

Intelligent Contracts Workshop Guide

Contents

AI Ladder & ModelOps	2
Intelligent Contracts Workshop Scenario	2
Business Automation Workflow Workshop	2
Introduction	3
Demo Installation	5
Running the Demo	19
Watson Discovery Contracts Intelligence Workshop	27
Watson Discovery Data Flow	27
Demo Setup	28
Demonstration (Discovery Enterprise Edition, with Contract Analysis)	30
Demonstration (Discovery Plus Edition)	34
Watson Studio With Watson Discovery To Build And Deploy a Contract Success AI Model	36
Required software, access, and files	37
Download These Files From Git	38
Required skills	39
Step 1: Create New Project Importing Intelligent-Contracts.zip	39

AI Ladder & ModelOps

(top)

IBM Cloud Pak For Data provides a stack of capabilities broken down into these 4 areas known as the AI Ladder.

ModelOps is an end to end process for developing and deploying data science assets to production that are monitored for bias.

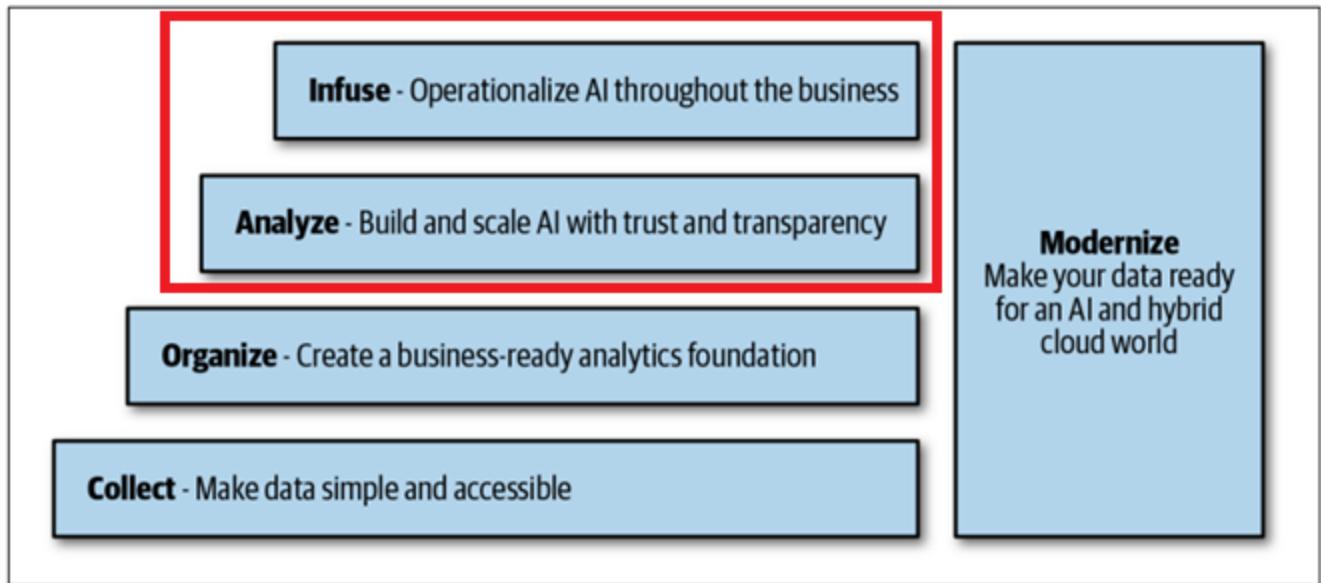


Figure 1 AI Ladder - Collect, Organize, Analyze, and Infuse AI into downstream applications.

Intelligent Contracts Workshop Scenario

(top)

In this workshop, we'll learn how to **infuse** an AI deployed model in an automated business workflow to gain prescriptive suggestions improving the likelihood of contract success.

We'll be using IBM Watson Studio, to **analyze**, build, test and deploy the machine learning models built on structured and unstructured data used to score contracts and make prescriptive suggestions.

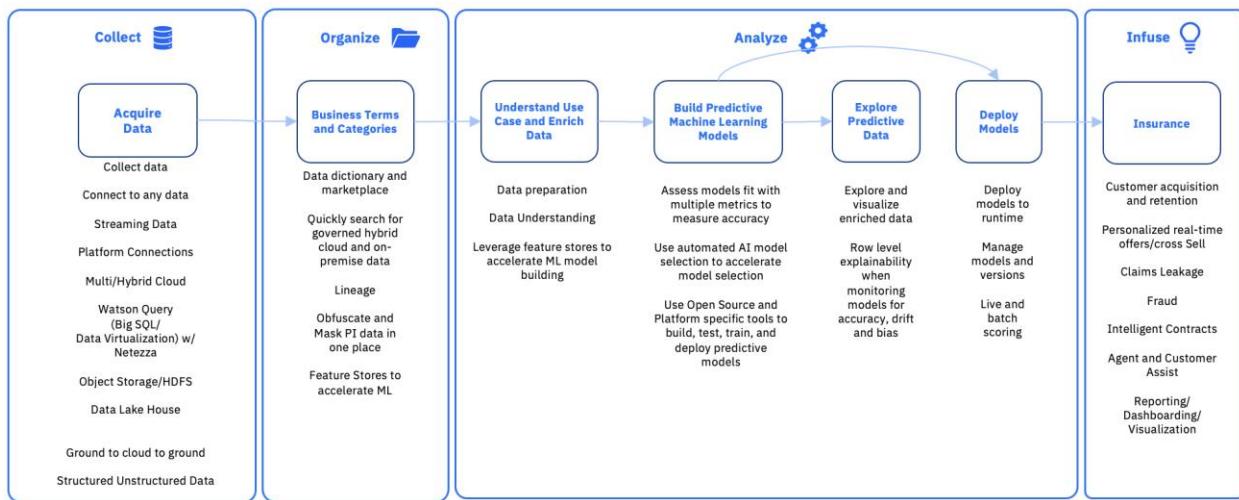
Using Watson Discovery, we'll see how we extracted and merged unstructured textual concepts coming from many contracts with structural contract data to improve the accuracy of our AI model.

Business Automation Workflow Workshop

(top)

Introduction

IBM AI has 4 primary capability areas – Collect, Organize, Analyze and Infuse:



The Infuse capability (on the RHS) is all about how other applications can use ML models - how the models are *infused* into these applications. This part of the demonstration illustrates how an application – Business Automation Workflow – can be infused with ML capabilities. This script will show how to install the demonstration on a BAW environment of your choice and then how to run through the demo.

Note that the demonstration is a “vision demo”, there is no actual call into a ML service. This is convenient as it means that the demo assets can be installed on any BAW environment without the need to integrate with some other system. No prior knowledge of IBM BAW is required in order to install or run the demo.

Following the Demo instructions below, there is information on how to install the demo in a BAW environment.

Demo Installation

The demo workflow is provided in a file with a '.twx' extension and is installed into the Workflow Center component of BAW. The demo was created with BAW v21.0.3 and so will require an environment at this level or later. Any BAW 21.0.3+ environment will be suitable – a local VM, a Skytap environment, BAW on Cloud, CP4BAaaS or a BAW container deployment. It is recommended that a SaaS environment is used, as this requires no software installation but any of the other environments listed here will also work. The following instructions assume that a Cloud Pak for Business Automation as a Service environment is being used.

1. Create a IBM Business Automation Workflow environment in Tech Zone.
 - a. Open the following URL: <https://techzone.ibm.com/collection/ibm-business-automation-traditionaland-on-premise-asset-version-32> . This URL is for a Skytap instance for IBM Business Automation Workflow

The screenshot shows a TechZone collection page for 'IBM Business Automation - Traditional and On-premise - Asset Version 3.2 Updated 05-12-2022'. The page includes a sidebar with links for 'Business value', 'Authors', 'Resources', 'Environments', 'Metadata', and 'Comments'. The main content area displays the asset details, including a list of required environments: BAW 21.0.3, IID 21.0.3, eclipse Process Designer 8.5.7 CF2021.12, ODM 8.11, IBM RPA 21.0.2 ifix3, Datacap 9.1.9 (Golden Demo Updates), Daeja 5.0.10 IF001 to fix the issue with Daeja due to missing libraries, BAI for a Server 20.0.3 and BAW ML Server (unchanged), and a note to see important update information at <https://ibm.box.com/v/IBM-DBA-VM-EXT-V32>.

- b. Select the Environments link on the left hand side:

Environments

May 24, 2022

IBM Business Automation - Traditional and On-premise. Asset
Version V3.2 [Updated 05-12-2022]

Skytap: APAC-2, EMEA, US-Central

Includes latest BAW, ODM, Datacap, BAI and RPA - all in one VM!

Visibility

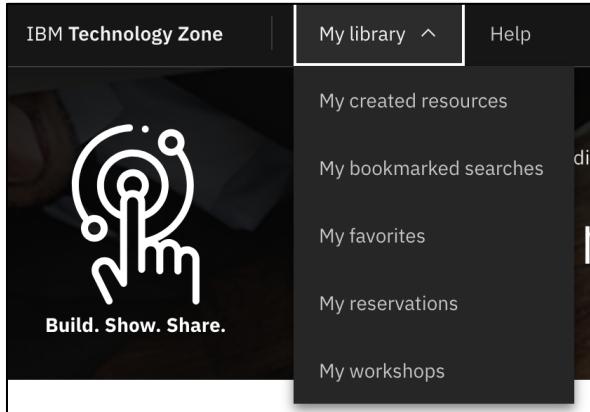
IBMer, Business Partners

Reserve



Click on Reserve. In the screen that follows click on the 'Reserve Now' radio button

- c. Select an appropriate purpose and geography. Click on submit.
- d. When the environment is ready, you will receive an email notification. This should not take more than 10-15 minutes.
- e. After the email is received click on my reservations:



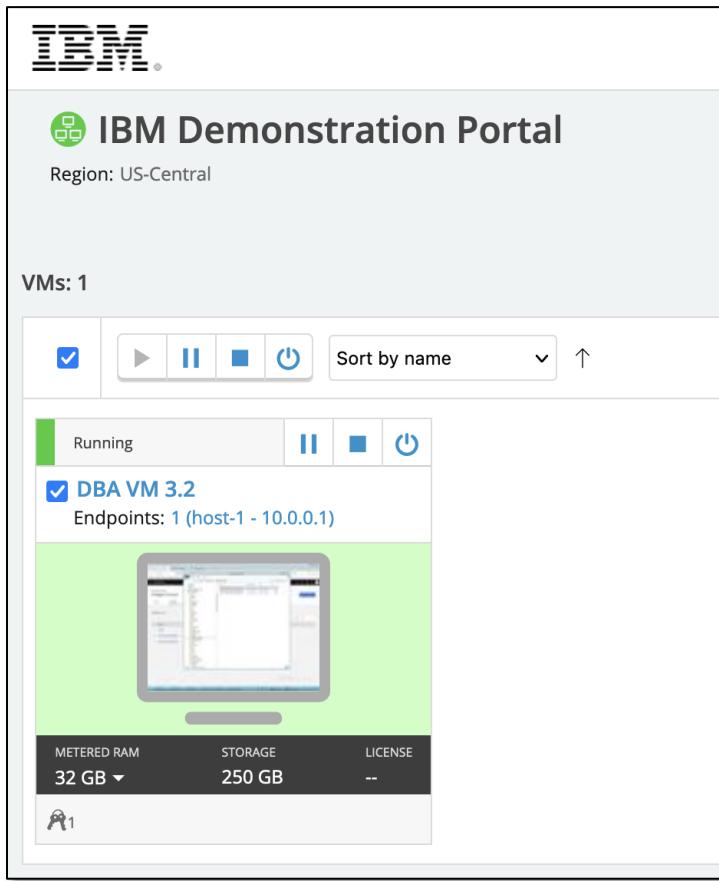
You will see a view like the following:

The screenshot shows the 'My reservations' section of the Skytap interface. At the top, there is a logo and the text 'Build. Show. Share.' Below the logo, the title 'My reservations' is displayed. A navigation bar includes links for 'My resources', 'My bookmarks', 'My favorites', and 'My reservations'. A search bar allows filtering by name. The main content area shows a reservation entry for 'IBM Business Automation - Traditional and On-premise. Asset Version V3.2'. The entry includes a 'Customer Demo' link, a unique identifier '0063h00000FwsqfAAB', and the organization 'Westfield Insurance'. It also lists the reservation details: 'IBM Business Automation - Traditional and On-premise - Asset Version 3.2[US- Central]' and the date range 'May 1, 2022 5:57 PM - Jun 13, 2022 5:57 PM'. Below these details, there are fields for 'Username' (10595759) and 'Password' (6cduxm3a), both with copy icons. The status is shown as 'Status: Ready' with a monitor icon.

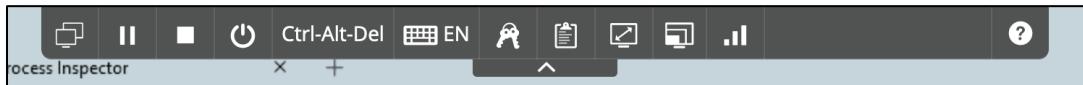
- f. Make a note of the password for your environment and then click on the blue display icon at the foot of the page to go to the Skytap environment:

This screenshot shows the detailed view of the 'Desktop' reservation. It lists various configuration options: 'Desktop', 'Published services', 'Purpose' (Shared Reservation), 'Notes', and 'Environment'. To the right of each option are input fields or dropdown menus. A prominent blue button labeled 'Open your Skytap environment' with a monitor icon is centered on the page. Below the button, the URL 'Desktop url: https://cloud.sktap.com/vms/0d60735aa54fe472a608154b2c6...' is displayed.

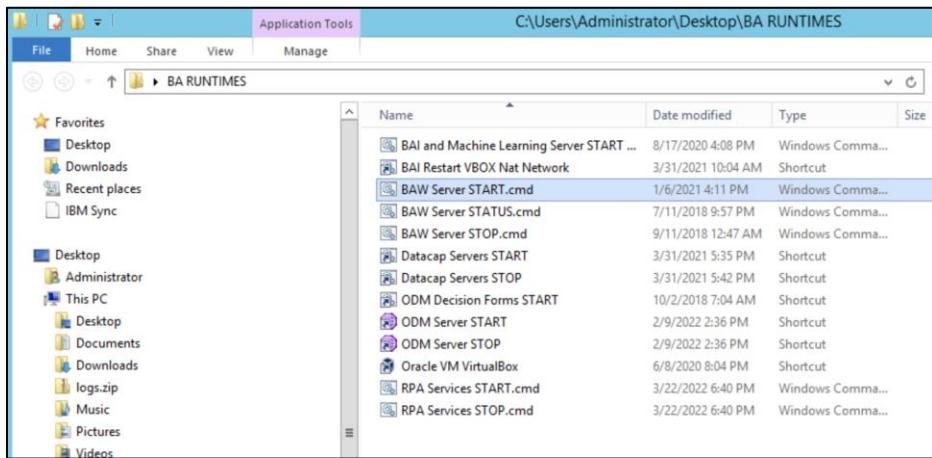
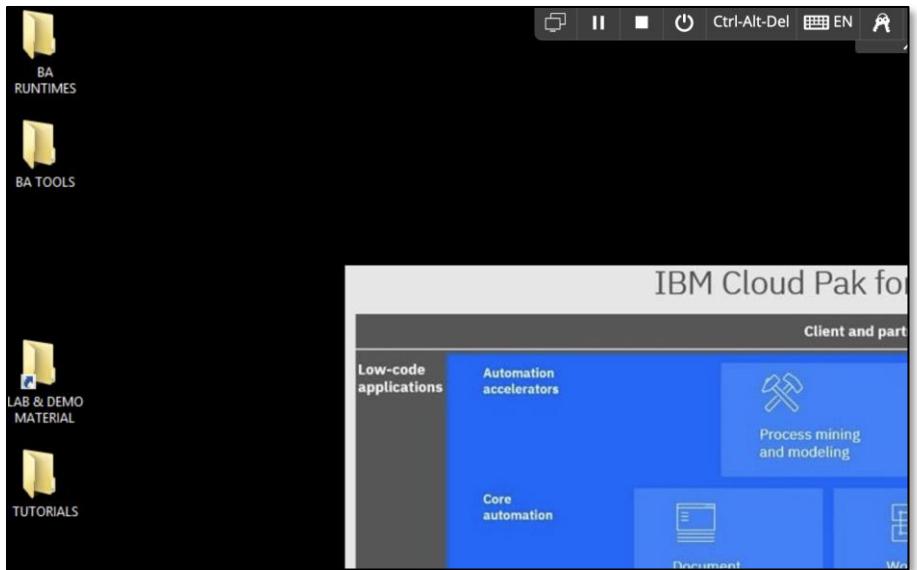
Click on the blue button to open the Skytap environment. You may need to enter the (previously copied) password. You will then see a screen like this:



- g. If the environment is running, click on the terminal icon. If the environment is not running, click on the start/play button.
- h. Clicking on the terminal icon will open the Windows desktop. There is a control segment for the screen, at the top. These provide several useful capabilities including a copy/paste (4th from right) and fit to window (3rd from right):



2. It is necessary to start BAW before it can be used.
 - a. Click on the BA RUNTIMES folder in the top left of the Windows desktop

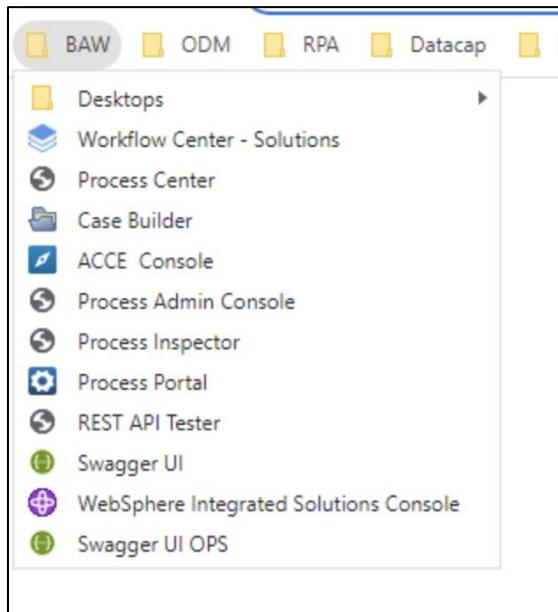


Right click on the ‘BAW Server START.cmd’ file and click on open. This will open a Command window showing the output of the various commands being executed. Actually, there is just a single command:

```
CALL BPMConfig.bat -start -profile DmgrProfile -de ProcessCenter
```

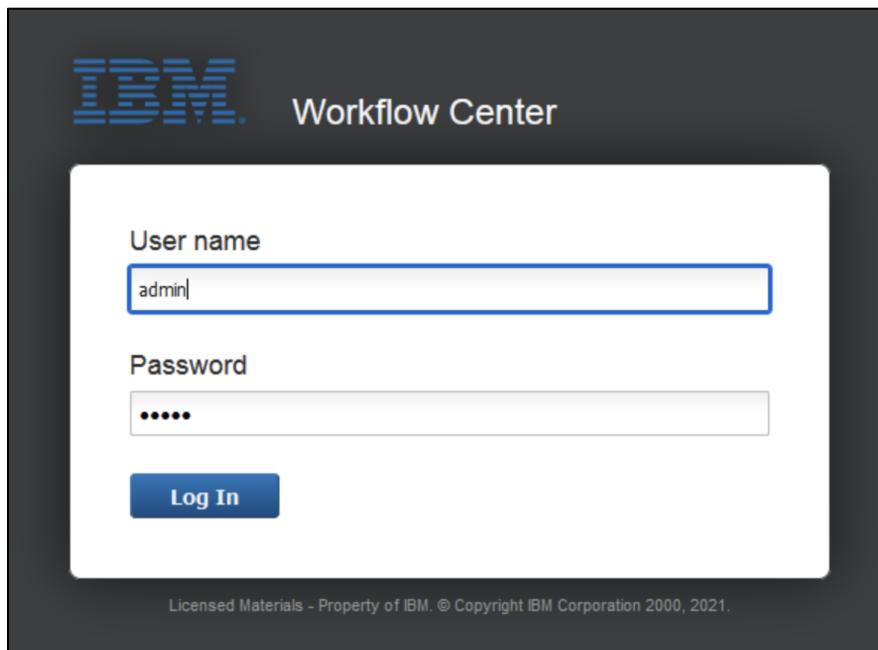
After a few minutes (maybe 5 or 6) the cmd file completes with “Press any Key to continue...”. Dismiss the window.

3. All of the browsers included in the environment are preconfigured with links to the various installed components. Open the browser of your choice and open the

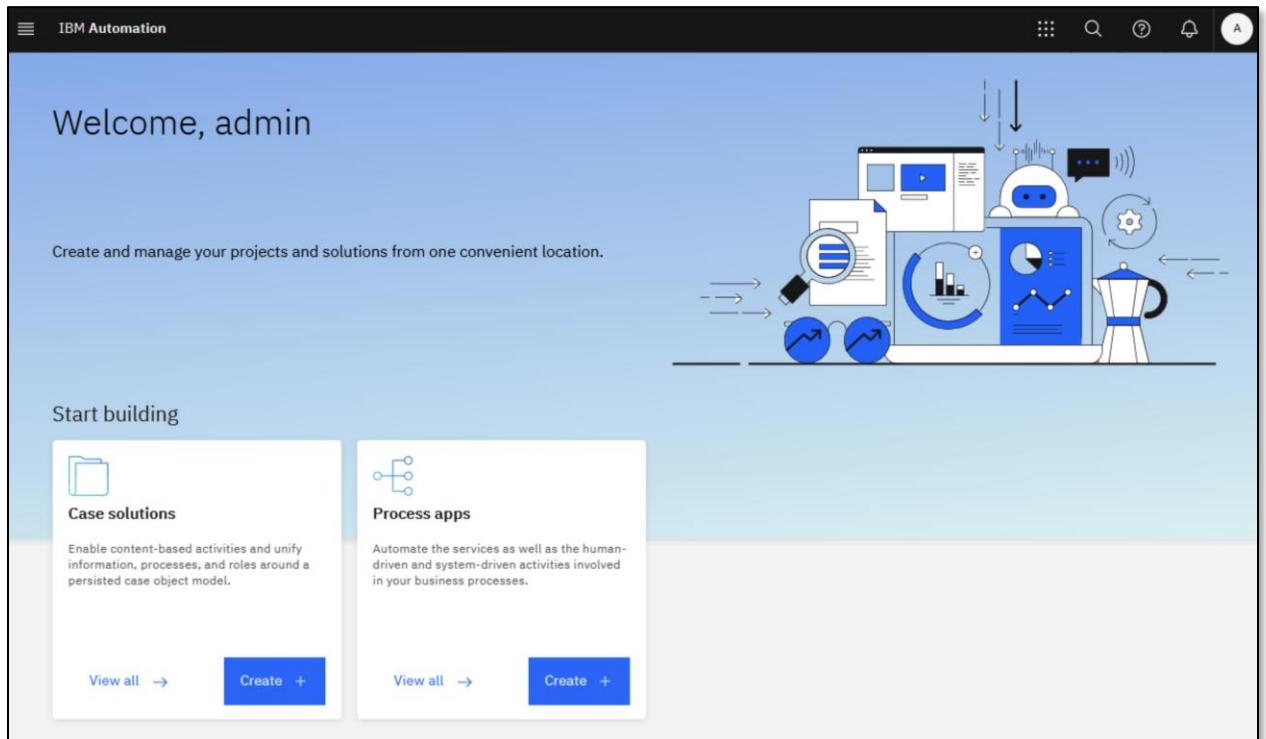


Click on ‘Workflow Center – Solutions’ to open the BAW Workflow Center environment.
(For other BAW environments, look for the URL for the Workflow Center URL, e.g.
<https://host:port/WorkflowCenter/>, <https://ibmbaw:9443/WorkflowCenter/>.

4. Log into the environment with suitable credentials, admin/admin is often available



The following page will be displayed:

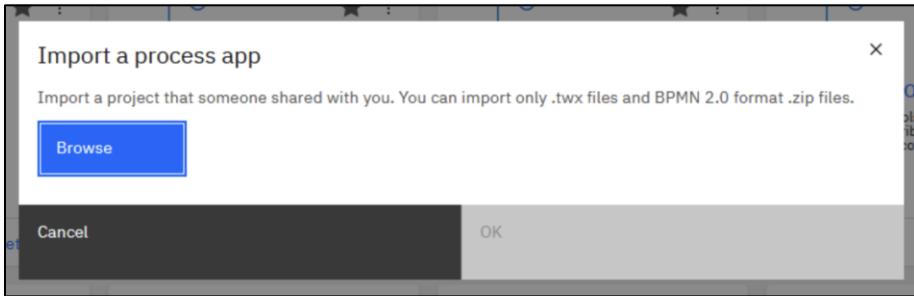


5. Click on the Process apps tile. A page showing all of the available Process Applications is shown. Your page will differ according to the applications installed in your chosen BAW environment:

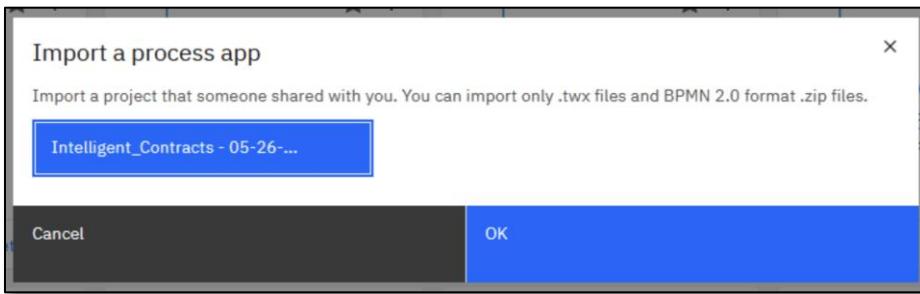
This screenshot shows the "Process apps" page within the IBM Automation interface. The title is "Process apps (10)". There are several filters at the top: a search bar, dropdowns for "Recently updated" and "Favorites", and buttons for "Import" and "Create +". Below this, there are ten cards, each representing a different process application. The cards are arranged in two rows of five. Each card includes a small icon, the application name, a star rating, a more options menu, and a "Details →" button.

Application	Description	Author
ODM REST	Author: Paul Pacholski - pacolks@ca.ibm.com	Paul Pacholski
ARC Processing		
Safety Critical...	Utilities Employee onboarding for a nuclear power plant	
JK Bank Mortgage...	Author: Paul Pacholski, IBM Canda Ltd. With notable contributions from: Stu Leibowitz (UI conversion to BP3...)	Paul Pacholski, Stu Leibowitz
Performance		
Mortgage		
BAI DemoB	Paul Pacholski	Paul Pacholski
Account Opening	Author: Jeff Goodhue; evolved from Retail Banking to Account Opening	Jeff Goodhue

6. Note the blue button in the top right labeled Import. Click on this:



Click on Browse and navigate to where you have placed the import file with the .twx extension. For our example, this is named “Intelligent_Contracts - 05-26-2022-1.twx”, you may have a file with a later date in the name.



Select the file and then click on the blue OK button. The Process Application will be imported into the Workflow Center, which will be refreshed to show the imported project.

The screenshot shows the 'Process apps (33)' section of the IBM Automation platform. At the top, there are search and filter options: 'Recently updated' dropdown, a dropdown for 'All' projects, 'Import' button, and 'Create' button. Below this, a message says 'Displaying 20/33 projects'. The main area contains a grid of 8 cards, each representing a different process app:

- ODM REST**: Author: Paul Pacholski - pacolsk@ca.ibm.com
- Intelligent Contracts**
- ARC Processing**
- Safety Critical...**: Utilities Employee onboarding for a nuclear power plant
- JK Bank Mortgage...**: Author: Paul Pacholski, IBM Canda Ltd. With notable contributions from: Stu Leibowitz (UI conversion to BP3...)
- Performance**
- Process Portal**: Process Portal
- Mortgage**

7. Click on the Intelligent Contract tile and the Process Designer tool will open:

The screenshot shows the 'Intelligent Contracts' process app settings page. The left sidebar has a tree view with nodes like 'Intelligent Contracts' (selected), 'Processes', 'User interface', 'Exposed Automation Services', 'Services', 'Events', 'Teams', 'Data', and 'Performance'. The right panel has tabs: 'Overview' (selected), 'Environment Variables', 'Servers', and 'UI Conversion'. The 'Common' tab displays basic information: Name: Intelligent Contracts, Documentation: (empty). The 'Target Environment' tab contains a note: 'The target installation environment determines the set of features that are supported in the project target environment that corresponds to the environment that this project will be installed on.'

Click on Processes and the list of processes will appear.

Click on Contract Analysis:

8. There are 6 activities in this process:

- Setup** is for initialization steps. This is currently limited to setting up some date information.
- Load Contracts** is to load a specific file to be analyzed and to enter any necessary comments
- Analyze Contracts** is to call the ML service that analyzes the contract file and returns an opinion on the likely success of the contract plus a set of significant

criteria that are relevant to the opinion.

NOTE: In this demo the call to the ML service is not implemented. Instead, a set of default values is provided. This is OK, as this is a “vision demo” and not a proof of capabilities.

- d. **Review Results** shows the information returned by the ML service call. It shows information on the likelihood of a successful contract. It also shows the contract characteristics that influence contract success (as derived during ML modeling) and the particular characteristics that affected this opinion.
The next step is an approval step and there is the opportunity to enter more comments for the approver.
 - e. **Approve Contract** is for an approver to ‘accept’ the contract or return it to be re-worked.
 - f. **Update Systems of Record** is a no-op step included to represent a next step after a contract approval.
9. The 3 user activities are contained within 2 swim lanes named **Procurement Analyst** and **Procurement Reviewer**. Each swim lane has a set of authorized users in a Team. The **Contract Analysis** Team is associated with the **Procurement Analyst** swim lane and the **Contract Mgmt** team is associated with the **Procurement Reviewer** swim lane. You may associate any set of users/groups with each team. The simplest way to run the demo is to ensure that there is a user common to both teams so that all 3 activities can be run by the same user.
 - a. On the left side of the Process Designer page, click on Teams and select Contract Analysis from the list:

The screenshot shows the IBM Automation interface. At the top, it says "IBM Automation". Below that, "Process apps / Intelligent Contracts". A sub-section titled "Contract Analysis" is open, showing a list of components: "Intelligent Contracts", "Processes", "User interface", "Exposed Automation Services", "Services", "Events", and "Teams". The "Teams" item is highlighted with a blue background. To the right of the list, there is a search bar labeled "Type" and a dropdown menu showing "Team" selected, with options "Contract Analysis" and "Contract Mgmt".

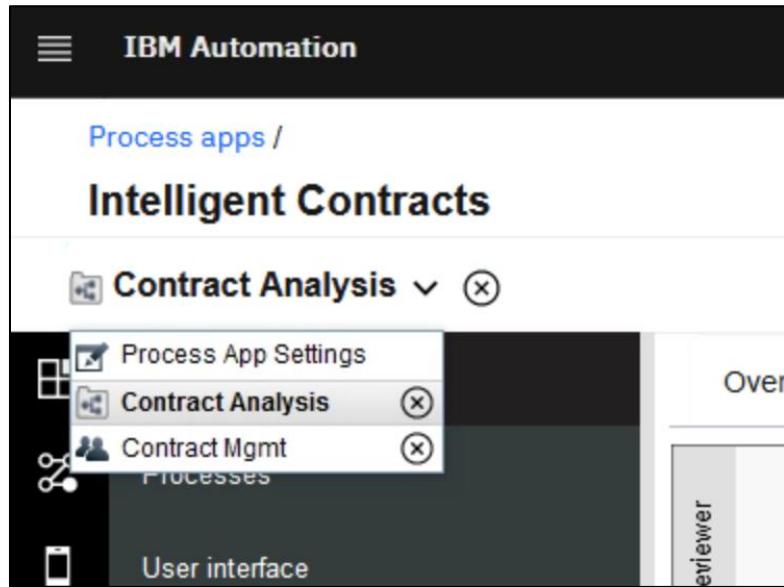
- b. The members of the team are shown on the right side of the page:

The screenshot shows the "Behavior" configuration screen. At the top, it says "Specify members by using: Users or groups A service". Below that, a "Members" section is expanded, showing a list of users under "Users": jkOfficer1, jkOfficer2, jkUnder1, jkUnder2, admin. There is also a "User Groups" section with a plus sign (+) to add more groups.

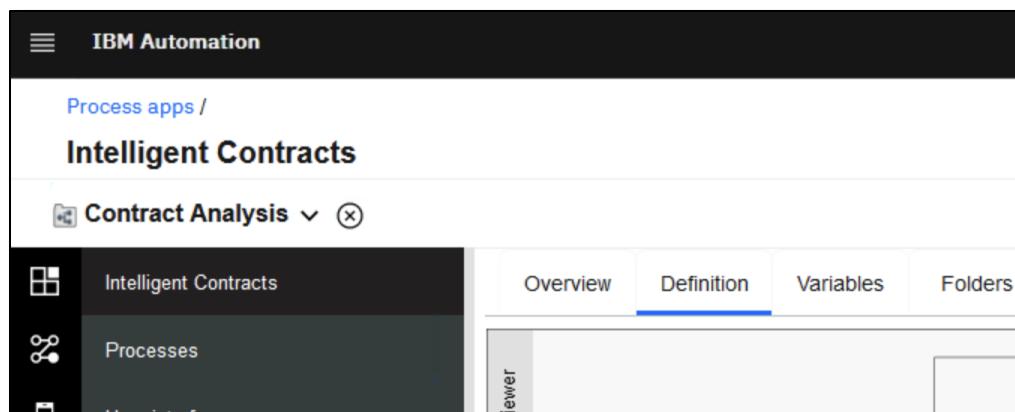
There are 5 users and no groups shown above. You can use any user that is

available to your system. With the exception of SaaS (where your SaaS user is the best option), admin is the most commonly available/simplest user to use. If your preferred user is not present click on the plus “+” to the right of users and add the appropriate user.

- c. Repeat the above steps for the **Contract Mgmt** team.
10. Lastly, ensure that any user can start an instance of the **Contract Analysis** process.
 - a. Navigate back to the **Contract Analysis** process definition:



- b. Select the Overview tab:



- c. Under the Exposing section on the RHS, ensure that 'Expose to start' is set to All Users:

Details

Instance name: + tw.system.process.instanceId

Enable due date:

Due in: Hours

Enable at risk calculations:

Enable tracking groups:

Allow projected path management:

Work Schedule

Time schedule:

Time zone:

Holiday schedule:

Exposing

Expose to start: System Data

Expose business data:

This ensures that any user can start an instance of the **Contract Analysis** process.

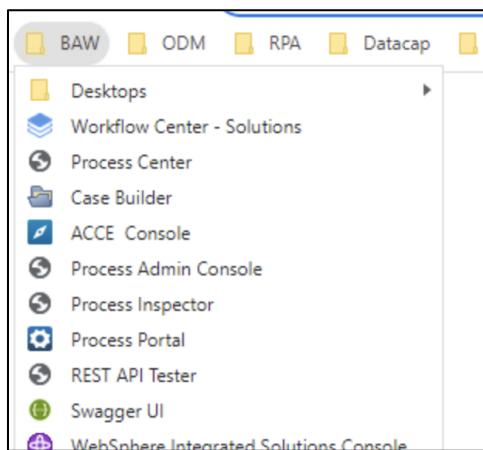
Note that there are just 3 user activities in this process, those colored green. In the next section there is a description of how to run the demo and what points to emphasize.

Running the Demo

The demo consists of a set of UIs that show how a contract might be assessed.

Business Automation Workflow has a user portal that enables user activities to be executed, known as the Process Portal. It is an out of the box application provided by the BAW product.

1. Log on to the Process Portal Environment. Click on the BAW folder and select Process Portal:



For many BAW environments (e.g. SaaS) a Process Portal tile is provided, for Skytap a browser bookmark is often available. The form of the URL is <https://host:port/ProcessPortal/>, e.g. <https://ibmbaw:9443/ProcessPortal/>. There will be a Sign In screen as follows:

A screenshot of a web-based sign-in form titled "Sign in to Business Automation Workflow". The form has two input fields: "Username" containing "admin" and "Password" containing "*****". To the right of the password field is a "Continue" button with a right-pointing arrow icon. At the bottom of the page, there is a small legal notice: "Licensed Materials - Property of IBM. © Copyright 2008, 2018 IBM Corporation. IBM, the IBM logo, and WebSphere are trademarks of IBM Corporation, registered in many jurisdictions worldwide. Other product and service names might be trademarks of IBM or other companies." Below the notice is the large IBM logo.

Enter a userid/pwd as appropriate and click on Continue. (admin/admin is usually available.)

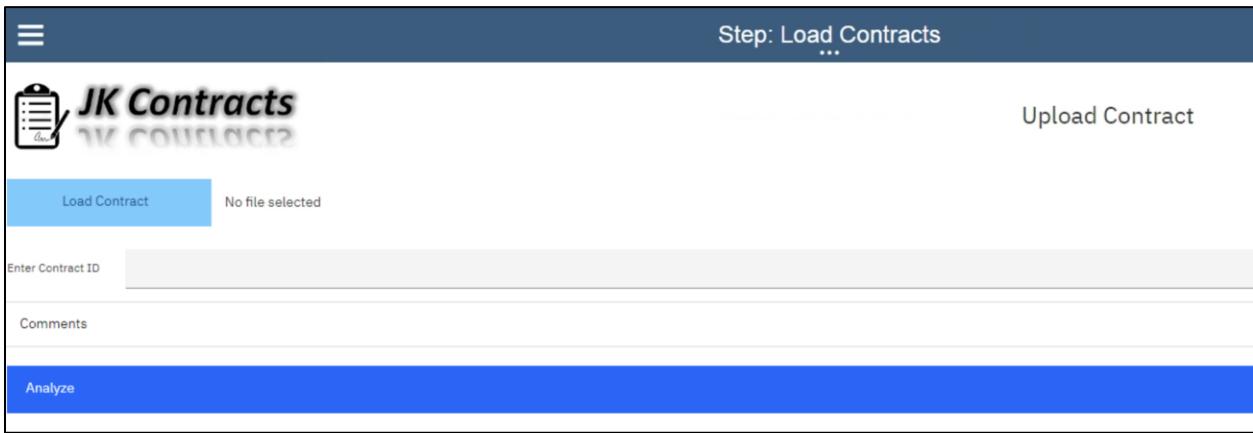
2. The main page for Process Portal is presented:

The screenshot shows the Process Portal interface. At the top left is the user profile 'admin' with 'Edit Profile' and 'Log Out' options. The top right displays '8 Total Open' tasks with status indicators: 0 On Track, 0 At Risk, and 8 Overdue. A search bar says 'Enter search text...' with icons for search, filter, and more. The main area is titled 'Work' with three dots. Below it is a table of tasks:

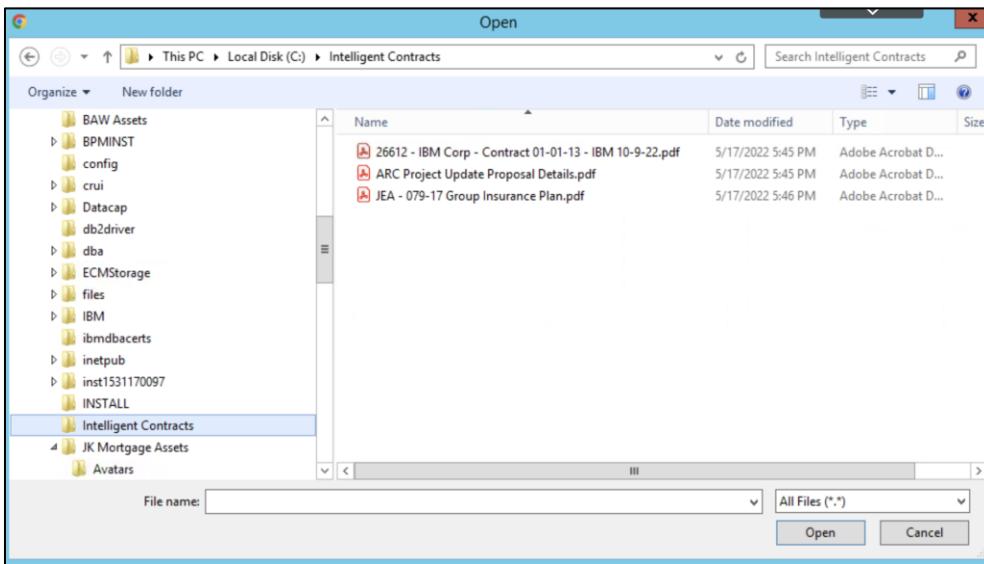
	Contract Approval for 26612 - IBM Corp - Contract 01-01-13 - IBM 10-9-22.pdf Contract Analysis:6119 Due: May 23, 2022, 3:43:34 PM	
	Step: Issue Offer Letter to Candidate Onboard People: 6143 for Sarah Evans Due: May 24, 2022, 4:32:30 PM	
	Contract Approval for JEA - 079-17 Group Insurance Plan.pdf Contract Analysis:6155 Contract Mgmt Due: May 25, 2022, 3:22:59 PM	
	Step: Review Project Details ARC Intake:6166 Due: May 26, 2022, 5:17:47 PM	
	Step: Get Initial Project Details ARC Intake:6167 Due: May 26, 2022, 5:18:06 PM	
	Step: Summarise Actions from ARC Review ARC Intake:6168 Due: May 26, 2022, 5:21:17 PM	
	Step: Summarise Actions from ARC Review ARC Intake:6169 Due: May 26, 2022, 6:32:36 PM	
	Contract Approval for 26612 - IBM Corp - Contract 01-01-13 - IBM 10-9-22.pdf Contract Analysis:6176	

There are 3 primary sections to the page:

- a. The Dashboards section, top left, shows the different dashboards that are available. The selected dashboard is shown in the main space of the portal. Work is the default setting.
- b. The Launch section, bottom left, is a list of processes that this user can start. Notice, in the bottom left corner of the screenshot, Contract Analysis, the process that we wish to start
- c. The majority of the screen is taken up with the current dashboard or current activity UI.
3. To start a new process instance, click on Contract Analysis, in the Launch list. The first user activity in the process automatically opens:



- Click on *Load Contract*. This will open a file explorer from which a contract file can be selected. Navigate to where your sample contracts are available, e.g.



The screenshot above shows 3 samples, you might have others. The default processing for the file is that a contract with name beginning “26612” will be predicted as successful. All other files will be predicted as unsuccessful. Select the contract file according to the result that you wish to illustrate and click on open.

- Note: in testing, the upload sometimes fails but succeeds on a second attempt. The uploaded file is now available to the process and can be seen in the Contracts List which becomes visible when there are contract documents available:

The screenshot shows the JK Contracts software interface. At the top right, it says "Step: Load Contracts ..." with three dots. On the left, there's a logo with a clipboard icon and the text "JK Contracts". To the right of the logo is a blue "Load Contract" button. Below the button is a text input field with the placeholder "No file selected". Underneath this is an "Enter Contract ID" input field with a placeholder "Enter Contract ID". A "Contracts List" table follows, with columns for "Name", "File name or URL", and "Major Version Number". There is one entry: "JEA - 079-17 Group Insurance Plan.pdf" under both "Name" and "File name or URL", and "1.0" under "Major Version Number". Below the table is a "Comments" section with a text area and a "Save" button. At the bottom is a blue "Analyze" button.

6. Enter a Contract ID in the **Enter Contract ID** text box. Any ID is acceptable. If appropriate click on the document and it will open in a new browser window. Note that the documents do not contain contracts and so it might not be appropriate to open the document. If you need a document that is more contract oriented, be sure to have this available as a sample document.
7. Click on the Comment bar to expand the comments section:

The screenshot shows the JK Contracts software interface with the "Comments" section expanded. At the top, it says "Contracts List". Below is a table with columns "Name", "File name or URL", "Major Version Number", "Last Modified", and "Modified By". The same entry as before is listed. Below the table is a "Comments" section with a header and a "New Comment" text area. To the right of the text area is a "Save" button with a pencil icon. At the bottom is a blue "Analyze" button.

Enter comment in the *New Comment* text area and click on “Add Comment” to add the comment to the process. The comment will appear in the comment log:

The screenshot shows a 'Comments' section with a timestamp of '6-3-2022 18:58' and a user 'admin'. A new comment is being typed: 'Contract between JK Contracts and JEA Enterprises'. There is a blue 'Add Comment' button at the top right of the input field. Below the input field is a large blue button labeled 'Analyze'.

(The contents of the comment are not used in processing.) Click on **Analyze** to proceed to the next activity.

8. This will take you back to the process Portal Work page:

The screenshot shows the 'Work' page of the Process Portal. The left sidebar includes 'Dashboards', 'Work' (selected), 'Processes', 'Process Performance', and 'Team Performance'. The main area displays two activities: 'Step: Issue Offer Letter to Candidate' and 'Analysis Results for JEA - 079-17 Group Insurance Plan.pdf'. The 'Analysis Results' item has a yellow progress bar icon next to it.

Note that there is a new Activity available – “Analysis Results for <filename>”. Select this task to see the results of the ML analysis:

The screenshot shows a software application window titled "Analysis Results for JEA - 079-17 Group Insurance Plan.pdf". At the top left is the "JK Contracts" logo. The main content area is divided into two main sections: "Contract Analysis" and "Outcome Prediction".

Contract Analysis:

File Name	JEA - 079-17 Group Insurance Plan.pdf	Contract ID	1045-DFY
Start Date	3/8/2023	End Date	1/24/2025
		Duration Days	688

Outcome Prediction:

Successful Contract	No	Success Confidence	0.735535
---------------------	----	--------------------	----------

Comments: (A dropdown menu is shown here)

Forward For Approval (A large blue button at the bottom of the page)

9. Items to note on this page:
 - a. The Contract Analysis section shows some summary information regarding the contract.
 - b. The Outcome Prediction section shows that the predicted outcome is that this contract will not be successful and there is a confidence value provided with that prediction
10. 'Explainability' is a key tenet of IBM AI and the next step of the demo is focused on this.
 - a. Click on the **View Complete Analysis** button, middle right of the page. A modal will pop up:

Full Analysis

File Name	Contract ID		
JEA - 079-17 Group Insurance Plan.pdf	1045-DFY		
Start Date	End Date	Duration Days	On Time
3/8/2023	1/24/2025	688	Yes
Annual Contract Amount	Contract Range	Contract Type	Sourcing Org
\$10,500,000	High	Under Budget	IT
Expense Type	Intellectual Property	Auto Renewal	Vendor Quality
OPEX	Yes	Yes	4

Show influencers

This shows all of the Contract properties used in the ML model that have an effect on the un/successful outcome of a contract, on an historical basis.

- b. Now click on the **Show Influencers** button:

Full Analysis

File Name	Contract ID		
JEA - 079-17 Group Insurance Plan.pdf	1045-DFY		
Start Date	End Date	Duration Days	On Time
3/8/2023	1/24/2025	688	Yes
Annual Contract Amount	Contract Range	Contract Type	Sourcing Org
\$10,500,000	High	Under Budget	IT
Expense Type	Intellectual Property	Auto Renewal	Vendor Quality
OPEX	Yes	Yes	4

Show influencers

We now show, in red, the contract properties that were most influential in the prediction. For this contract, these properties are Duration Days, Annual Contract Amount, Expense Type, Intellectual Property and Vendor Quality. Dismiss the modal by clicking elsewhere on the page.

Again, note that this data is all part of a vision demo, this is not the result of calls to the ML model.

11. Click on the (collapsed) **Comments** section

A screenshot of a process portal interface. At the top, there is a header bar with the text "Comments". Below this, a list of comments is displayed, with the most recent one being from "admin" at "6-6-2022 14:42" regarding a "Contract between JK Contracts and JEA Enterprises". A text input field labeled "New Comment" is present, and a blue "Add Comment" button is located to its right. At the bottom of the screen, a large blue button labeled "Forward For Approval" is visible.

You will see the existing comment, made in a previous section, carried through to this step. The next Activity in the process is for a Contracts Approver to review the contract and either approve or send back for re-work. Enter and appropriate comment here for the approver.

A screenshot of a process portal interface, similar to the one above. It shows a list of comments, including a new one from "admin" at "6-6-2022 16:28" stating: "I understand that our predictor marks this as a failing contract but I know this vendor well and they will not let us down." A text input field labeled "New Comment" contains the same text, and a blue "Add Comment" button is to its right. The "Forward For Approval" button is also present at the bottom.

Then click on **Forward For Approval**.

12. The flow returns to the Process Portal Work page. Click on the Contract Approval activity

Contract Analysis

File Name	JEA - 079-17 Group Insurance Plan.pdf	Contract ID	1045-DFY
Start Date	3/8/2023	End Date	1/24/2025
			Duration Days 688
View Complete Analysis 			

Outcome Prediction

Successful Contract	No	Success Confidence	0.735535
---------------------	----	--------------------	----------

Comments

6-6-2022 14:42	admin	Contract between JK Contracts and JEA Enterprises
6-6-2022 16:28	admin	I understand that our predictor marks this as a failing contract but I know this vendor well and they will not let us down.
New Comment		Add Comment

 [Return for Rework](#)
 [Approve](#)

This presents a summary and approval page for a Procurement Reviewer/Approver role.
The contract can be approved or returned to the Procurement Analyst.

13. Click on Approve to end the demo.

Watson Discovery Contracts Intelligence Workshop (top)

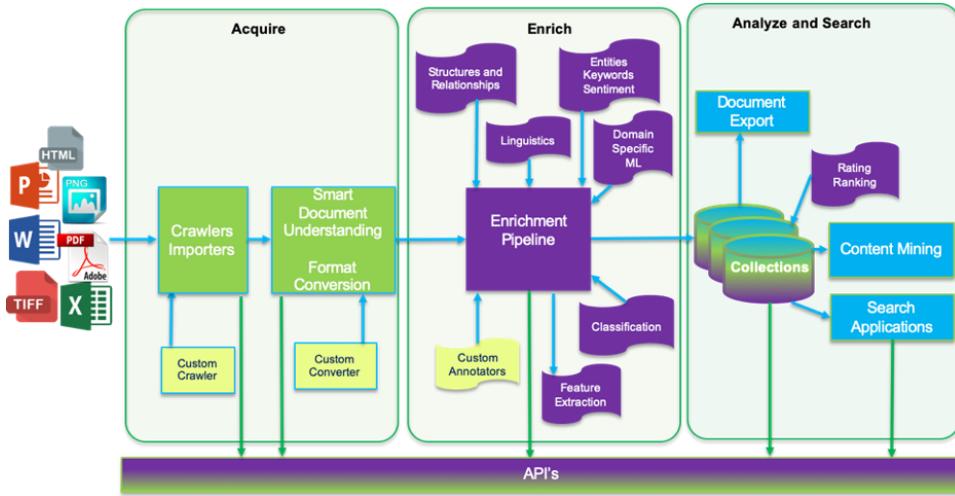
Watson Discovery Data Flow

Watson Discovery provides multiple methods of acquiring and enriching documents of various type. In the diagram below you can see three phases Acquire, Enrich, Analyze and Search.

In the Acquire stage, data is ingested from one or more data sources, stripped of unnecessary content (such as graphics and formatting) and then passed to the Enrich stage.

In the Enrich stage, the data (typically a mix of structured and unstructured text) is processed using techniques such as Natural Language Processing and Machine learning to provide meaning and context to the raw text. This enriched data is stored as a Collection.

The Analyze and Search stage uses the enriched data from one or more Collections to conduct discovery and exploration or to enable expert assistance through search-based applications.



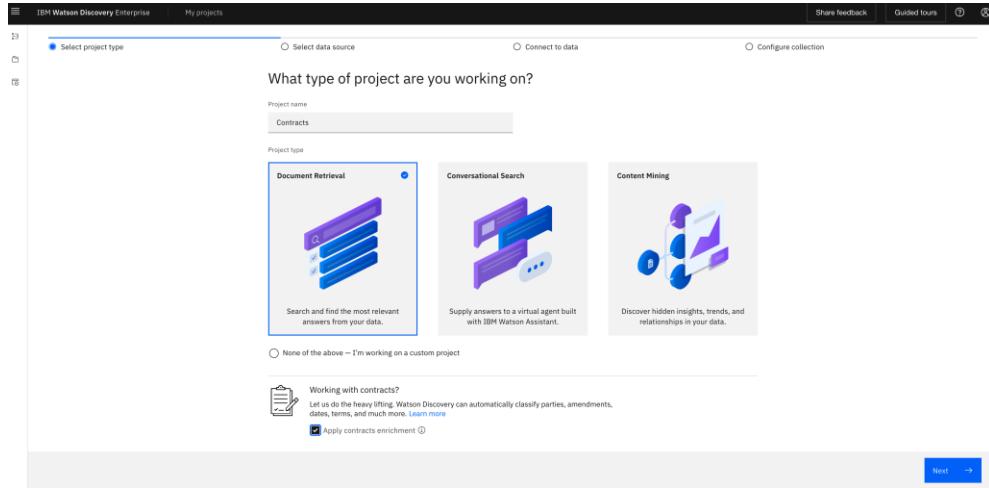
Watson Discovery uses Natural language queries as well as structured queries to find relevant results using passages and highlights across data that has been enriched and ingested. In this particular demo the data ingested is a small number of procurements contracts. We have chosen to apply a pre-built Contracts Intelligence enrichment model during ingestion in order to leverage Watson's understanding of contractual data.

Demo Setup (top)

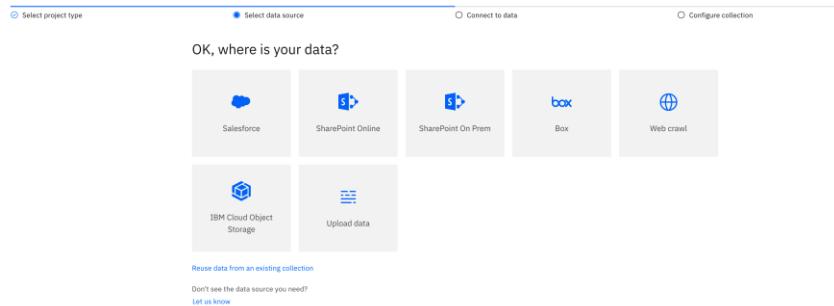
NOTE: This use case demonstration calls for Watson Discovery Enterprise Edition to be licensed and used for the purpose of the “Contract Analysis” feature. However, the workshop includes setup and demonstration instructions for the Plus Edition as well if you cannot access the Enterprise Edition.

1. Install Watson Discovery through the Cloud Services Catalog. <https://cloud.ibm.com/>
2. Once you have launched the Discovery Tooling, look to the right of the initial Project screen for the icon and click on it.
3. Enter a Project name (Contracts Intelligence), Select the “Document Retrieval” project type. Then check the box for “Working with Contracts”. Click Next

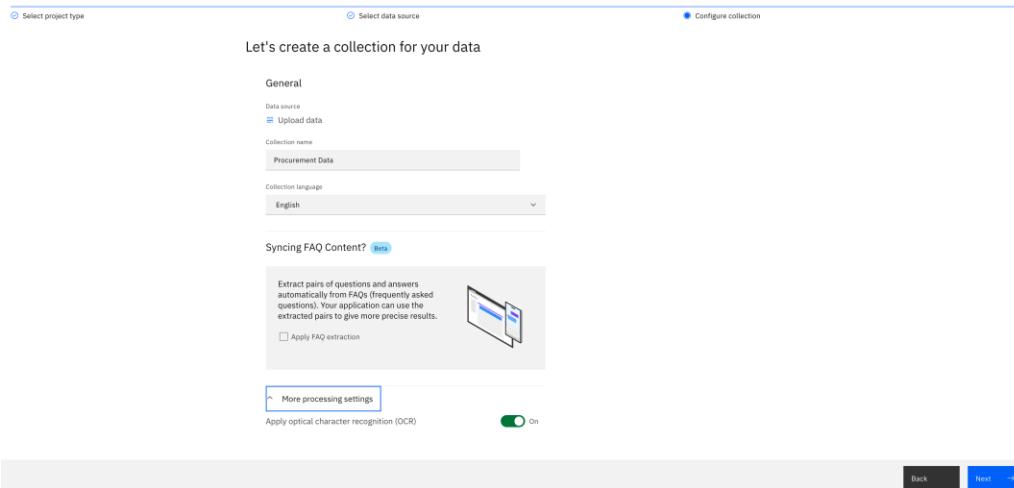
NOTE: If you do not have an Enterprise license, then the “Working with Contracts” option will not be available, and you should just continue with the steps outlined below. The optional demo for this will outline steps for a demonstration without the Contracts Model being used



- Now select “Upload data”, then click Next.

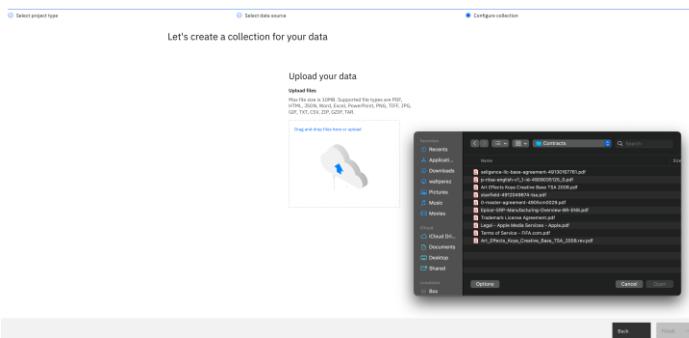


- Name your collection something unique, open the “More processing settings” options drop down and ensure the OCR option is enabled. (some of the content is scanned as an image, so this will enable us to pull out text). Click Next



- Now, download the content found in the github repository for this workshop to your computer and then unzip into a local folder...This should give you 6 documents.

You can either click and drag the docs from a folder or click within the box to open a local file explorer popup. Then click Finish in the bottom right corner of the screen.



Once the data has loaded, you will see the following screen, which indicates the data has successfully loaded and is ready for the demonstration.

Demonstration (Discovery Enterprise Edition, with Contract Analysis)

(top)

1. Launch Watson Discovery Tooling from Services and Software Resource List in ibm.cloud.com.

The screenshot shows the Watson Discovery Tooling interface. At the top, there's a navigation bar with 'Start by launching the tool', 'Launch Watson Discovery' (which is highlighted in blue), 'Getting started tutorial', and 'API reference'. Below this is a 'Plan' section with 'Enterprise' selected. There's also an 'Upgrade' button.

2. Select the **Contract Intelligence Project** from the **My Projects** list. You will now be in the **Improve and customize** panel of Discovery Tooling and ready to demo.
3. In the search box enter **Stanfield Intellectual Property** as the query.

The screenshot shows the 'Improve and customize' panel. A search bar at the top contains the query 'Stanfield Intellectual Property'. Below it, there are several search results listed in a grid format. Each result includes a preview of the document content and a 'View passage in document' link. The results are categorized under 'Collection: Contracts'. On the right side of the panel, there are several dropdown menus for refining the search results: 'Customize display', 'Extract meaning', 'Teach domain concepts', 'Define structure', and 'Improve relevance'.

In the return results you will see that not only results have been displayed, but also enriched structure from the document now exists in order to use for digging deep into the exact areas of the contract we are interested in.

4. Click on **view passage in document** for the first result in the list. This will show the natural understanding of the concept we queried highlighted within the original document.

The screenshot shows the 'View passage in document' interface. It displays a PDF document titled 'Technical Services Agreement' with the file name 'stanfield-4912049674-tsa.pdf'. The document page number is 10 of 11. On the right side of the interface, there is a 'Details' panel which includes information such as 'File name: stanfield-4912049674-tsa.pdf', 'File type: pdf', and 'Collection: Contracts'. At the bottom right of the main document view, there is a blue button labeled 'Open advanced view'.

5. Click on **Open advanced view** in the bottom right of the window. This is a Contracts specific User Interface designed to expose the full gambit of the Contracts Intelligence. You can see in this screen, we now have more structured enrichments that have been exposed from the specific document.

6. Click on the Category, Intellectual Property.

The screenshot shows a contract document titled "stanfield-4912049674-tsa.pdf". The left sidebar has a "Filters" section with several categories checked, including "Intellectual Property (44)". The main content area contains several definitions and notes related to intellectual property terms like "Affiliates", "Agreement", "Business Partner Agreement", "Customer", "Deliverables", "Developed Works", "Electronic Self-Help", "Externals", and "SOW". On the right side, there are tabs for "Details", "Categories", "Types", and "Attributes".

Now every concept from the contract around Intellectual Property has been identified and highlighted in the document. You can use the top navigation to jump from highlighted passage to highlighted passage. This shows that we have successfully identified the concept of Intellectual Property as an enrichment in the document, which will be crucial as a predictive field with our Machine learning model in Watson Studio.

7. With Intellectual Property still selected, now click on the **Buyer** radio button under the **Party** category. We have now intersected the one area in the contract where Intellectual Property is discussed in regards to the Buyer.
8. Other metadata is extracted as well and can be used to enrich models built with Machine Learning. Click on the **Metadata** tab above the categories.

The screenshot shows the "Metadata" tab selected in the top navigation bar of the "stanfield-4912049674-tsa.pdf" document. The sidebar lists categories such as "Pricing & Taxes", "Privacy", "Responsibilities", "Safety and Security", and "Scope of Work".

This will expose other metadata, such as the effective date of the contract.

Contract Data Document
stanfield-4912049674-tsa.pdf
Metadata
Effective dates
2022-06-16
Contract types
Base Agreement
Base Agreement
Parties
INTERNATIONAL BUSINESS MACHINES (Buyer) 2
STANFIELD SYSTEMS (Supplier) 2
GLOBAL TECHNICAL SERVICES COUNCIL 1
Addresses
3039 Cornwallis Road Raleigh, NC 27709-2195

This Base Agreement ("Base Agreement") between International Business Machines Corporation ("Buyer") and Stanfield Systems Incorporated ("Supplier") establishes the basis for a multinational procurement relationship under which Supplier will provide Buyer the Deliverables and Services described in SOWs and/or WAs issued under this Base Agreement. This Base Agreement is effective from June 16, 2012 ("Effective Date") and will remain in effect until terminated.

1.0 Definitions

"Affiliates" means entities that control, are controlled by, or are under common control with, a party to this Agreement.

"Agreement" means this Base Agreement and any relevant Statements of Work ("SOW"), Work Authorizations ("WA"), and other attachments or appendices specifically referenced in this Agreement.

"Business Partner Agreement" means an agreement executed between Buyer and Supplier to promote, market, and support certain products and services.

"Customer" means Buyer's customer.

"Deliverables" means items that Supplier prepares for or provides to Buyer or Customer as described in a SOW and/or WA.

Deliverables include Developed Works, Preexisting Materials, and Tools.

"Developed Works" means all work product (including software and its External) developed in the performance of this Agreement as described in a SOW and/or WA. Developed Works do not include

9. You can also add custom enrichments assisted by Watson AI through the Discovery tooling as well. Click on the [/ Improve and customize /](#) hyperlink located at the top left of the window to go back into the main Improve and customize screen. On the right side, click on the **Teach Domain concepts**. This opens more AI assisted tools to further enrich your contracts data by adding custom Dictionary terms, extracting custom entities or even applying custom Machine Learning.

Improve and customize

Stanfield Intellectual Property

Category

Communication
Intellectual Property
Confidentiality
Dispute Resolution
Indemnification

Show all

Nature

Disclaimer
Obligation
Exclusion
Definition

Contract Term

32 days
45 days

Contract Type

Base Agreement
TRADEMARK LICENSE AGREEMENT

enriched_html_tables.row_headers.text_n
remained

Items per page: 5 1-5 of 11 results

Supplier Role

3rd Base Ltd

View table in document

Collection: Contracts

Microsoft Word - Art Effects Koya Creative Base TSA 2018.doc

and/or other Materials that are identified as "Type A Materials" in the SOW and in which the Intellectual Property Rights are owned by the Customer pursuant to Clause 15.2a) (Intellectual Property Right)

View passage in document

View table in document

Collection: Contracts

Phone Support

Company X

View table in document

Collection: Contracts

Customize display

Extract meaning

Teach domain concepts

Dictionaries

Patterns

Extract entities

Regular expressions

Classifiers

Machine learning

Advanced rules models

Define structure

Improve relevance

Now that we have shown how we can enrich unstructured content, Watson Studio will be used to leverage existing data fields as well as the newly extracted Watson Discovery enrichment fields to create predictive models.

Demonstration (Discovery Plus Edition)

(top)

This alternative Demonstration will rely on a custom field being created as the pre-trained Contracts enrichments are not available. This path can also be shown in addition to the above path to illustrate the fact that customized fields can also be added to the pre-trained models in Discovery.

1. Launch Watson Discovery Tooling from Services and Software Resource List in ibm.cloud.com.



- 2.
3. Select the **Contract Intelligence** Project from the **My Projects** list. You will now be in the **Improve and customize** panel of Discovery Tooling and ready to demo.
4. In the search box enter **Stanfield Intellectual Property** as the query. Notice the Entities being displayed on the left. Since we do not have a pre-trained contracts model listing of entities, we will need to show how we can easily start building a custom entity to easily find the concept of intellectual property.

5. On the right side of the screen open the “Teach Domain Concepts” drop down. Now click on the “Dictionaries” option.

Now, click on “New”, then enter the Dictionary name as, “Intellectual Property”. For the included terms, enter...intellectual property, inventions, third party code, and developed works. Lastly, click on the “Save Dictionary” located in the upper right corner of the screen.

6. Now click on the field to which this enrichment will be applied to. In our case, click “text”.

7. The goal is to create an enriched field to be extracted from the unstructured text. Once this has been saved, you will notice a popup that mentions re-processing of the collection has started. It will take a few minutes for the collection to be refreshed with the new field we just created. So, in the meantime, go back to the “Bach to Improve and Customize” screen by clicking on the hyperlink in the upper lefthand corner of the screen.

Once the processing has finished and enter a query, you should see the following screen, which contains our newly created field of intellectual property. This shows that we have successfully identified the concept of Intellectual Property as an enrichment in the document, which will be crucial as a predictive field with our Machine learning model in Watson Studio.

Contracts / Improve and customize

Top Entities

- intellectual_property
- inventions
- third party code

JobTitle

Organization

Number

Collections

Available collections

Epicor-ERP-Manufacturing-Overview-BR-ENS-1018

Collection: Procurement Contracts

"Instructional or informational text is identified in *italics* and should be deleted prior to presentation to the Supplier. Language that is either optional or where text must be inserted will be underlined throughout the document (delete language or options that are not applicable)."

View passage in document

Microsoft Word - P-NTSA English v1_1 - ID 49900935125_0.doc

Collection: Procurement Contracts

"On 22 December 2008 ART EFFECTS LIMITED and Customer entered into an Information Technology Procurement Framework Agreement ("the Prime-Contract"). Buyer is seeking information technology services (and certain related services) for its business operations and to meet obligations in connection with transactions under the Prime-Contract."

View passage in document

Microsoft Word - Art Effects Koya Creative Base TSA 2008.doc

Collection: Procurement Contracts

"This Base Agreement ("Base Agreement") dated as of 09/20/2005 ("Effective Date"), between IBM ("Buyer") and Overland Entertainment ("Supplier"), establishes the basis for a multinational procurement relationship under which Supplier will provide Buyer the Deliverables and Services described in SOWs issued under this Base Agreement."

View passage in document

O-master-agreement-4905cm0029.pdf

Collection: Procurement Contracts

"This Base Agreement ("Base Agreement") between International Business Machines Corporation ("Buyer") and Seligence LLC ("Supplier") establishes the basis for a multinational procurement relationship under which Supplier will provide the Deliverables and Services described in SOWs and/or WAs issued under this Base Agreement."

View passage in document

Items per page: 10 ▾ 1–6 of 6 results

1 of 1 pages ▶

You can even go further and show the exact type of Intellectual Property...

Clicking on one of the sub-entity types, will further slim down the results to show only the passages that contain that term. Try clicking “inventions”, which should yield one result.

Now that we have shown how we can enrich unstructured content, Watson Studio will be used to leverage existing data fields as well as the newly extracted Watson Discovery enrichment fields to create predictive models.

Watson Studio With Watson Discovery To Build And Deploy a Contract Success AI Model

(top)

In our previous demo with Watson Discovery, we learned how it was able to provide Domain Concepts like “Intellectual Property” from many contractual documents.

When building our machine learning model to predict contact success, we’re going to merge the unstructured concepts like “Intellectual Property” with the historical contract history to build and deploy a more robust machine learning model to predict contract success.

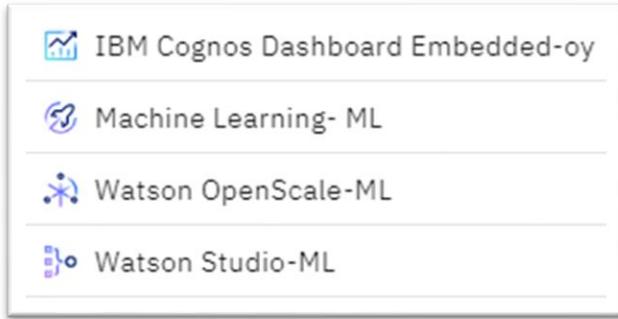
The screenshot shows a search interface for 'Stanfield Intellectual Property'. A red circle highlights the search bar at the top. Below it, there's a 'Category' section with checkboxes for Communication, Intellectual Property, Confidentiality, Dispute Resolution, and Indemnification. A 'Show all' link is present. The main results area displays a document snippet: "' of this Agreement and will remain in effect until fulfilled: "Taxes", "Ongoing Warranties", of Action", "Exchange o'" followed by a 'View passage in document' link. Another result is shown below: 'stanfield-4912049674-tsa.pdf' with a snippet: "' and/or other Materials that are identified as "Type A Materials" in the SOW and in which the Intellectual Property Rights are owned by the Customer pursuant to Clause 15.2a) (Intellectual Property Right'" followed by a 'View passage in document' link. On the left, there are sections for 'Nature' (Disclaimer, Obligation, Right, Exclusion, Definition), 'Contract Payment Term' (12 days, 45 days), and 'Contract Type'.

Figure 2 Example of using Watson Discovery To Uncover Common Categories

Required software, access, and files

(top)

1. To complete this lab, you will need a **Cloud Pak for Data as a Service (CPDaaS)** account:
<https://dataplatform.cloud.ibm.com>
If you don't have a CPDaaS account, use the same URL to sign up for a free trial. The account will be activated in approximately 5 minutes.
2. If you already have an **IBM Cloud** account, make sure that you provisioned the required services
 - a. **Watson Studio**
 - b. **Watson Machine Learning (WML)**
 - c. **Watson OpenScale**
 - d. **IBM Cognos Dashboard Embedded**.
3. Navigate to your *Resource list* in your **IBM Cloud** dashboard: <https://cloud.ibm.com/resources>
4. Check if the mentioned services are displayed under **Services**. If not, search for the services in the **Catalog** and add them.



NOTE: You will likely not have the same endings. (IE. '-oy' and '-ML')

5. Download the [project zip file](#) to your machine. It will be imported into a Cloud Pak For Data Project.
6. Please visit this [git repository](#) to download all the files for this workshop.
7.  Watch [this recording](#) before you proceed! It will step you through the demo in approx. 9 minutes.

Download These Files From Git

(top)

1) Intelligent-Contracts.zip

Import this zip file when creating a new IBM Watson Studio Project

It will include the following project assets:

- 3 CSV files - Scored_Contracts.csv, Contract_Analysis.csv, Unscored_Contracts.csv
- Python Notebook - ContractSuccessRandomForest-Py38 Using Sklearn - Using Open Source SkLearn Python with a Random Forest Model deployed to IBM Platform
- Modeler Flow - Build and deploy the same Python model without the need for coding
- Dashboard - Historical and Predictive Visualizations using structured and unstructured contract data
- Model - Contract Success Using AutoAI - P3 Snap Random Forest Classifier - This model was generated by AutoAI. We will deploy in the workshop.

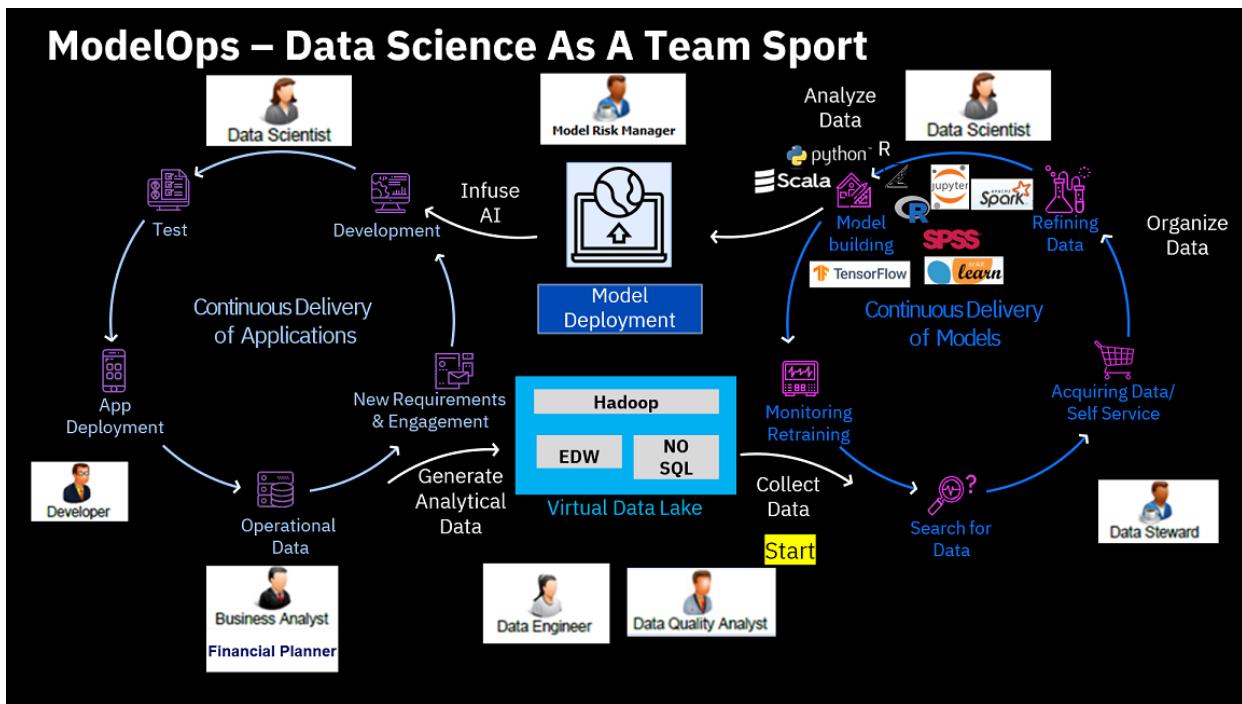
2) Intelligent-Contracts-Workshop-Guide.pdf (CURRENT DOCUMENT)

Use this step-by-step workbook to:

- Automate Contract Workflow (Ingestion, Analysis, Approvals)
Uses Cloud Pak For Business Automation
- b) Enrich Intelligence Accuracy (Extracting Information from Contracts)
Uses Cloud Pak For Data Watson Discovery
- c) Integrate Continuous Improvement (Infusing AI into the Operation)
Uses Cloud Pak For Data Watson Studio

3) data_science_modelops_team_sport.png

ModelOps as a Team Sport image depicting all those involved in delivering AI models and how IBM has them all collaborate together on one platform.



4) contracts.zip [Already used in previous workshop]

Sample contracts used in demo with Watson Discovery and used in the modelOps workflow.

5) modelOpsForContractSuccess.mp4

A recording of the end to end modelOps demo.

6) csv_files.zip

(Optional) Start a new Project in Cloud Pak For Data, import these CSV files and create all the project assets yourself from scratch.

Watch the video as a guide.

7) Trustworthy AI.mp4

(Optional) In this 9 minute recording, learn how IBM provides AI guardrails by monitoring key model metrics on and off our platform using OpenScale to avoid data bias or drift with model risk workflow to adhere to regulator guidelines like SR 11–7 that requires model risk management for all models in financial services using OpenPages.

8) ContractSuccessRandomForest-Py38 Using Sklearn.ipynb

(Optional) Import this Python notebook using Open Source Sklearn and Random Forest Model.

Required skills

(top)

We recommend that users who work through this lab:

- Understand the data science model lifecycle
- Have at least beginner knowledge of different methods for creating models

Step 1: Create New Project Importing Intelligent-Contracts.zip

(top)

1. Sign into [Watson Studio](#). From the quick navigation on the left, select **Projects** → **View all projects**.

The screenshot shows the left sidebar of the IBM Cloud Pak for Data interface. The sidebar has a dark background with white text. It includes a 'Filter navigation' search bar at the top. Below it are several menu items with icons: Home (house), Data (database), Projects (square with a checkmark), View all projects (highlighted with a red box), Jobs (person icon), Deployments (target icon), Services (grid icon), Services catalog, Service instances, Gallery (camera icon), Administration (gears icon), Dashboards (chart icon), Support (question mark icon), Cognos Dashboard Embed, and Data pipelines. The 'View all projects' item is circled in red.

2. On the far right, click the **New project**, then select **Create a project from a sample or file**.

The screenshot shows a modal dialog box titled 'Create a project from a sample or file'. At the top left is a blue button labeled 'New project' with a '+' sign. To its right is a circular icon containing a hand holding a document with a plus sign on it. The main area of the dialog has a light gray background. It contains the title 'Create a project from a sample or file' and a sub-instruction 'Get started fast by loading existing assets. Choose a project file from your system, or choose a curated sample project.' A small cursor icon is visible at the bottom right of the dialog.

3. Drag the *project zip* file (downloaded from Git) from your machine to the **Upload file** section.

Name your project **Intelligent Contracts**

Select a **Cloud Object Storage** service

Select **Dashboard Service** from the dropdown list

Click **Create**.

4.