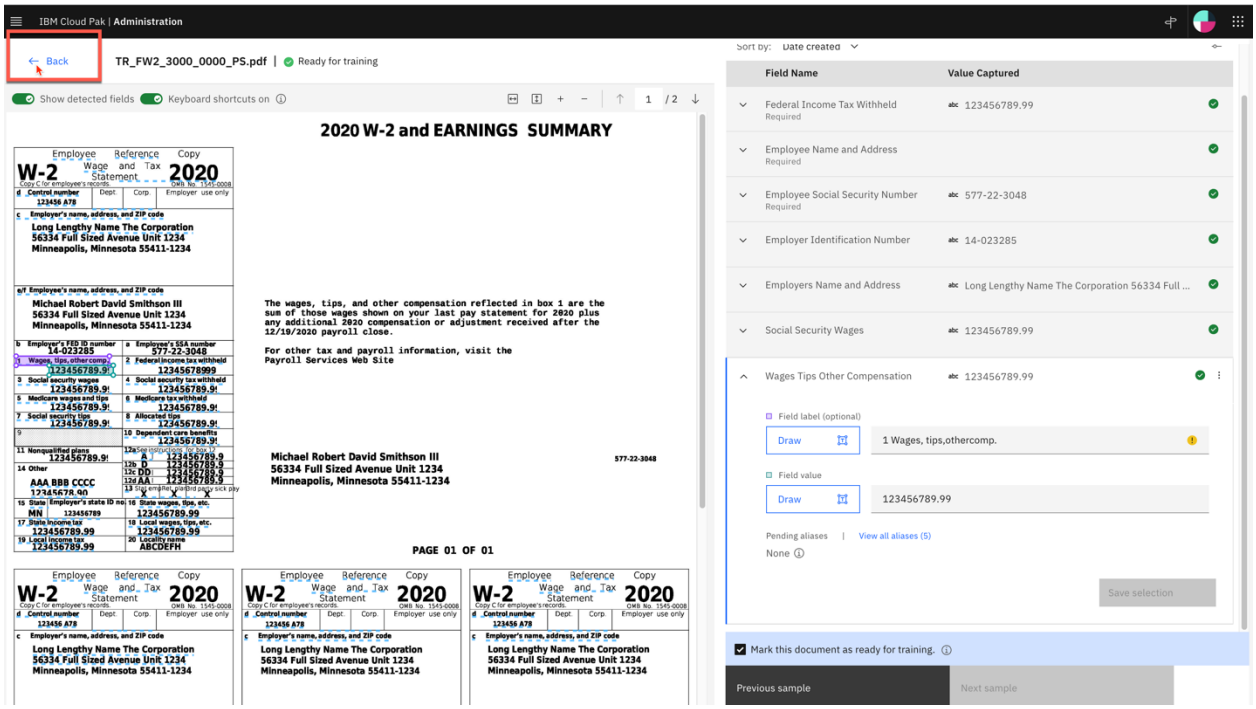
_7. Once complete **check the box** next to “Mark this document as ready for training” at the bottom



_8. Review ALL other fields carefully. **Do not leave any incorrect values**. You can adjust or delete values as needed by clicking on Edit selection. If you leave incorrect values, the system will assume they are correct and actually LEARN them as if they were good values.

_9. Repeat **steps for Next Sample**
Over the course of next few samples you may find that ADP has extracted the wrong results, perhaps getting a value that is above when it should have been below. If this is the case and you pick you a blue underline data, but the results are wrong. Simply use the draw box for the Field Label and Field Value.

_10. Once complete review of all the sample documents **Click** on the **Back link**

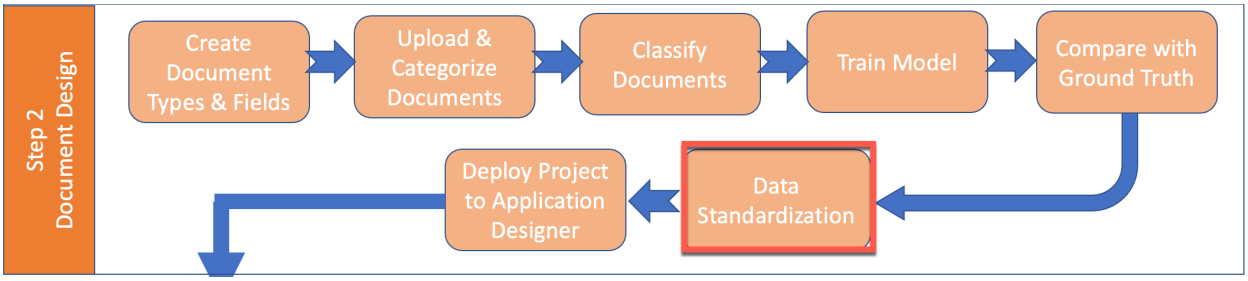


8.2 Train extraction model

We will be performing the quick training in this lab due not having a GPU in our TechZone architecture. A GPU is only needed a development environment and is not needed in either a production or runtime environment. The Deep Learning capabilities have been disabled on this training environment. You can find instructions in the Appendix for when you have access to a server with it enabled.

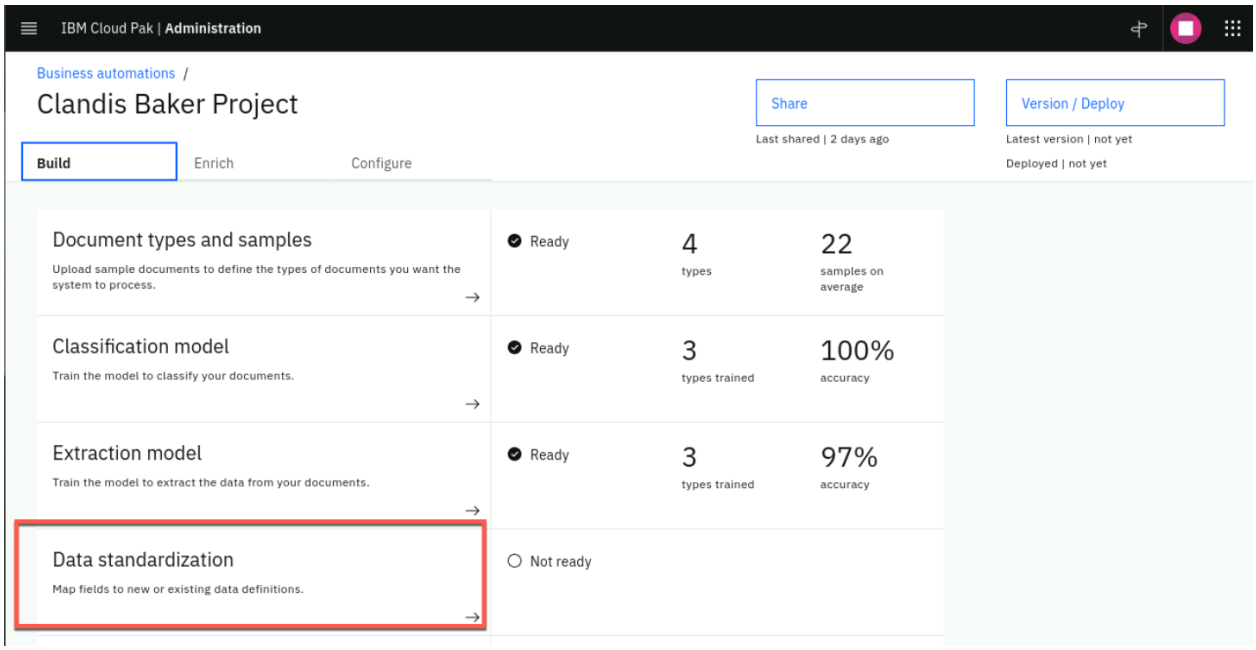
_1. **Click Train** button.
This will take several minutes. (Good time for a break)

9 Data standardization

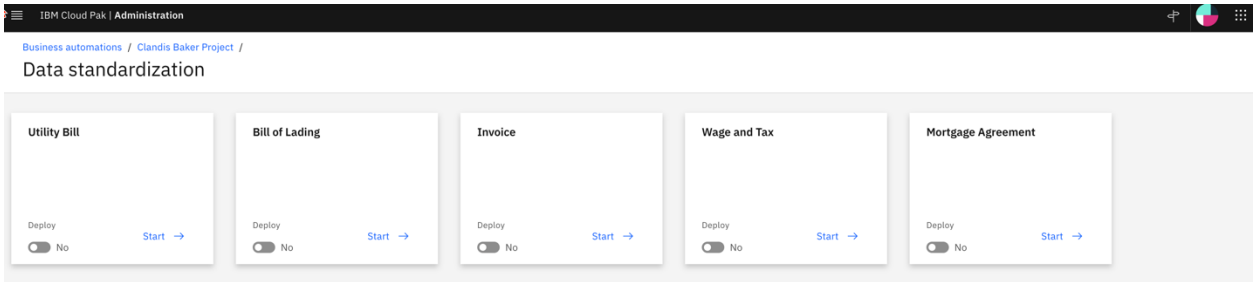


Next, we need to standardize the data that will be presented in the user interface and how it will be stored in the FileNet repository for example. Data standardization is the process of defining attributes for a data field in a standardized way. This is done using data definitions. These definitions can be used across projects, and across different applications within the CloudPak for Automation. Each data definition has a title, description, and a datatype. We can also set a data definition as required or not. When a document is ingested into ADP, it results in a list of Key Value Pairs' (KVP) for that document. The Designer maps some of these KVP's to fields and teaches the model on how to extract the fields from the full list of KVP's. The designer then maps some of those fields to data definitions for a particular document type. Only the fields that have been mapped to data definitions will become Content Process Engine properties.

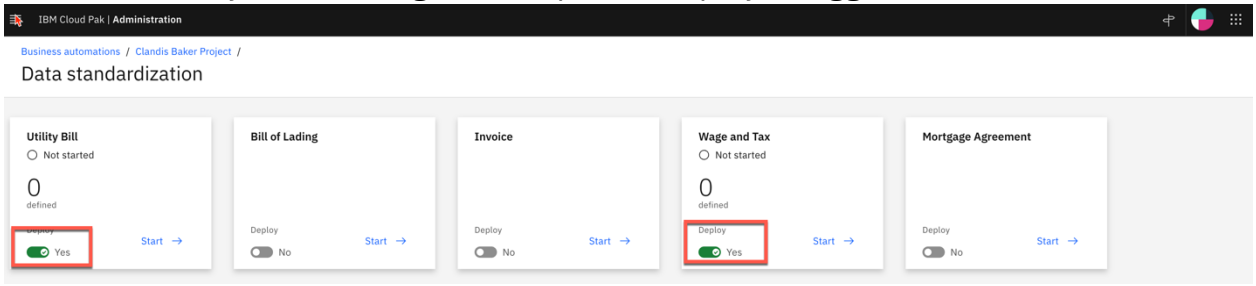
_1. Return to the guided configuration flow and **Click** anywhere in the **Data standardization** box



Here, you will see a list of available document types. Only the ones which have Deployed turned on will be visible in the verify interface and will have fields stored in FileNet.



_2. Ensure the Utility Bill and Wages and Tips and Deploy is toggled to **Yes**

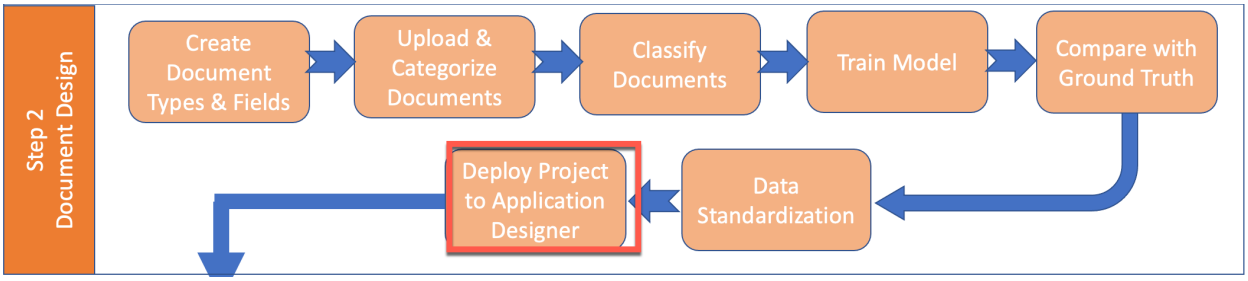


_3. **Click** on **Start** on either selected deployment.

This is where we begin defining the data filed attribute definitions. You could create a new data definition and configure them.

_4. Return to the guided configuration screen by **Clicking** on **<your project>** name at the top of the screen.

10 Version and deploy your project

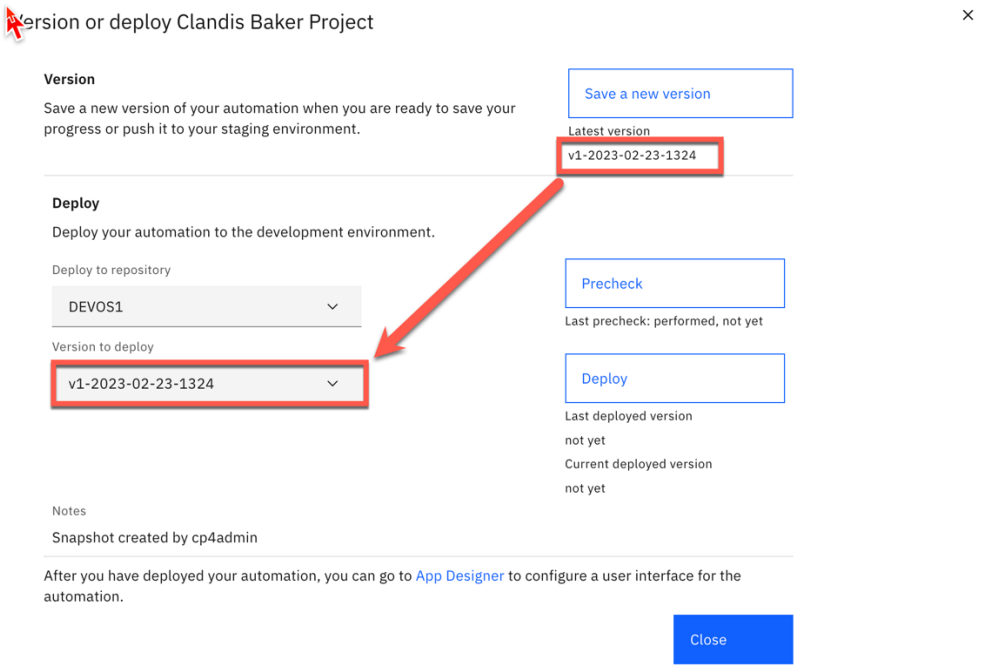


At this point in our Designer project, we have defined a document type, labeled the fields we want from the document, trained (classified) the system to recognize the document type, reviewed the extracted fields we wanted and standardized (mapped) the document fields to our output.
Now that we completed the configuration of the content extraction project, we need to save and deploy the design project to the application side. This will allow you to test your project using a client runtime interface.

_1. If not already there, return to the guided home screen by clicking on your project name. Then **Click Version / Deploy**

_2. Click **Save a new version.**

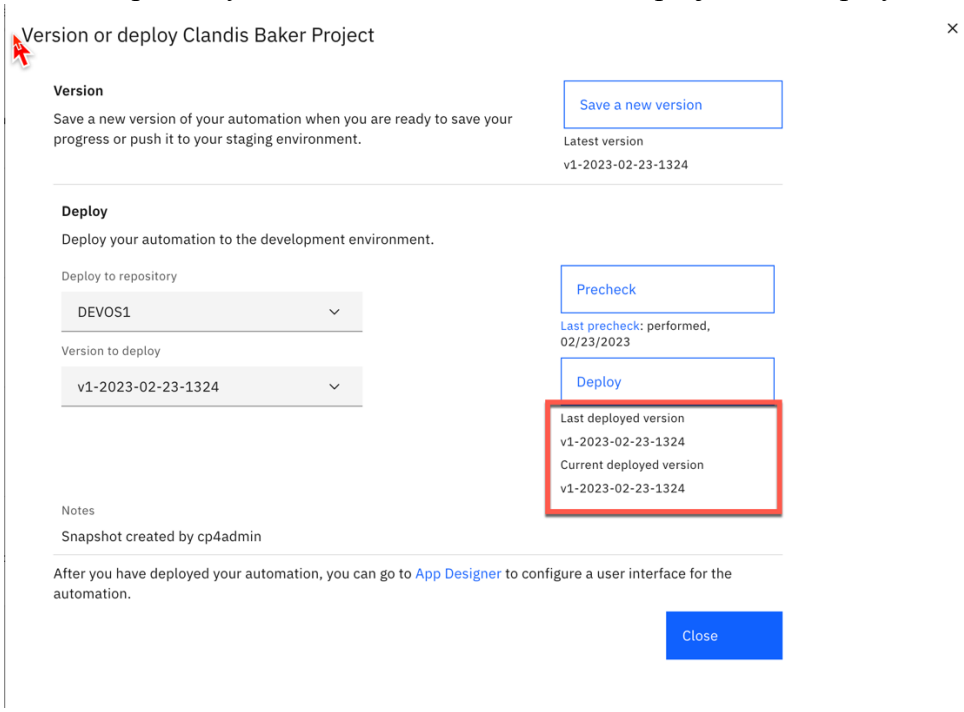
_3. Once the version is saved, you should see the version in the Version to deploy drop down list



… also, in the top corner has the “Latest Version”

_4. Click **on** the **Deploy button**. This will also take several minutes and potentially time out if others are also trying to deploy.

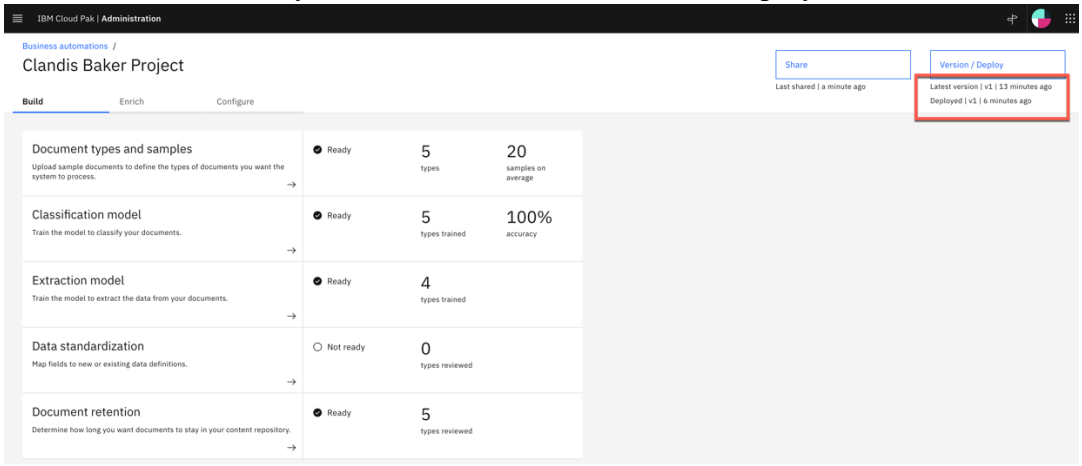
Once completed, you should have a notice that the project was deployed.



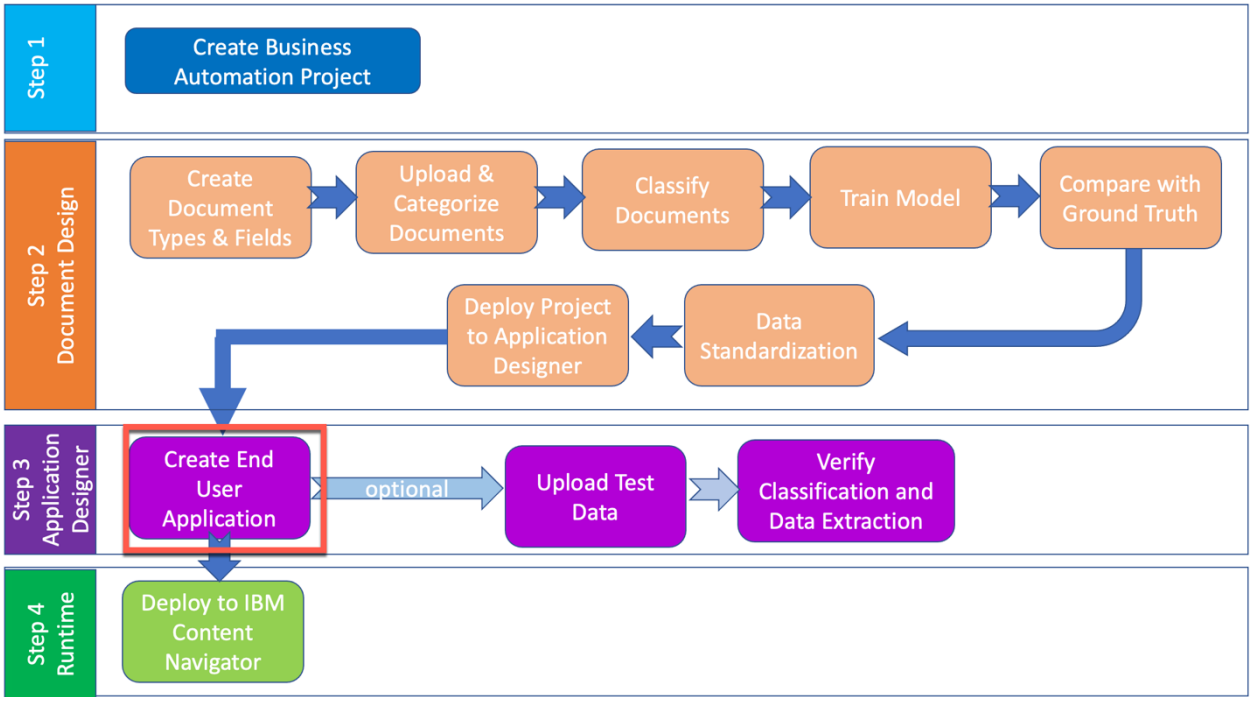
Note that you do not have to remain in the deploy screen while it is versioning or deploying. You can always click the button and then go back into any other screen if you like. It will run in the background. If you do this, just keep an eye on the top right of your screen for deployment status.

_5. **Click Close** button.

Once deployed, proceed to the next steps.
From the home screen you can see the latest version and deployment



11 Application designer



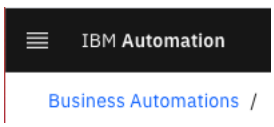
At this point we have designed or built a project that consists of document types, data or filed types and methods to extract the desired data. The next major section of this lab is to build the user interface using the Application Designer. IBM provides two application templates for Document Processing

1. Batch Document Processing template – used to process batches of documents.
2. Document Processing Template – used to process single documents.

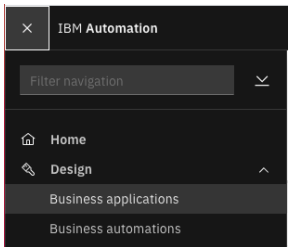
The lab will have you create a new batch processing application. We will quickly explore the various tabs in the interface, preview what the IBM Content Navigator (ICN) client would look like using the Preview feature and then publish our application to ICN where we will process a batch of documents.
Changes to the application itself will not be in the scope of this lab.

11.1 Create your Runtime Application.

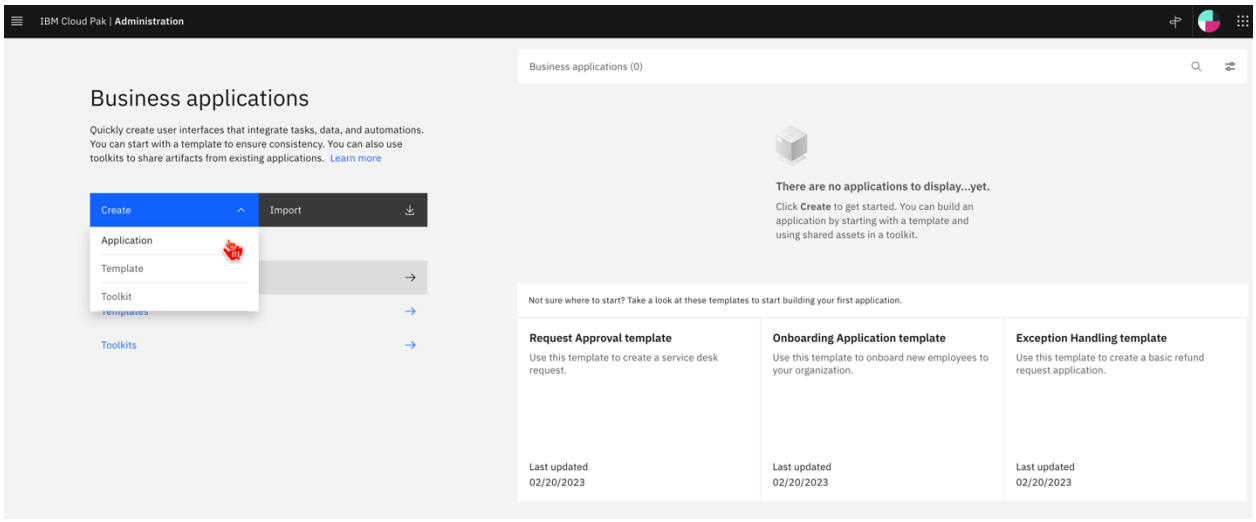
_1. Return to the starting screen by **clicking** the **hamburger** in the top left.



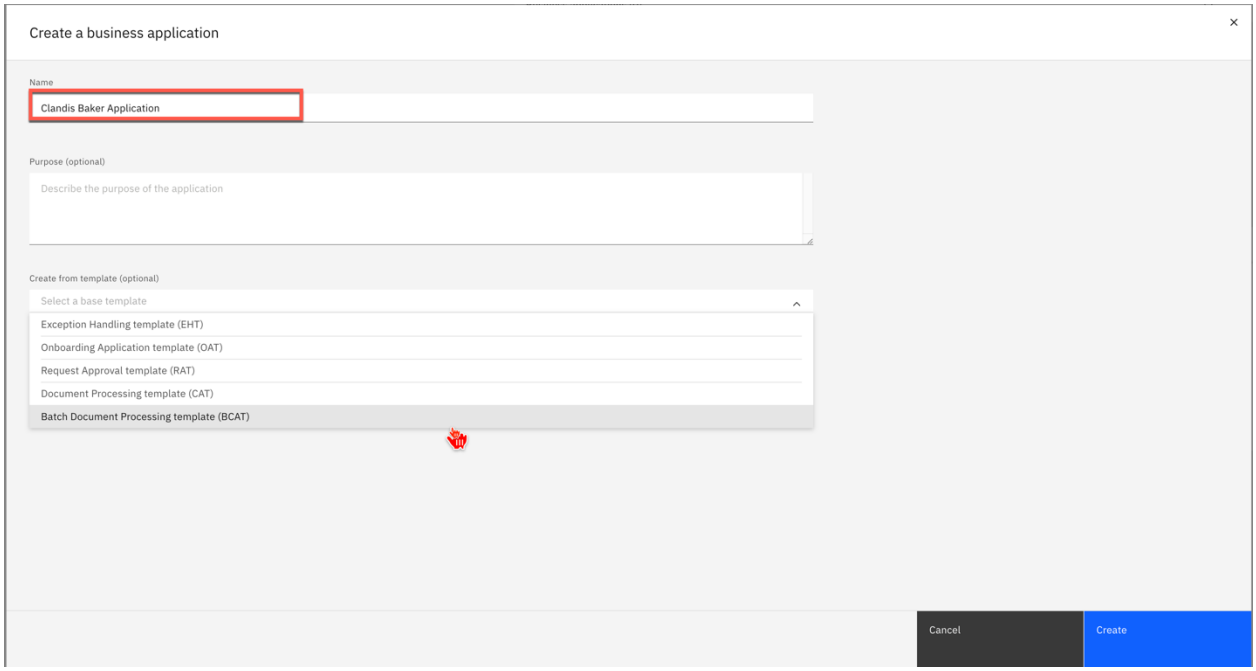
and **selecting Business Applications**



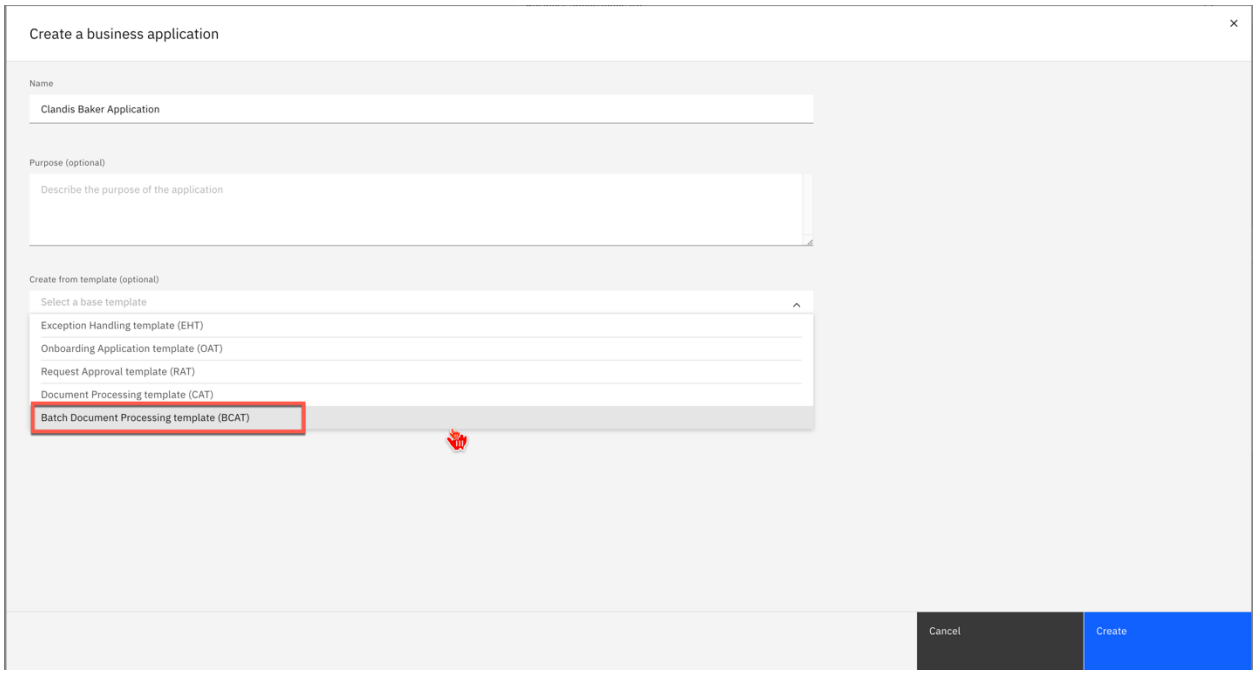
_2. From the **Create** drop down list, **select Application**



_3. Select **Enter your <*application name*>** in the Name field.



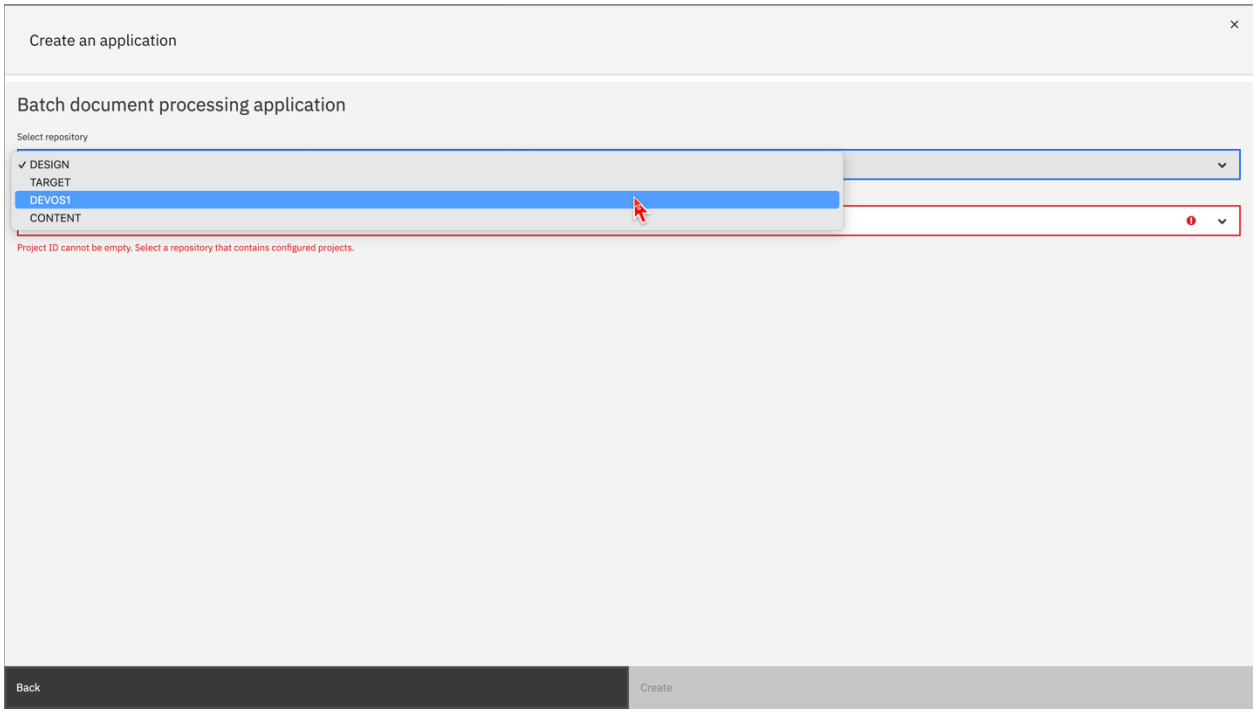
_4. In the Create Form Template give it a ***<Name>*** and in drop down **select Batch Document Processing template (BCAT)**.



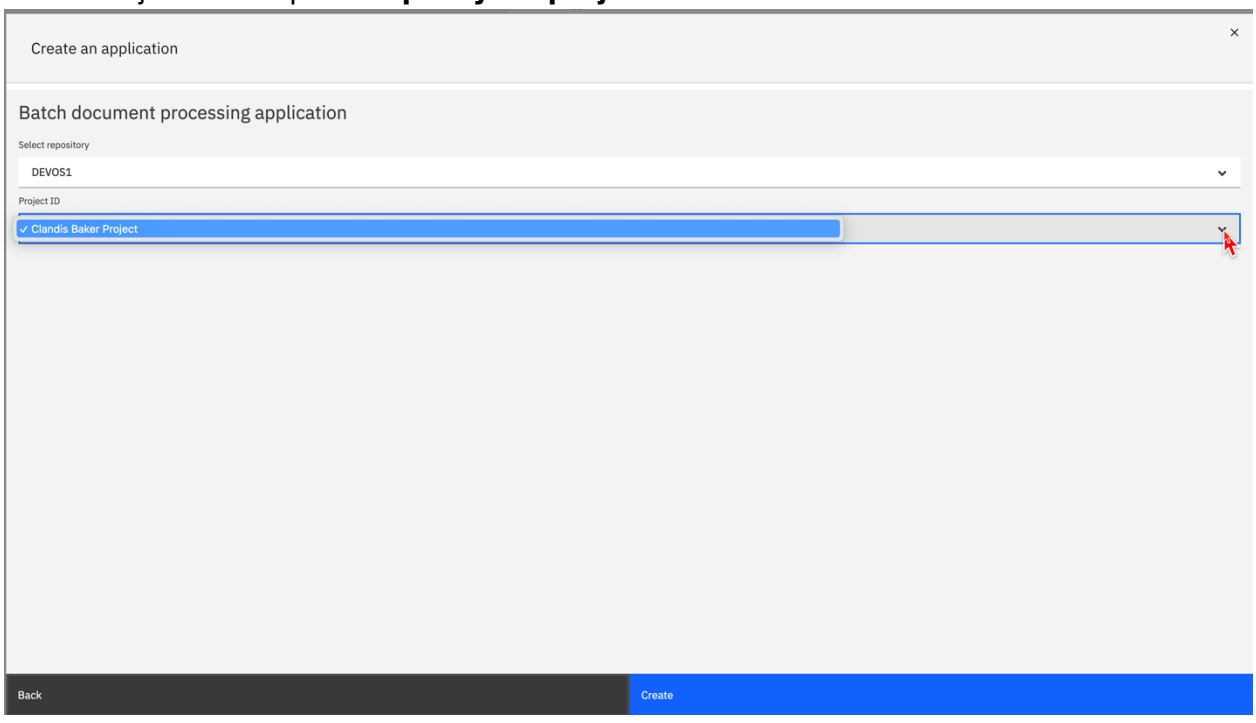
You could have selected the Document Processing Template if you only wanted to process a single document at a time, but in this lab, you will process several documents in a batch.

_5. Click **Next**

_6. You will be presented with the Create an application window. In the Select repository **pick DEVOS1**

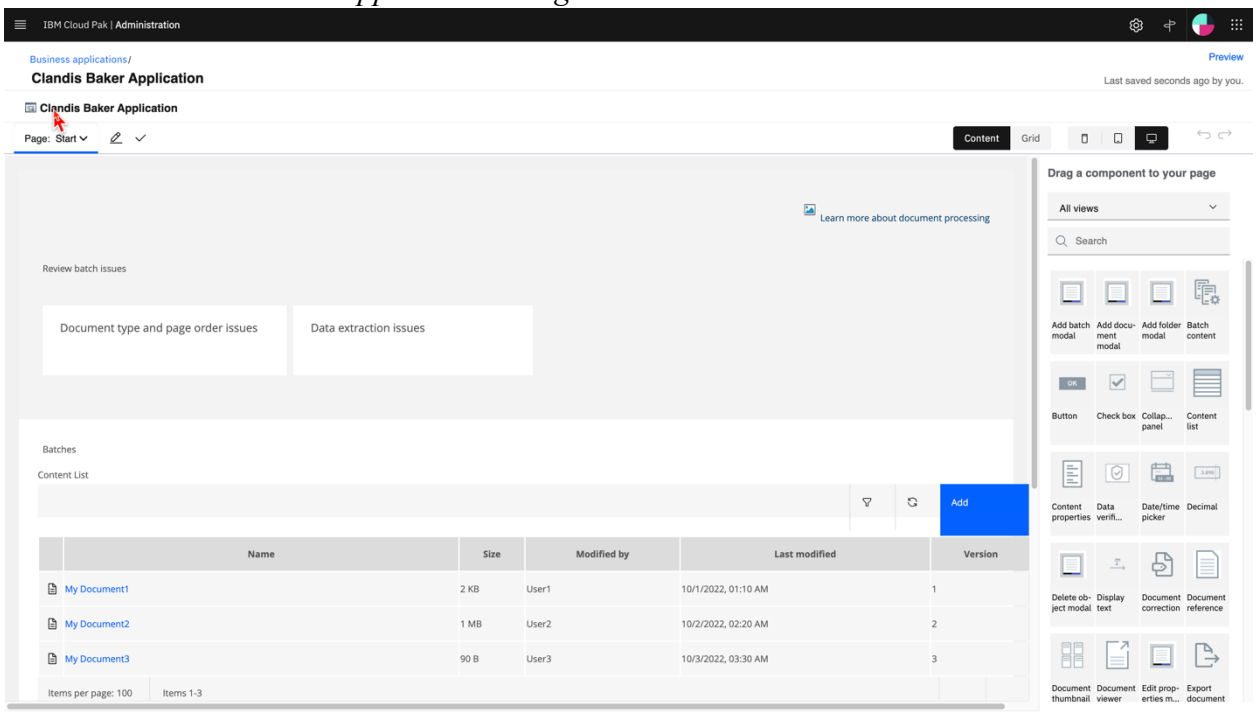


_7. In the Project ID drop down **pick your project name.**



_8. Click **Create**

You should now be in the *Application Designer*

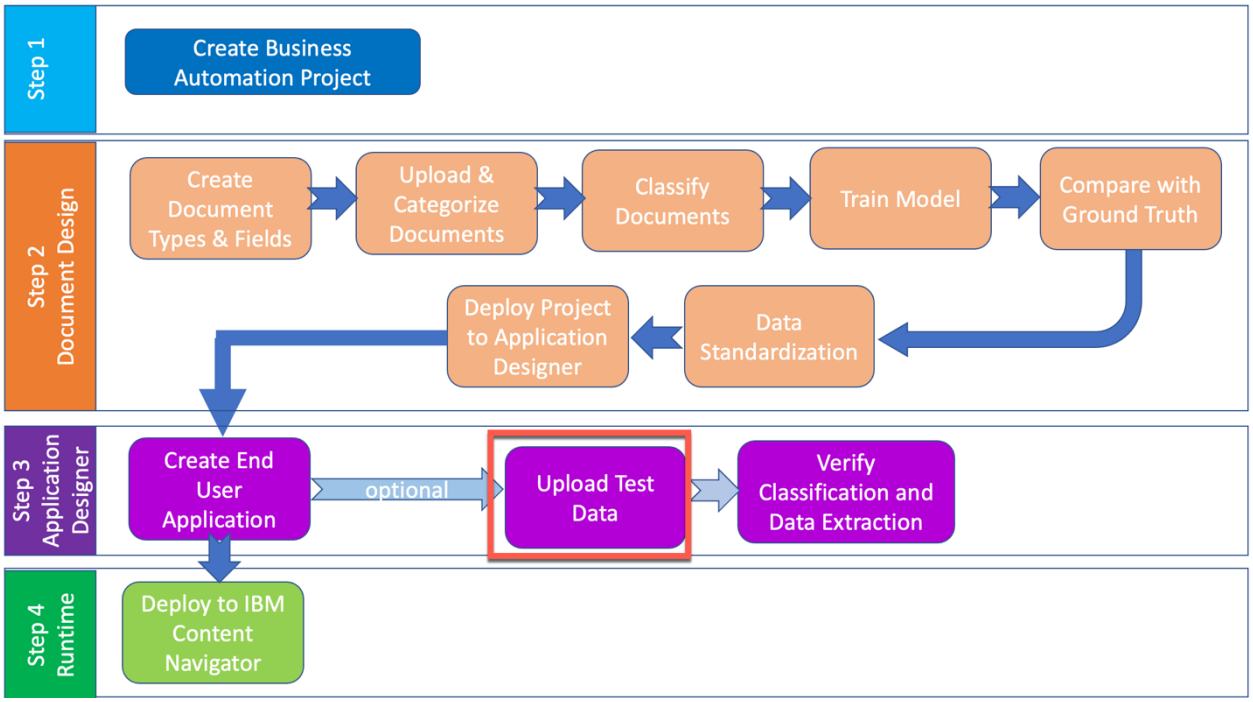


Batch Document Processing template (BCAT) has all the necessary pages and configuration to start using the application. Using this designer user interface, you have the option to further customize the application, such as its page design or actions, to fit your requirements.

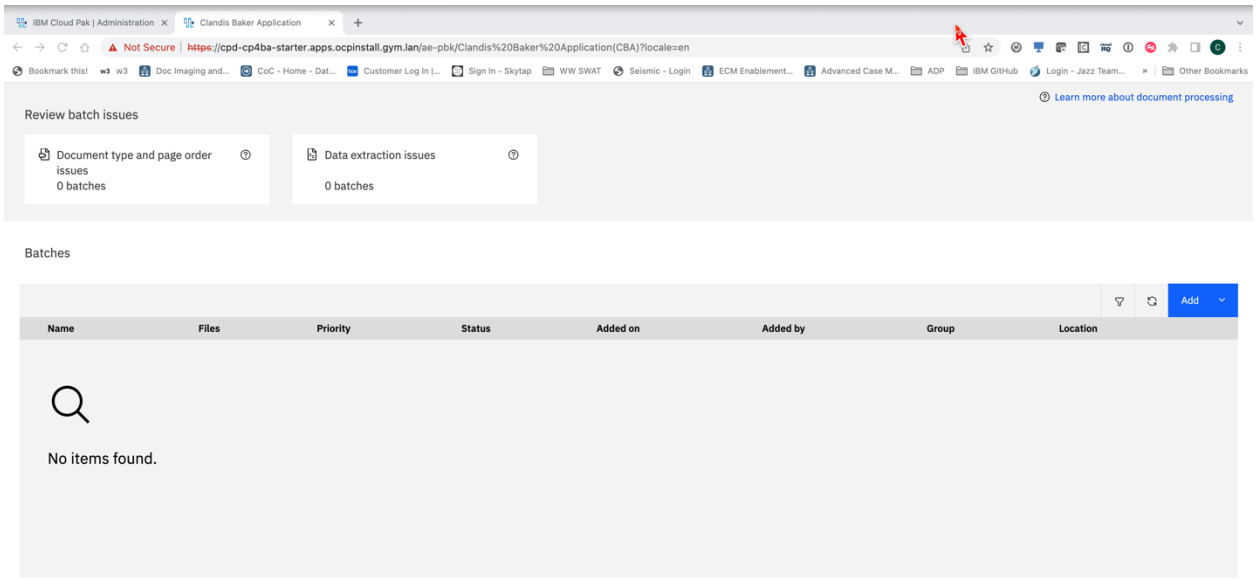
_9. Click **Preview** at the top right corner**.**

> *Note: It may take several seconds to build and display the current configuration of the interface.*

11.2 Upload documents for processing

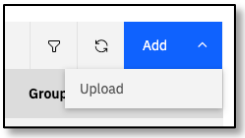


_1. You should be in the default application user interface for ADP.

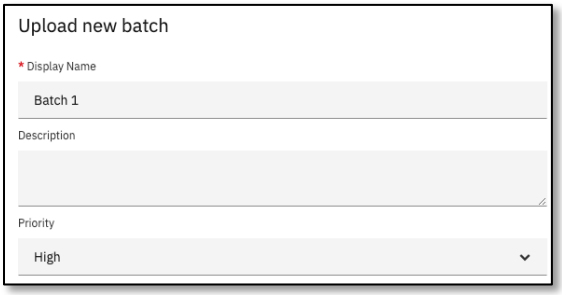


There are two key screens you will work with: "*Document type and page order issues*" and the "*Data extraction issues*". First, we need to upload some test documents and have them processed.

_2. **Click** on **Add**, then **Upload.**



_3. Enter a ***name*** for your batch in the Display Name field and set the **Priority to High** as seen in the image below.

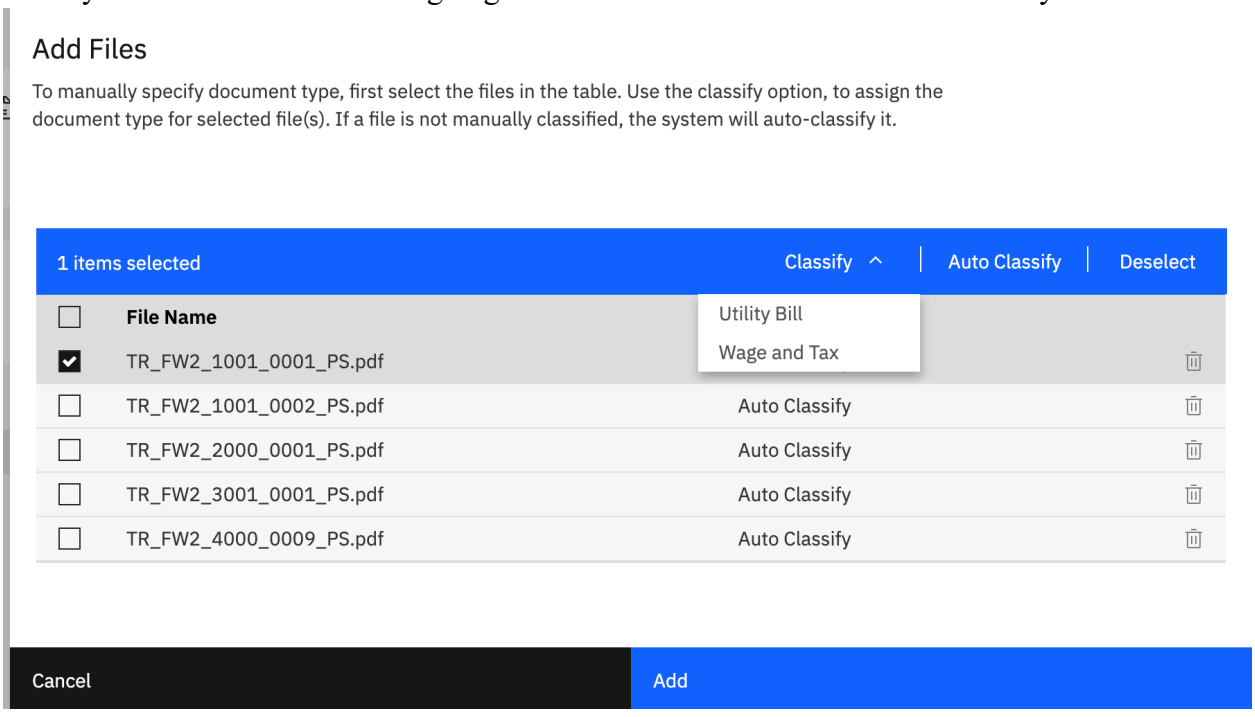


_4. Click **Select files**.

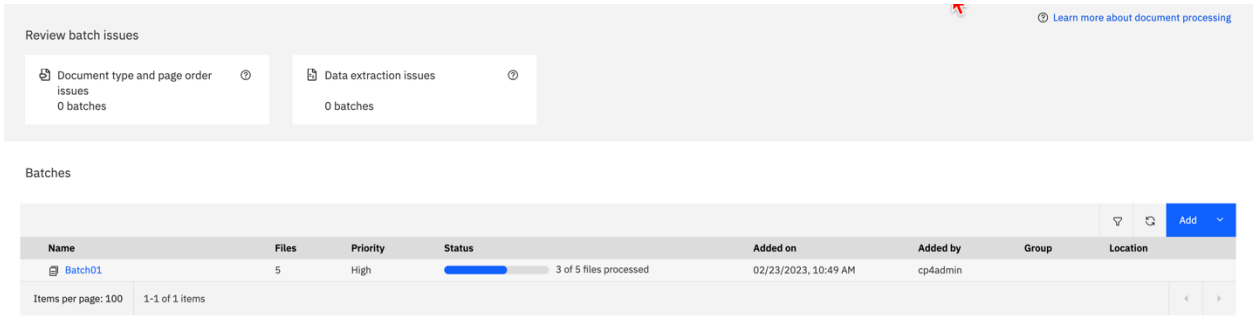
Navigate to the samples folder previously downloaded and use the *Group 2 ADP Application* folder documents.

_5. Click **Open**

You will see a window that will give the operator a chance to manually classify the documents before they are ingested. In the example below would be how to manually classify a document. We are not going to do this but instead let ADP auto classify them.

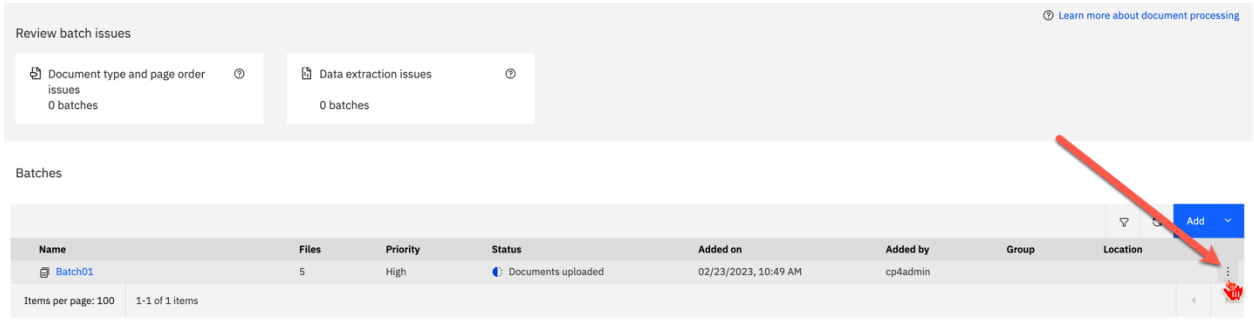


_6. **Click** on the **Add button.**



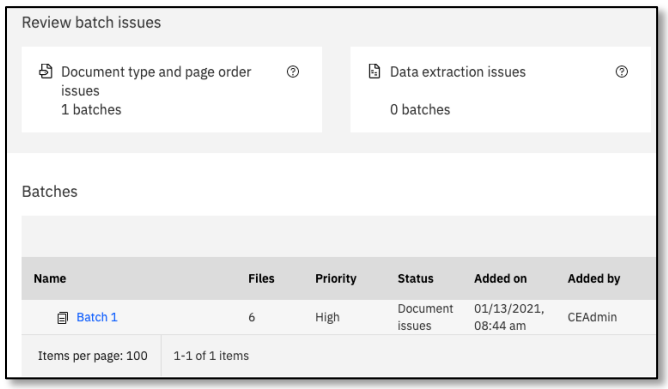
A progress bar will be displayed indicating when all documents have been uploaded.

_7. **Click the 3 dots** at the end of the line.



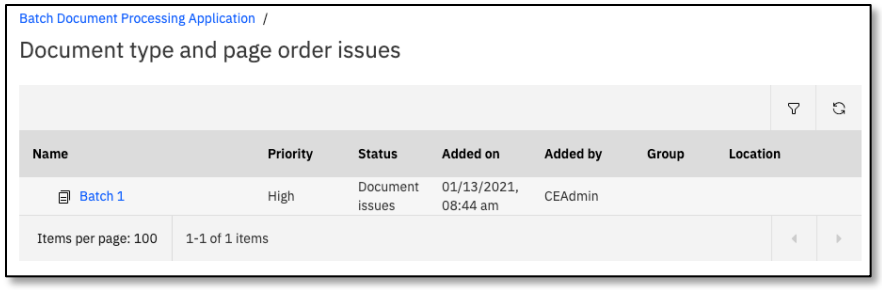
_8. **Click Submit**

In the screen shot below, you see we have a document issues (status) and we now have 1 batch in the “Document type and page order issue” tile.



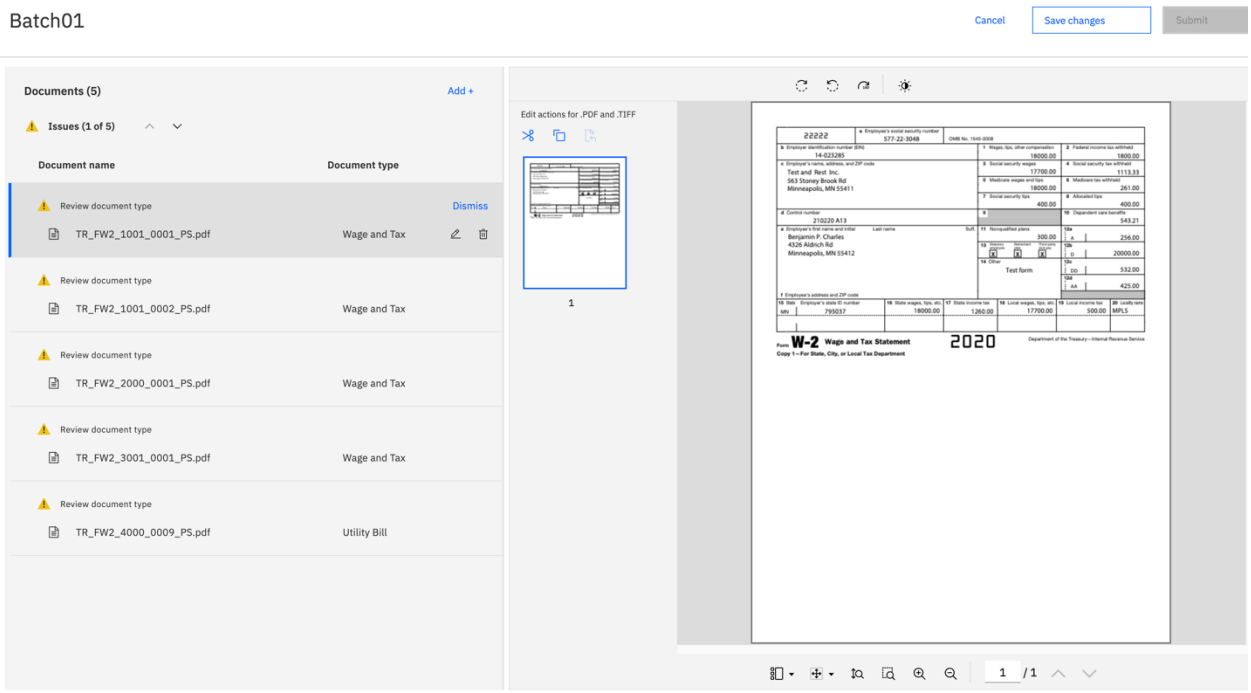
11.3 Correct any classification errors.

_1. **Click** on the **Document type and page order issues** tile to open the batch.



_2. **Click** on ***<your batch name>*** to open it.

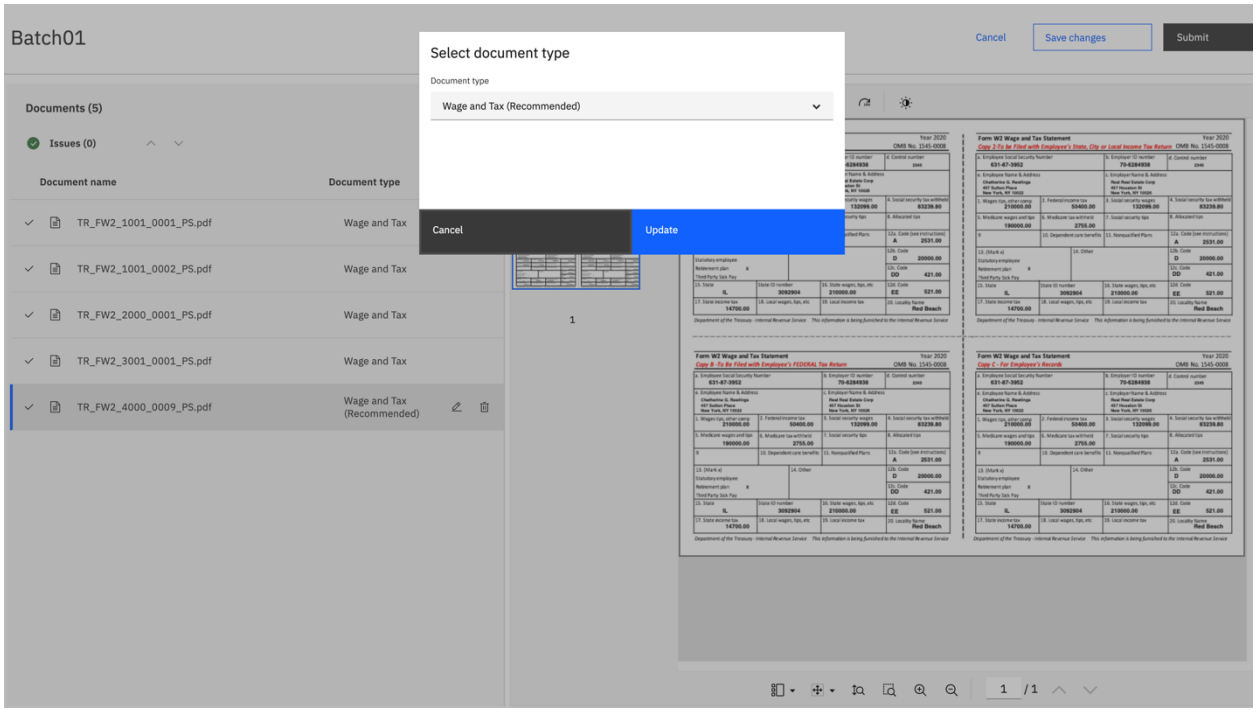
You should now see all the documents you uploaded in your batch. The ones with issues will have a yellow checkmark for documents that have a low confidence document type and a red exclamation mark for documents it could not classify.



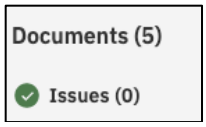
Why did all of Wage and Tax get flagged for review of document type? If you remember back in the classification section, we only uploaded the bare minimum of 5 documents and our classification was marked low. By adding more documents, we can train ADP further and not receive low confidence on these documents.

_3. Most of the document types are correct so we can **Click** on **Dismiss**

_4. If the last document has the wrong Document Type. **Click** on the **Pencil icon** and **Select Wage and Tax** then **Select Update**



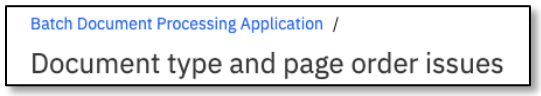
_5. Review all documents to ensure everything is correct. If the system no longer detects any issues, you should see a green checkmark near the top of the document list.



_6. **Click Submit** to save your changes and have the batch processed.

The system will start reprocessing the documents now that they have been classified correctly.

_7. **Click** on the **Batch Document Processing Application link** at the top to return to the previous preview menu.



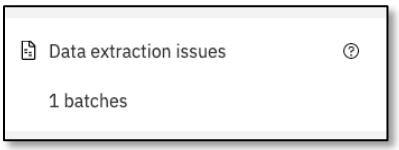
11.4 Correct extraction issues

The following instructions are based on a pre-trained sample application. Not what you will see in your untrained application.

Important Note: The project you are using for this has been configured but NOT run through the training (Deep Learning). So, the results will not reflect what they should be. IN A NORMAL SCENARIO, ON A CLUSTER WITH GPU AND DEEP LEARNING ENABLED, YOU WOULD HAVE TRAINED YOUR MODEL BEFORE DEPLOYING IT AND WOULD BENEFIT FROM HIGHER EXTRACTION RATES. the purpose of this lab is to teach you the tools but won't show you the trained results.

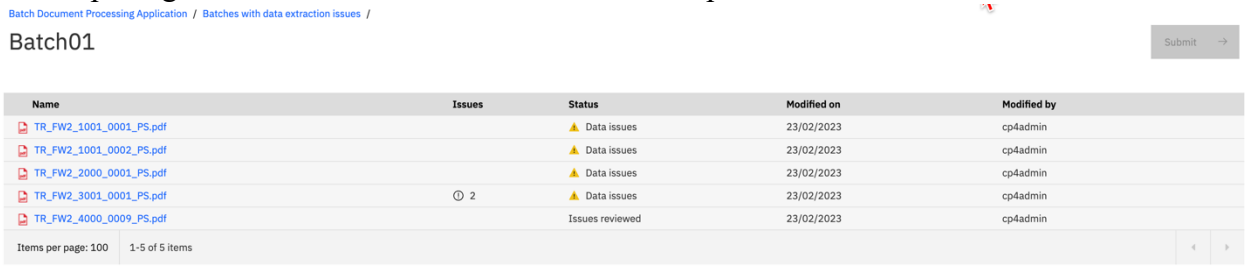
It may take a few seconds for your batch to advance to the next step. If your batch needs further attention, you will see it appear in the Data extraction issues tile.

_1. **Click** on the ***Data extraction issues*** tile to open it.



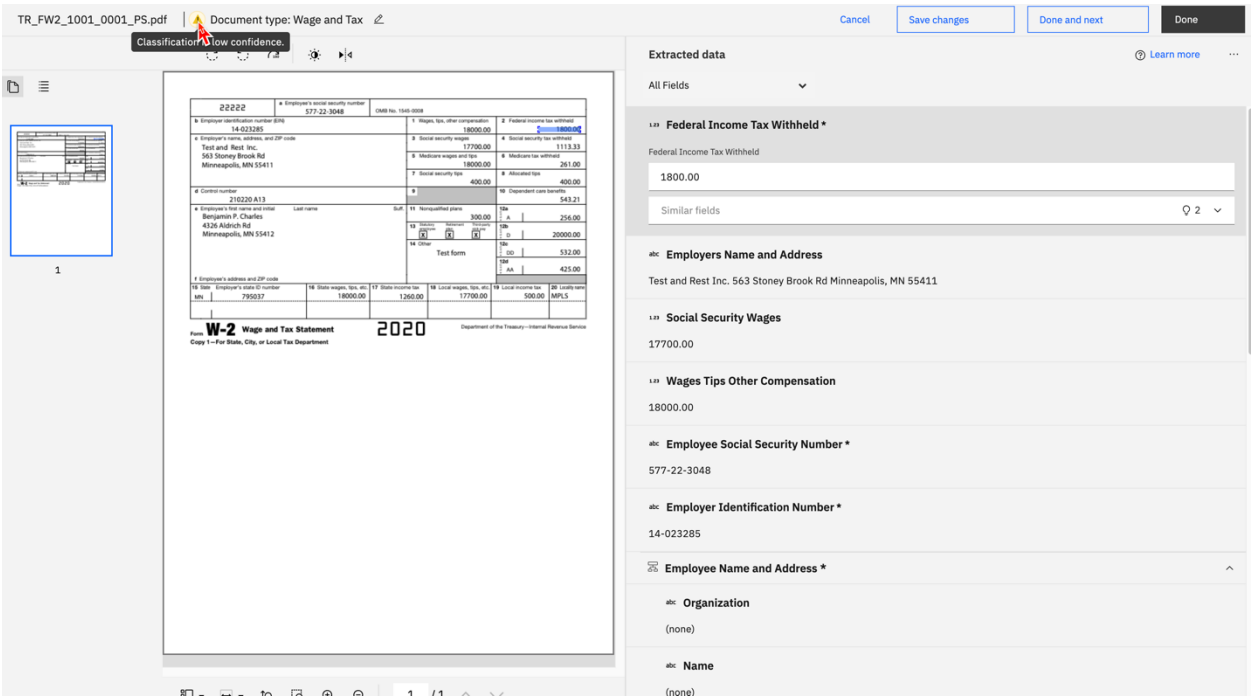
_2. **Click** on ***<your Batch name>*** to open.

After opening we see all the documents that have been processed but have extraction issues.



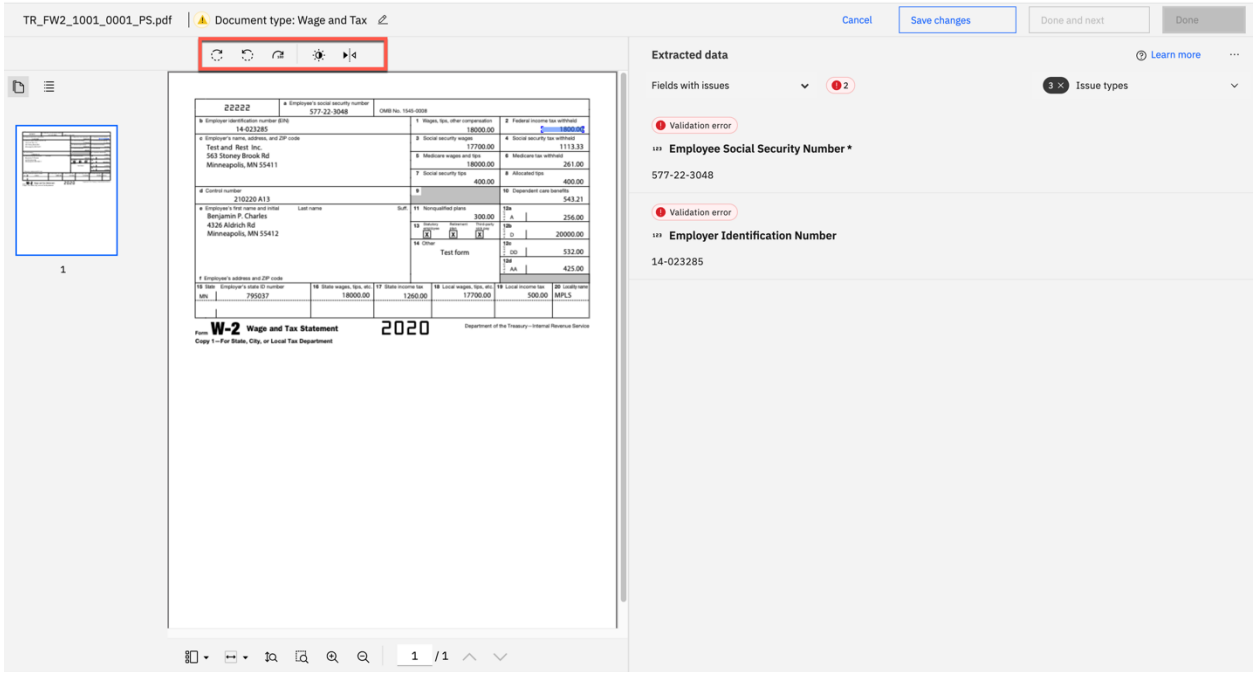
Notice 4 of the 5 documents have Data issues. One document has 2 issues raised. And the last one doesn't have any. What happened? Why are we getting document issues on most of our documents? The reason again is our low confidence for the classification of Wage and Tax.

_3. **Click** on the first document to open it. Notice the yellow triangle at the top.



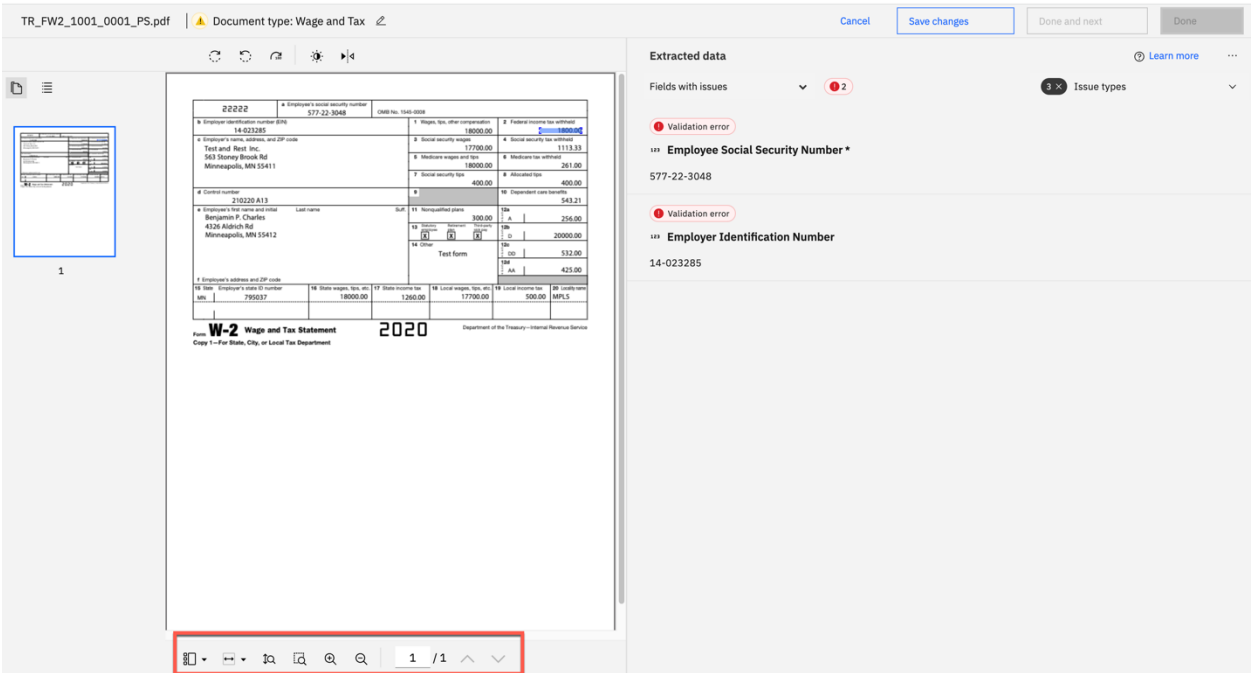
Take a moment to discover the image viewer features.

Image viewer features at top:



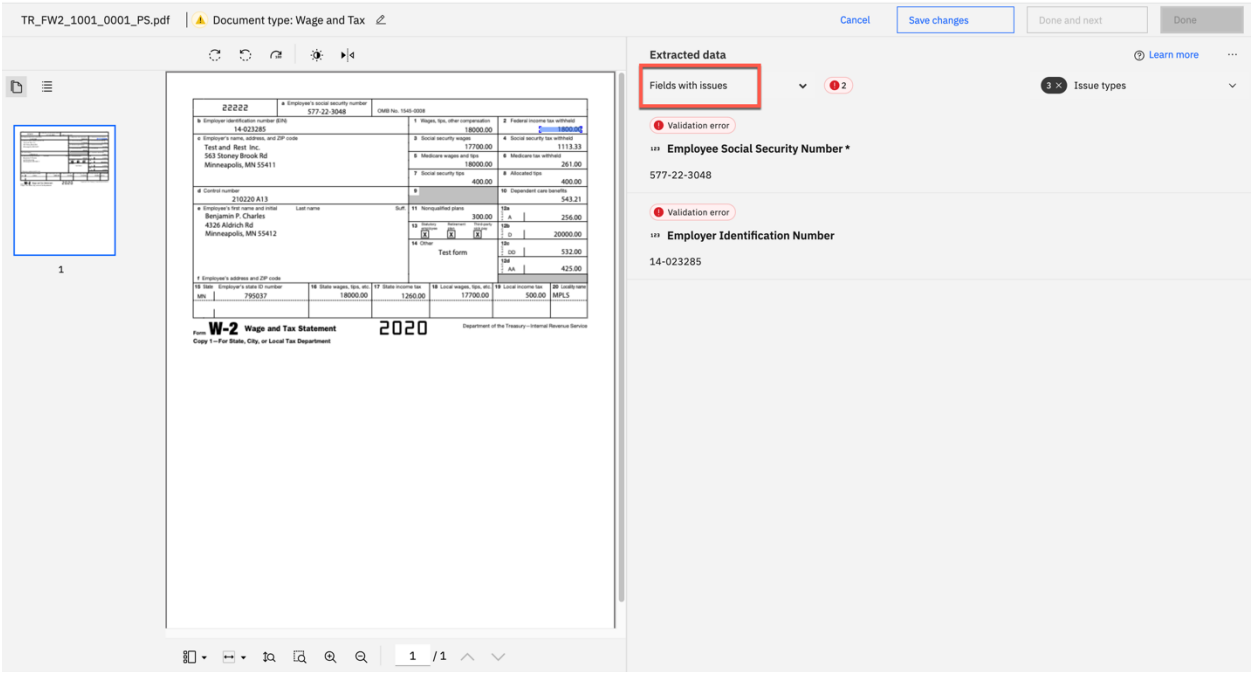
- Rotate image
- Visual effect adjustment
- Invert

Image viewer features at bottom:



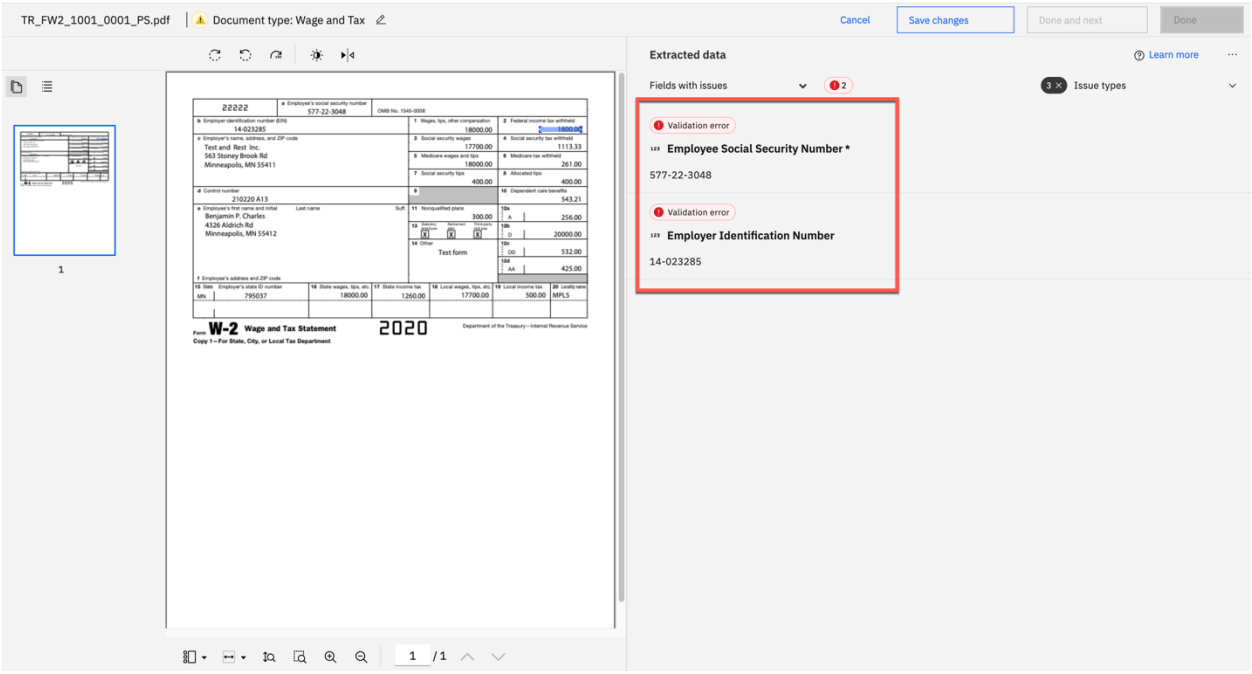
- Page and thumbnail's view
- Fit to window
- Zoom and Magnify

Field features

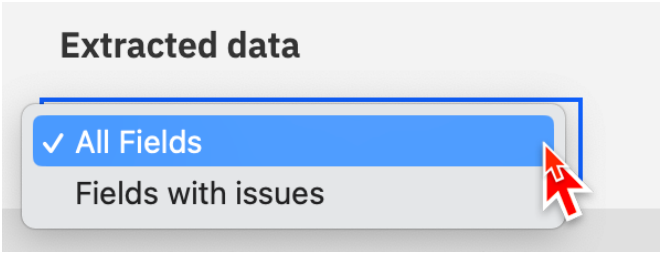


- Show all fields.
- Show fields with issues.

Also note that fields that that do have issues have a notification icon next to them. For example, the Employee Social Security Number field is a mandatory field and expects a numeric value. But in this example this field also has hyphens in it therefore didn't pass validation.

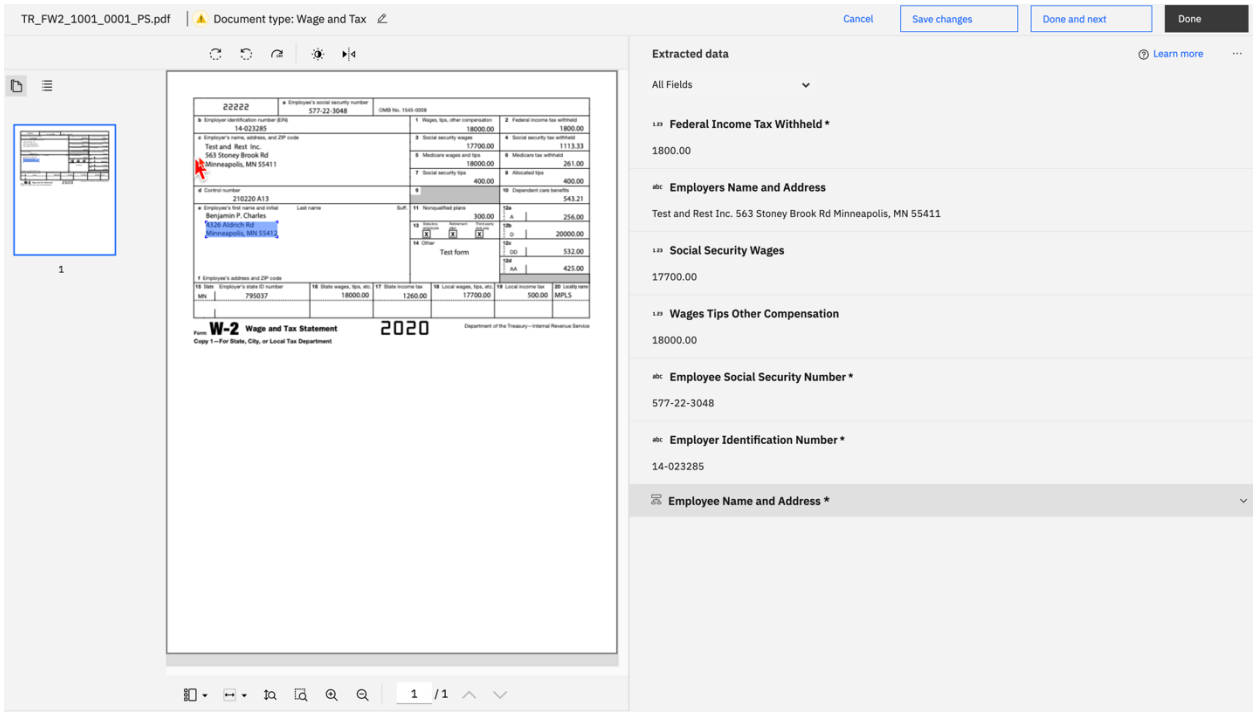


_4. Under Extracted data click on the drop down twisty.

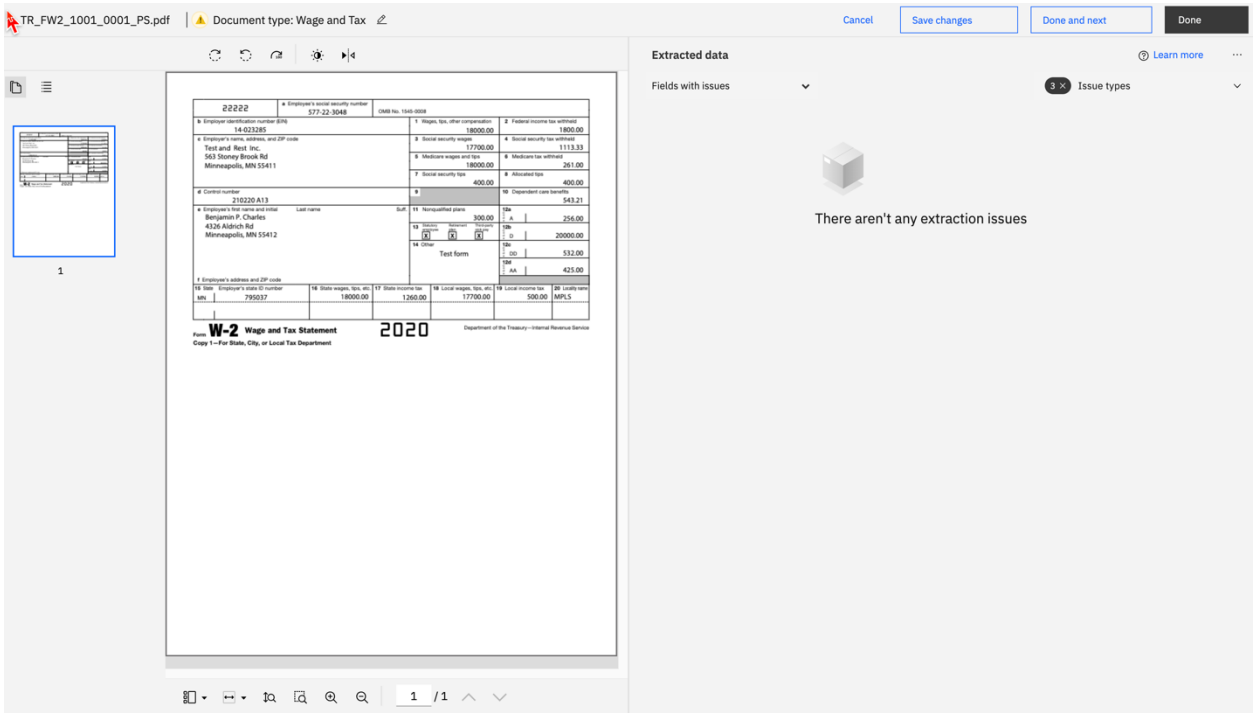


_5. **Click** on the **ALL Fields**.

This view shows all the fields that we defined earlier. Fields with an asterisk are mandatory fields.

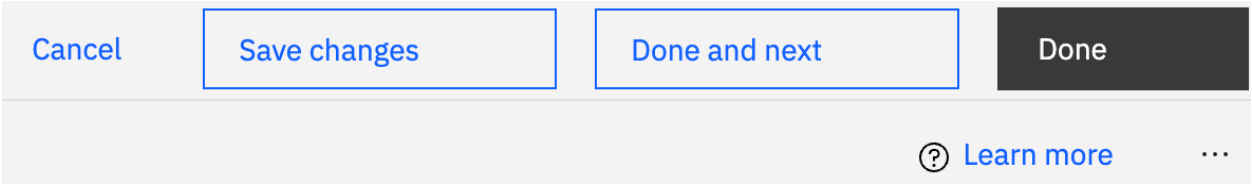


If we change the Extracted data back to Fields with issues:



Notice no fields are displayed since ADP was able to get all the mandatory fields required.

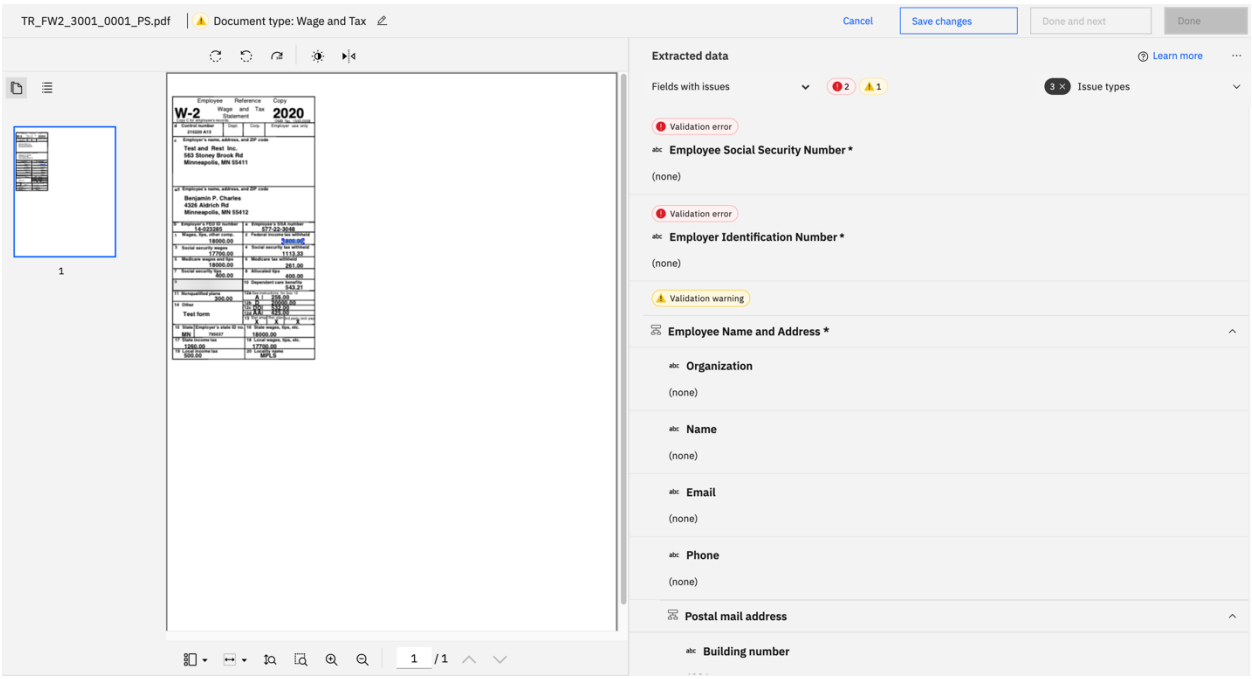
_6. **Click** on **Done and next** box at the top.



_7. For the next document there are no extraction issue only low confidence on document type. For this document you shouldn't have any issues to resolve.

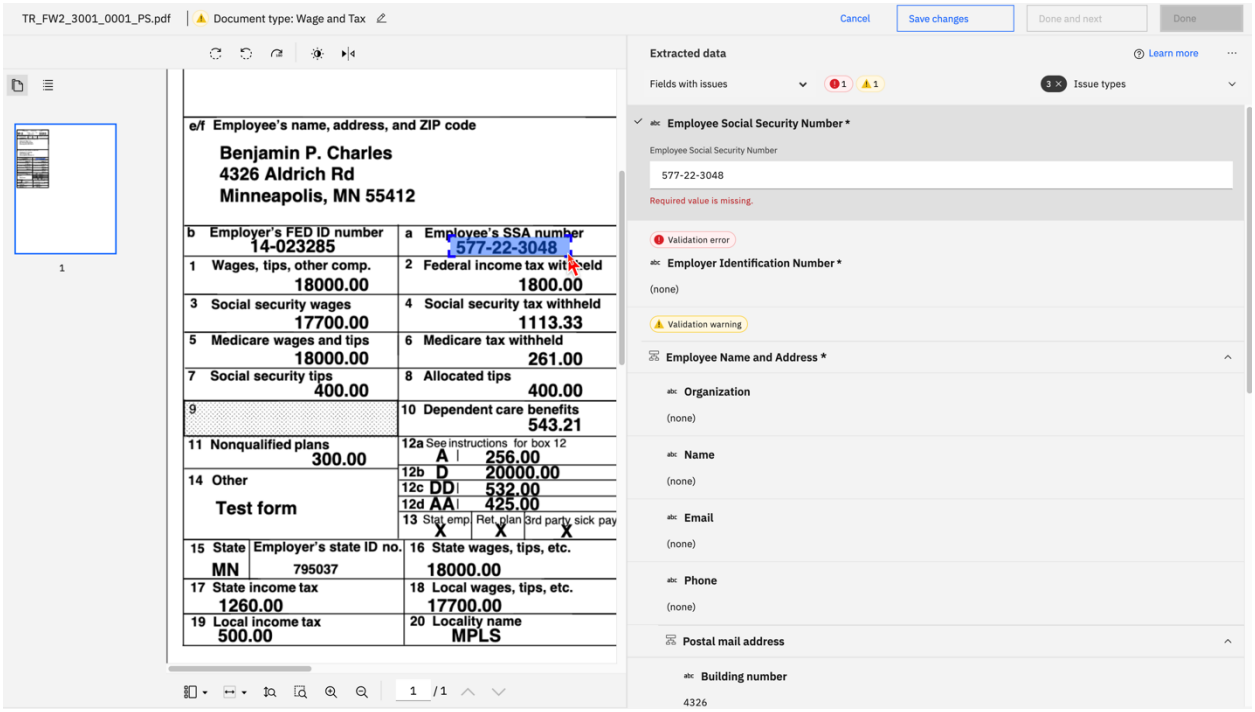
_8. **Click** on **Done and next** again. And again, no issues with our mandatory fields.

_9. **Click on Done and next** again. Now we are at the document which earlier in the queue told us there were 2 issues (step 2 above).



_10. **Click** on the Employee Social Security Number.
You may have to zoom in a bit so you can see where the SSA number is located.

_11. **Take your mouse and lasso around the SSN number.**



_12. **Repeat same steps above for Employer Identification Number.**

_13. **Click** Save Changes at the top.

_14. **Select Done and next.**

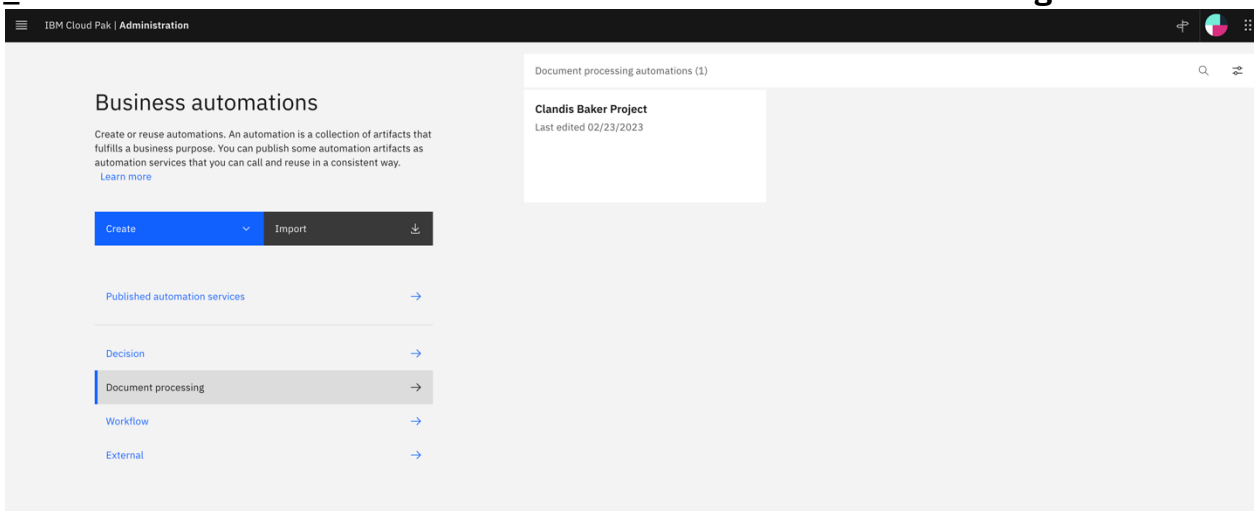
_15. All documents have been processed **Click** on **Submit** at the top to complete the batch**.**

END OF LABS

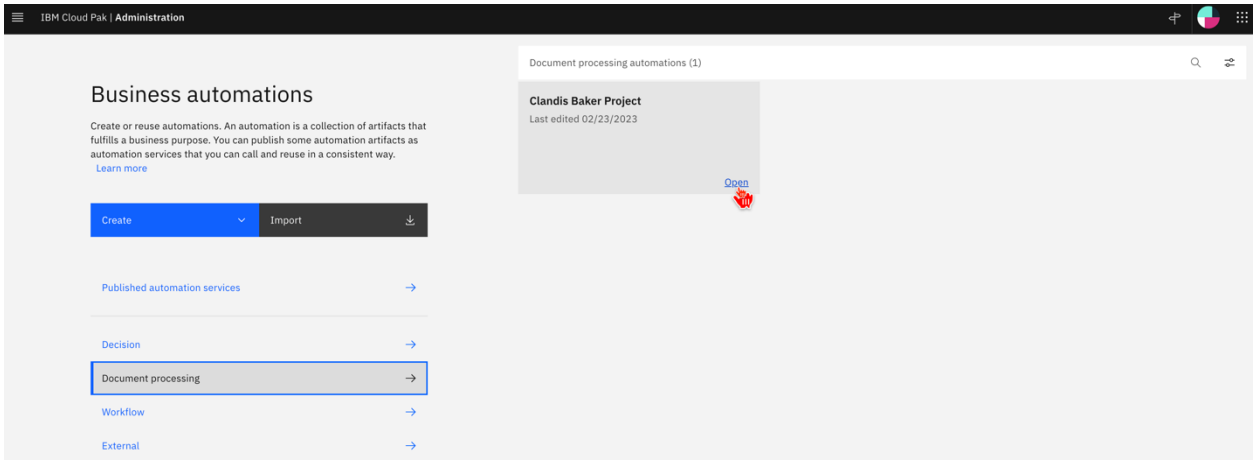
12 Export Import Project.

From the Business Automations

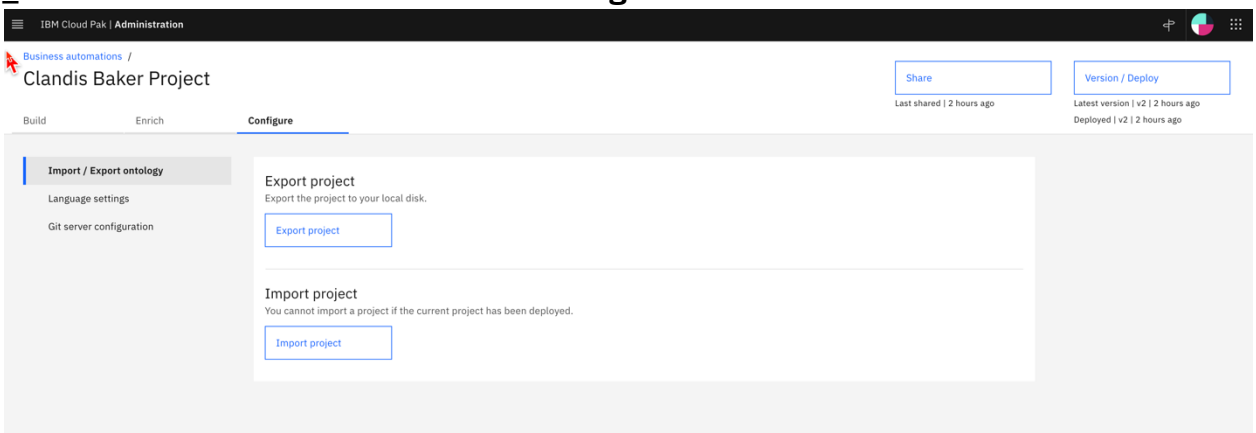
_1. From the Business Automations screen **select Document Processing**.



_2. **Select <your project name> Click open**

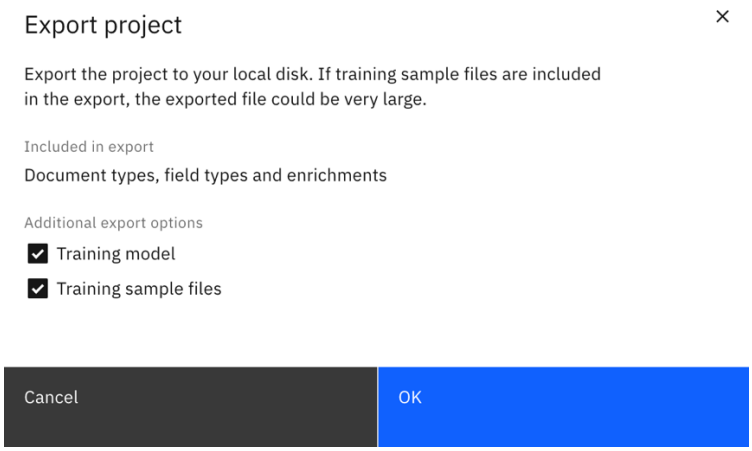


_3. From the Main screen **select the Configure tab**



_4. **Select Export Project**

_5. On Export Project window **check Training Module** and **Training Sample files**



_6. **Click** on **OK**

_7. A project-export-*<date-time>*.zip will be download via browser to local machine.

Appendix A - Troubleshooting

TechZone Pending Status taking Long Time

Operator shows Pending status in a namespace – OLM know issue.
An operator fails to install and continuously shows Pending status.
For fix visit below link.
https://www.ibm.com/docs/en/cpfs?topic=ii-operator-shows-pending-status-in-namespace-olm-known-issue

Can't find user/password in Daffy

If your deployment has FAIL when looking into getting username and password then your environment is not working.

```
############################################################
#                   Daffy Options                          #
############################################################
Please use this tool and select what option you would like to retrieve more info on.
With this menu you can get your OpenShift Console URl, id/passwords and status.
You can also get your CP4BA Console URL, id/passwords and status info.

1) OpenShift
2) Services
3) ExitMenu
#? 2
CP4BA Services Menu:
1) Console
2) Status
3) Back
#? 1
#############################################################################################################
                            Running daffy service process v2023-01-11
                            Log File - /data/daffy/log/ocpinstall/cp4ba/service.sh-2023-03-05-10-47.log
#############################################################################################################
Start time : Sun Mar  5 10:47:01 EST 2023

Checking OS before continuing on
############################################################
Linux is being used (Red Hat Enterprise Linux 8.7 (Ootpa))

Login via oc(ocpadmin)
############################################################
oc login https://api.ocpinstall.gym.lan:6443 -u ocpadmin -p ************ --insecure-skip-tls-verify
admin user - ocpadmin

Validate OCP Access
############################################################
✔ PASSED  Access to cluster via oc command


Validate CP4BA version info
############################################################
✔ PASSED  Valid version CPBA_VERSION=22.0.2

############################################################
Daffy Version                          :  v2023-01-11
Bastion OS                             :  rhel - 8.7
Platform Install Type                  :  vsphere-ipi
OpenShift Cluster Name                 :  ocpinstall
OpenShift Version                      :  4.10.36
CP4BA Version                          :  22.0.2
Project/Namespace                      :  cp4ba-starter
Zen Version                            :  4.8.0
Message 1                              :  Running reconciliation
Message 2                              :  Prerequisites execution done.
Message 3                              :  FAIL - prerequisites Deployment failed
Message 4                              :
Deployment Service                     :  Starter docprocessing
Config Map Dump                        : /data/daffy/log/ocpinstall/cp4ba/icp4adeploy-cp4ba-access-info.yaml


Console Automation Document Processing
############################################################
```

*****Environment verification*****

Once you have reserved a cluster in IBM TechZone, it is first ***Scheduled*** for provisioning. After a while it moves into status ***Provisioning***, and after some time finally becomes

Ready.

At that time, you'll also get an email that your cluster is Ready, but this only means that the Red Hat OpenShift part is now available. Once the cluster is Ready, the deployment of the CP4BA Starter pattern will automatically be performed. Therefore, you must wait until not only the OCP cluster has been provisioned but also until CP4BA Starter pattern has been completely deployed.
******Combined this may take several hours (~5-6 hours).******

At the moment, there is a known Red Hat OpenShift bug that can intermittently block the successful deployment of CP4BA Starter pattern. To identify that your TechZone provisioned environment has hit this issue, **please check about one hour after the cluster has become ready** if your cluster is affected by this bug.

For this, please perform the following steps:

- Open the *OpenShift web console* in a browser.
- In the left-hand side navigator go to *Operators -> Installed Operators*.
- Make sure the *project scope* is set to *All Projects*.
- Verify that *all Operators* show in the column with *Status* the value *Succeeded.*
- If there are one or multiple Operators *NOT with Status 'Succeeded'* (for example in Status 'Failed', 'Unknown', or 'Cannot update'), your environment is affected by the mentioned bug and applying a manual workaround is required. For this, please reach out for [Support](#support).
- Once all Operators show in column *Status 'Succeeded'*, you can proceed with the next prerequisite.

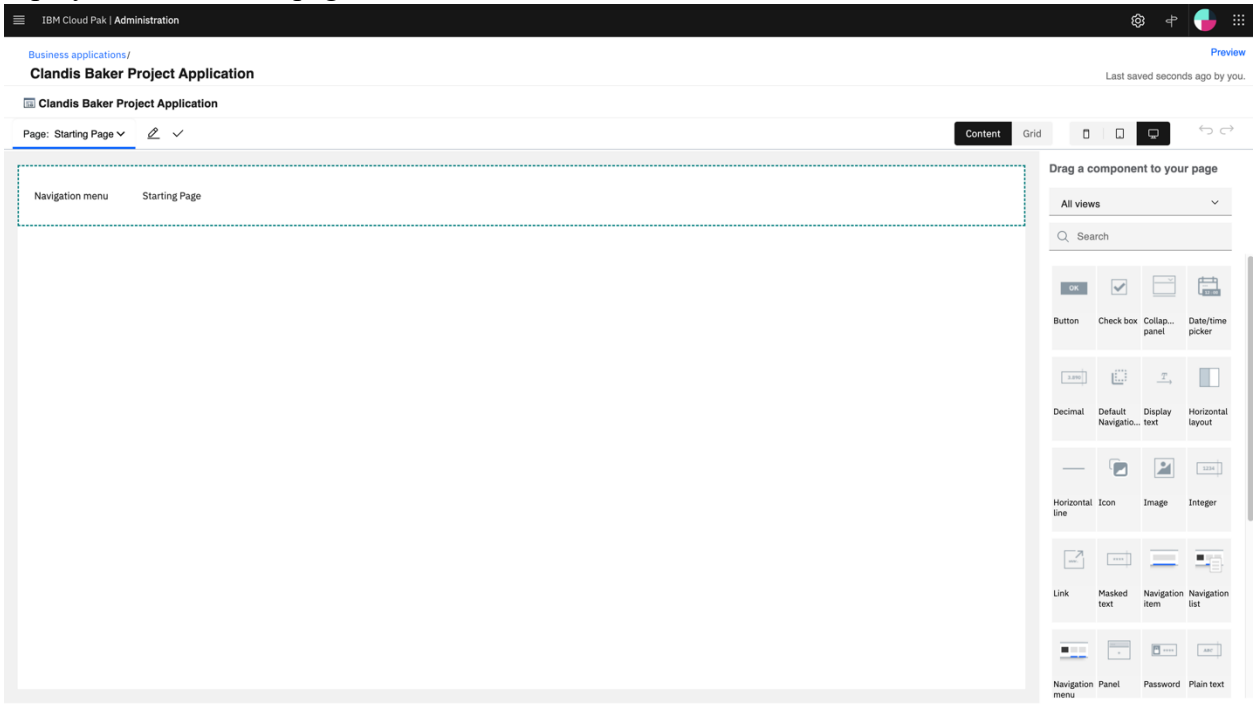
To verify that your CP4BA cluster is completely deployed:

- Open the **OpenShift web console** in a browser.
- Click on ***Workloads -> ConfigMaps*** on the left-hand side navigator.
- Type '**access-info**' in the field next to 'Name'.

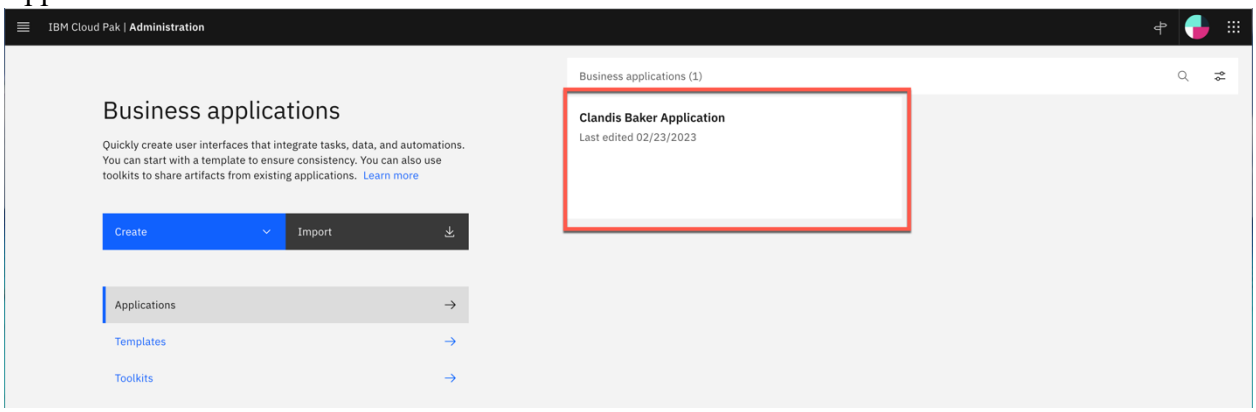
If the ConfigMap '**icp4adeploy-cp4ba-access-info**' is shown, your CP4BA cluster is deployed.

APPLICATION BLANK

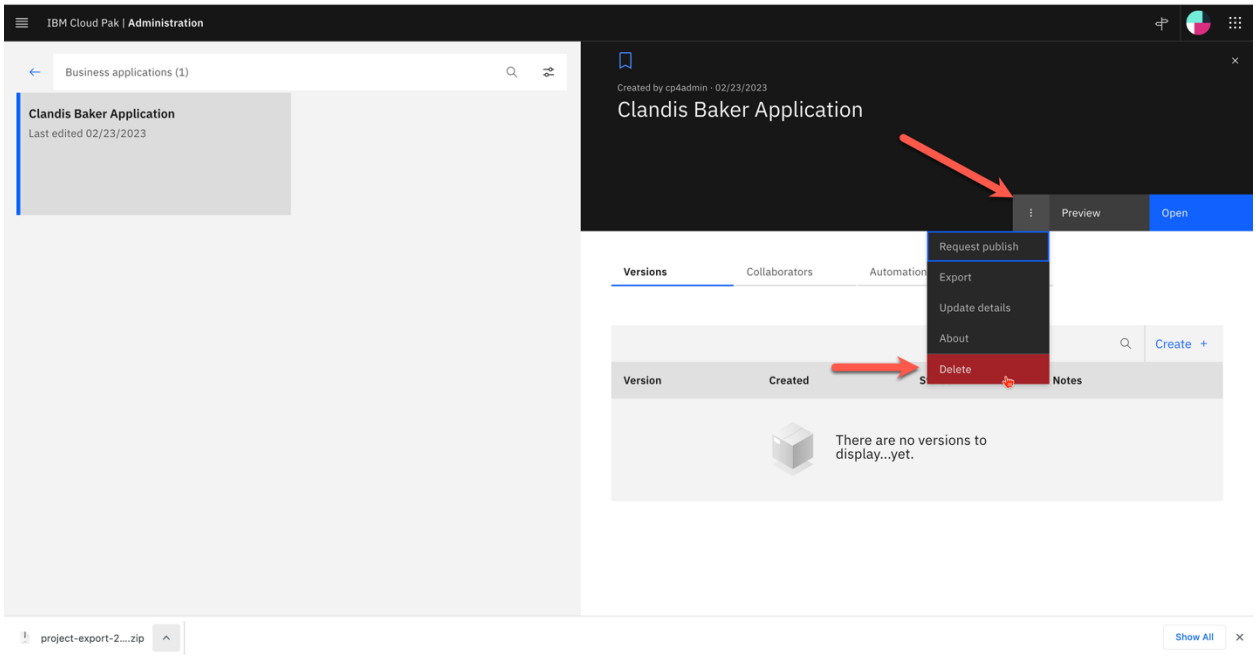
During creating of Business Application setup, sometimes on first time after project has been deployed. The Starter page is blank.



If this happens delete the application and try again. To delete the application, Click on the Application tile



Then Click on the 3 dots and Select Delete

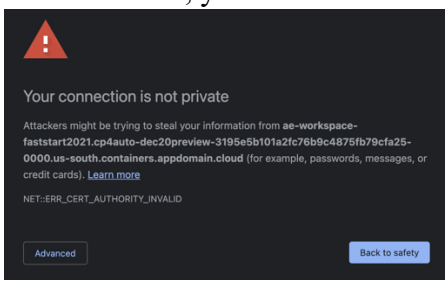


Connection issue with Workstation to Cloud.

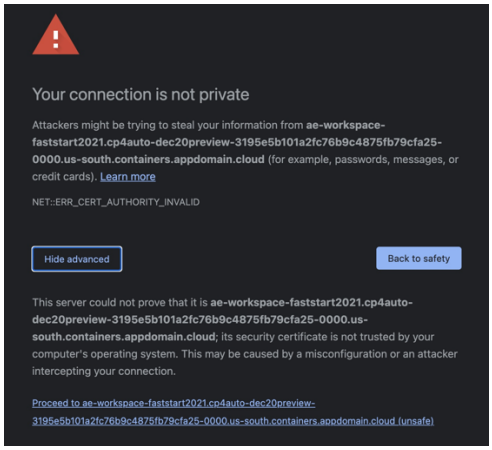
If issues with connection from workstation to cloud after it's been working. Reboot your workstation.

OPENING AN INCOGNITO WINDOW

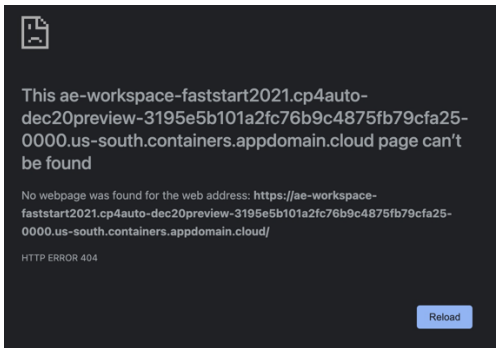
When you open a new incognito window, you will need to accept certificates before logging in to ADP. Customers shouldn't have this issue because they will have their own certificates instead of the self-signed certificates used in this environment.
In your incognito window, go to the following URLs located in this Box:
Open the Generate Security Tokens Box note and click all 3 of the links listed. This will reset the self-signed security certificates.
For each URL, your browser window will show a message like this:



Click Advanced, and the browser window will look something like this:



Click the “Proceed to...” link. You’ll see a message like this in your browser window:



Ignore the error and proceed to the next link.
After doing this for each of the URLs above, log in to BAStudio

Appendix B - BAW & ADP Integration Sample

https://github.com/IBM/baw-adp-integration-sample