

IBM StoredIQ Cognitive Data Assessment

*Building CDA models for document
classification*



Note

Before using this information and the product it supports, read the information in [Notices](#).

This edition applies to Version 7.6.0.20 of product number 5724M86 and to all subsequent releases and modifications until otherwise indicated in new editions.

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Contents

- IBM StoredIQ product library..... iv**
- Contacting IBM StoredIQ customer support.....v**
 - Contacting IBM..... v
- IBM StoredIQ Cognitive Data Assessment..... 1**
- Building CDA models for classification..... 2**
 - Administering tag groups and tags..... 4
 - Managing a training project..... 5
 - Contributing to a training project..... 8
- Notices.....10**
 - Trademarks..... 11
 - Terms and conditions for product documentation..... 12
 - IBM Online Privacy Statement..... 12
- Index..... 14**

IBM StoredIQ product library

The following documents are available in the IBM® StoredIQ® product library.

- *IBM StoredIQ Overview Guide*
- *IBM StoredIQ Deployment and Configuration Guide*
- *IBM StoredIQ Data Server Administration Guide*
- *IBM StoredIQ Administrator Administration Guide*
- *IBM StoredIQ Data Workbench User Guide*
- *IBM StoredIQ Policy Manager User Guide*
- *IBM StoredIQ Cognitive Data Assessment User Guide*
- *IBM StoredIQ Insights User Guide*
- *IBM StoredIQ Integration Guide*

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For IBM StoredIQ technical support or to learn about available service options, contact IBM StoredIQ customer support at this phone number:

- 1-866-227-2068

Or, see the Contact IBM web site at <http://www.ibm.com/contact/us/>.

IBM Knowledge Center

The IBM StoredIQ documentation is available in [IBM Knowledge Center](#).

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IBM StoredIQ Cognitive Data Assessment

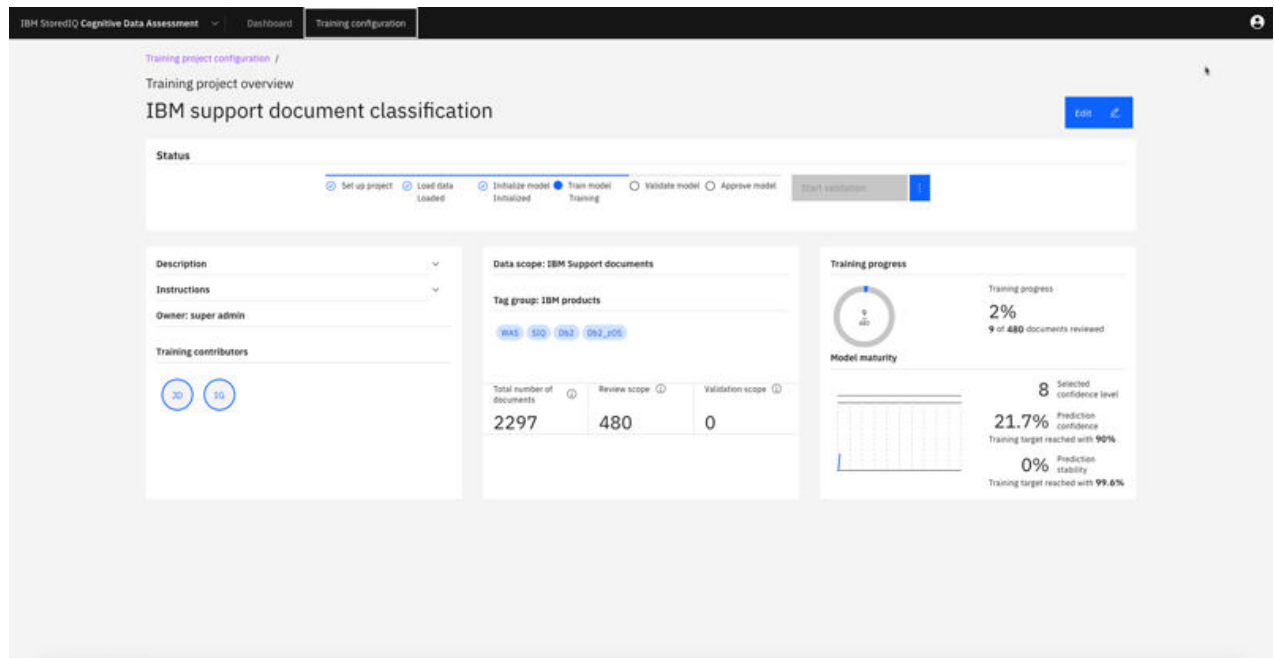
With IBM StoredIQ Cognitive Data Assessment, your organization can vastly improve the efficiency, accuracy, and automation of document classification decisions.

Gaining actionable insight in your unstructured data most often requires assessing and reviewing documents, no matter what the use case is:

- e-discovery
- Data cleanup
- Compliance and audit activities
- Retention
- Sensitive data management

To categorize your data properly, unstructured documents of various formats and different length must be classified or tagged. To minimize the time and effort spent on tagging, you can create a machine-learning model by using IBM StoredIQ Cognitive Data Assessment.

Cognitive Data Assessment streamlines the creation of a model. It combines the training and validation of the model where users contribute to the process in a training project by accepting or rejecting the suggested classification. After the model is built, it can automatically tag new documents for you. When the model is deemed mature and is approved, it can be downloaded and deployed as a cartridge and applied to any IBM StoredIQ infoset. The classifications are then readily available in IBM StoredIQ Insights.



Building Cognitive Data Assessment models for classification

Create Cognitive Data Assessment (CDA) models that can classify documents automatically by choosing the appropriate tagging.

Build classification models in IBM StoredIQ Cognitive Data Assessment, add them in IBM StoredIQ Administrator, run them in IBM StoredIQ Data Workbench, and work with the results in IBM StoredIQ Insights.

Prerequisites

Before you can work with IBM StoredIQ Cognitive Data Assessment, you must meet several prerequisites:

- Your IBM StoredIQ deployment must include a data server of the type DataServer - Distributed managing an Elasticsearch cluster. Only documents from volumes managed by distributed data servers can be used with CDA.
- The training data that you want to use must be full-text indexed. For proper training, the data scope loaded into a training projects should comprise between 5,000 and 50,000 documents with representative data. Smaller data scopes will work as well but the resulting model might be less robust due to the reduced diversity of a smaller data set. Larger data scopes will not necessarily add to the model quality. However, if you have larger candidate infosets, you can use the sampling filter in IBM StoredIQ Data Workbench to reduce the infoset size while preserving representativeness. Random sampling can also help you to generate infosets with representative data in the first place.
- Access to IBM StoredIQ Cognitive Data Assessment requires the **CDA Project Owner** or the **CDA Project Contributor** role. The **CDA Project Owner** provides access to the training configuration section and to the dashboard. The **CDA Project Contributor** role provides access to the dashboard where users can select and work on training projects.

Users with just one of these roles have direct access to IBM StoredIQ Cognitive Data Assessment when they log in to IBM StoredIQ. Users with multiple IBM StoredIQ roles can switch applications by selecting **Cognitive Data Assessment** from the list of available applications. This list can be expanded by clicking the arrow next to the application name in the global navigation bar.

- The following web browsers are supported:
 - Google Chrome 77
 - Microsoft Edge 44
 - Mozilla Firefox 68.0.1

Key terms

Contribution

Data experts and other Subject Matter Experts (SMEs) contribute to training projects by tagging documents manually in the training phase and by reviewing automatically set tags in the validation phase.

Confidence level

The confidence level indicates the accuracy of tag predictions that you want to achieve. It is a number between 1 and 10, where 1 indicates that you're content with the model having only little confidence that the selected tag is correct, and 10 indicates that you expect the model to be absolutely confident that the selected tag is correct. Smaller values typically allow to train a model more quickly, i.e. with fewer documents to review. Larger values require more effort in reviewing documents but typically result in higher quality models.

Data scope

The training data that you load into a project based on an IBM StoredIQ info set. The documents in the data scope make up the candidate pool from which the optimal documents are automatically selected for training and validation.

Model maturity

The term relates to the degree to which the model has reached the targeted confidence and stability. The learning curving gives an idea of how well the model is learning. At the start of the training, the model's learning curve usually will be pretty steep but flatten at some point.

Prediction confidence

The model's confidence in its tag predictions. The model prediction confidence is the average prediction confidence for the reviewed training data.

Prediction stability

For each training iteration, tags predictions for the documents still to be reviewed are made based on the current model. These predictions are stored. In each iteration, this stored set is compared to the current predictions. Depending on the differences in the predictions, the stability changes. If the predictions are the same, prediction stability is at 100%.

Review scope

The number of documents that must be reviewed to train the model properly.

Validation scope

The number of documents that must be reviewed to verify the model's tag selections.

The overall process

Phase	Who	What
Data preparation	IBM StoredIQ data expert	Prepare data for learning by creating a full-text indexed info set as training data in IBM StoredIQ Insights or IBM StoredIQ Data Workbench
Training configuration	CDA project owner	<ol style="list-style-type: none"> 1. Create tag groups and tags in CDA. 2. Add a new training project: <ol style="list-style-type: none"> a. Define project data and data scope. b. Adjust the model configuration as required. c. Load the training data. d. Initialize the model. e. Start the training and let data experts know they can start contributing.
	IBM StoredIQ Insights administrator	Create a matching set of tag groups and tags in IBM StoredIQ Insights.

Phase	Who	What
Training	CDA project contributor	Review the provided documents and assign the proper tags.
	CDA project owner	<ol style="list-style-type: none"> 1. Monitor the training progress to see how the model evolves. Make necessary adjustments. 2. End the training manually if you think the model is mature enough. (The system might end the training automatically when the training targets are reached.) 3. Start the validation cycle.
Validation	CDA project contributor	Review the tag settings in the provided documents. Confirm the model's prediction by accepting the tag. Reject incorrectly set tags.
	CDA project owner	<ol style="list-style-type: none"> 1. Monitor the validation progress. 2. End the validation manually if you think the model is mature enough. (The system might end the training automatically when the training target is reached.) 3. Evaluate the model quality. If your model is good to go, approve the model.
Publishing	CDA project owner	Download the model and provide the cartridge file to the IBM StoredIQ administrator for deploying it.
Deployment	IBM StoredIQ administrator	Add the cartridge to IBM StoredIQ and create a Step-up Analytics action for applying it.

Administering tag groups and tags

Create and maintain the tag groups and tags for training models.

You must have project owner rights to be able to complete this task.

Before you start to add tag groups and tags, think carefully about a tag system that allows for efficient classification of content. The more thoroughly thought through your tag system is, the easier it is to find the content again later.

If you plan to work with the classified content in IBM StoredIQ Insights to draw the most profit from the classification, matching tag groups must exist there. Also, ensure that any tag groups used in both applications are kept in sync.

No default tag groups are provided with the product. You must create all definitions from scratch. Tag groups and tags can be deleted if they are not used in a training project.

1. In IBM StoredIQ Insights, select **Training configuration > Tag groups**.

2. To add a group, click **Add new**.

- A unique group name.

Names must not contain colons (:). Names of tag groups that must also be defined in IBM StoredIQ Insights must not start with \$SIQ\$ in any combination of upper- and lowercase letters. In addition, the name must not exceed 30 characters in length.

- A detailed description of the purpose of this tag group. Specifying a description is optional but consider that a detailed description helps to identify the proper tag group for a specific use case.

3. To add a tag, click **Add new**.

Provide a name and optionally a description. For tag names, the same restrictions apply as for tag group names. When you're done, click **Add**. You can also add a tag by just specifying a name and pressing Enter.

You can edit or delete a tag by clicking the respective icon next to the tag name.

4. To create the tag group, click **Save**.

To update a tag group, edit it by clicking its name or the **Edit** icon. You can update the details at any time. To delete a tag group that is not used in a training project, click the **Delete** icon.

Managing a training project

Create a training project, manage and monitor training and validation cycles, and finally approve and publish the model.

As soon as you save a project for the first time, it is added to the **Training projects** page. You can access any training project from there. Until training is started, clicking a project's name puts the project into edit mode. After training is started, you are taken to the project overview and can edit the project from there. Alternatively, you can directly edit a project by clicking the **Edit** button.

The overview shows all information that currently is available for the project. The information varies depending on the status of a training project.

Create a training project

To create a training project, configure basic project settings, load training data, and initialize the model.

Suitable training data must be available. That is, a full-text indexed infoset with documents appropriate for your learning use case must exist in IBM StoredIQ. In general, data scopes ranging from 5,000 to 50,000 documents with representative data should be sufficient. Smaller data scopes will work as well but the resulting model might be less robust due to the reduced diversity of a smaller data set. Larger data scopes will not necessarily add to the model quality. However, if you have larger candidate infosets, you can use the sampling filter in IBM StoredIQ Data Workbench to reduce the infoset size while preserving representativeness. Random sampling can also help you to generate infosets with representative data in the first place.

Also, the required tag groups and tags must be available. If you plan to work with the classified content in IBM StoredIQ Insights, matching tag groups must exist there.

At any time, you can leave the project setup. After you save your project, it is added to the list of training projects. You can open it again by clicking its name, which puts the project into edit mode until training is started. After training is started, you are taken to the project overview and can edit the project from there. Clicking the Edit icon also puts the project in edit mode.

Set up a training project:

1. Select **Training configuration > Training projects** and click **Add new**.

2. Enter a unique project name.

3. Provide the following information:

Project data

Tag group

Select the tag group that reflects the classification for which you want to train the model. This setting is required.

Training due date

You can set a due date by which the training is supposed to end to let contributors know the timeframe in which they can participate in the training. This setting is optional.

Project description

Provide some information about the purpose for which the model is trained. For example, you might want to train a model to classify sensitive data so that the company's data can be easily screened for violations of any policies for the placement of sensitive data.

Although this information is optional, consider providing a description because it will help contributors to decide whether the project falls into their field of expertise so that their contributions are valuable.

Instructions

Provide training and validation instructions for contributors so that they know exactly what to do and what to watch out for.

Although this information is optional, consider providing detailed and precise instructions to ensure the model quality.

Links

Provide links to any additional resources that you think contributors might profit from. Links are optional.

Data connection

Check the information about the suggested review scope before you select a data scope. The suggested number of documents to review is calculated based on the number of tags in the selected tag group and the confidence level set in the **Model configuration** section. The data scope that you select must have at least the number of documents that is shown as the minimum number of documents to be reviewed for a model of good quality. After you select a data scope, the review scope is recalculated based on the data scope size.

Data scope

Click **Select a data scope** to see a list of the available data scopes. A data scope corresponds to an IBM StoredIQ user infoset. For each data scope (or infoset), the name, the number of documents it contains, and its size in MB is displayed. If a description is available, it is also shown. Pick a suitable data scope for your training purpose.

Model configuration

You can change these settings at any time before you start the training.

Sample size

Defines the maximum number of documents to be reviewed in one training iteration. When this number of documents is reviewed, the document set is sent back to the model for training. Based on the training results, a new set of documents deemed valuable for training is made available for the next training iteration.

In most cases, the default value of 5 will render optimal results. However, you can select a lower value if you want to train quickly on a small data scope. Or, select a higher value if your data scope contains many similar documents. In this case, a larger set will most probably contain a wider variety of documents. The maximum sample size is 25.

Confidence level

Select the target confidence level. The training is considered complete when that confidence level is reached. A lower level means that your model is trained more quickly but at the cost of accuracy. The higher the level, the more manual training is involved but the predictions will also become more accurate. The default setting is a confidence level of 8.

Based on the selected confidence level and the number of tags, an initial calculation of the review scope is done and the minimum and maximum number of documents that need to be reviewed to train the model properly is shown. After you select a data scope, a more precise number is calculated and displayed.

4. Save your configuration data.

5. Load the training data.

The documents from the selected data scope are copied to the Cognitive Data Assessment application. After loading is complete, the load data result shows the number of successfully loaded documents. Sometimes, also a number of failed documents is listed. Such documents usually could not be loaded because they are empty or password-protected. You can ignore such errors.

If the data load fails because, for example, the connection timed out, you can start the load again. It is resumed at the point where it broke off.

Important: Data load is a resource-intensive operation. Therefore, do not start too many parallel loads or start data loads while harvests or full-text indexing step-up actions are running.

6. Initialize the model.

After the model is initialized, you can no longer change the tag group or the data scope.

Your model is now ready for training.

Start the training cycle. For more information, see [“Managing training and validation runs” on page 7](#).

Managing training and validation runs

Manage and monitor training and validation cycles to generate a high-quality model for classifying documents in IBM StoredIQ.

Your model must be properly initialized.

During the training phase, contributors manually set tags on the documents. With each batch of reviewed documents that is sent back to the model, the model learns to better predict the appropriate tags. In the validation phase, contributors validate the model's predictions and accept or reject suggested tag settings.

1. Open the training project by clicking its name in the training project list.

2. To begin the training cycle, click **Start training** in the **Status** section.

The training project is now listed in the CDA dashboard and users can start contributing.

3. Monitor the training progress.

In the training project overview, you can see who contributes to the training, how many documents were reviewed already, and the maturity level of the model. The latter probably provides the most significant information. The learning curving gives you an idea of how well the model is evolving. At the start of the training, the model's learning curve usually will be pretty steep but will flatten at some point.

While the training is in progress, you might realize that you need to rework the instructions to achieve better results or that you want your model quality to be better. In this case, you can reset the model. This wipes out all training effort made so far and you can start the training again with modified instructions or a changed confidence level.

4. When you come to the conclusion that further training will probably not improve the model quality, you can end the training to move on to validation. Click **End training** in the **Status** section.

The training might also be ended by the system when the training targets are met.

You can still reset the model to tweak some settings and start anew.

5. To start the validation cycle, click **Start validation** in the **Status** section. Then, select the number of documents that you want contributors to review for validation.

To efficiently improve the model's accuracy, contributors review the suggested tag assignments, accept the ones that are definitely correct, and reject all others.

Therefore, the validation scope should be representative for the size of the training corpus so that the resulting quality numbers are representative as well.

6. Monitor the validation progress.

If the validation results are not as expected, you can reset the model while the validation is in progress and then start over with training.

7. If you're confident that the results of the review so far are sound enough, you can end the validation cycle manually. To do so, click **End validation** in the **Status** section.

Otherwise, the validation cycle ends when the configured number of documents is reviewed.

If the model meets your quality expectations, you can now approve and publish the model. For more information, see [“Publishing the model”](#) on page 8.

Publishing the model

To make a model available for use in IBM StoredIQ, you must approve and download it.

After you end the validation cycle because your model is mature, approve and publish the model.

1. Unless you have already done so, open the training project overview for your model.

In the list of training projects, click the project.

2. Check the model maturity again to ensure that it has the expected quality.

3. In the **Status** section, click **Approve**.

This ends the training and validation cycle and you can no longer reset your model.

4. Click the three dots next to **Approve** and select **Download model**.

The model is packaged as an IBM StoredIQ cartridge file and saved to your default download location.

Load the cartridge into the IBM StoredIQ application stack and make it available in a Step-up Analytics action. Then, run the action on infosets as required and check the results in IBM StoredIQ Insights.

Contributing to a training project

As a data expert, you tag documents manually in the training phase. In the validation phase, you confirm automatic tag assignments.

In the training phase, you are presented with a set of documents to tag manually. For each document, the system provides an already ranked list of the tags that you can set within this project: HIGH, MED, and LOW indicate the predicted confidence. The selections you make during training are automatically captured and serve as feedback to the model. The system learns from your actions and automatically refreshes (retrains) the model correspondingly. Thus, the predictions become more accurate with each training iteration. In the validation phase, you confirm or reject the model's predictions. The ratio of accepted to rejected tag settings is an indicator for the model quality.

To contribute to an active training project, you access it from the IBM StoredIQ Cognitive Data Assessment dashboard. The dashboard is divided into two sections. In the **Latest classification training projects** section, the four newest training projects show up as tiles. The tiles show some basic information about the training project but you can drill down into the overview for more specific information such as the project status. From the **All training projects** list, you can also select older training projects. Clicking a project opens the overview page.

Select a project and click **Contribute**, either on the tile or on the project's overview page.

Complete the following steps depending on the phase in which the project currently is:

- **Training in progress**

- a. Review the metadata and the document content. The document content is presented in plain text, no matter what the original document format is.

- b. Select the appropriate tag and click **Set tag**. Double-clicking the tag also sets the tag.

You will notice that the system already did some sort of ranking of the tags. If you're not sure about the proper tag, you can always skip the document. However, a skipped document is excluded from the training process. All documents presented to you for review are deemed important for the training and thus the model maturity. Therefore, avoid skipping documents unless absolutely required.

- c. Continue with the next document. You can do so until no documents are left for review but you can also leave the review whenever you like.

If you're interested in the training progress, you can expand that section. Here you can see how the model maturity evolves and the ratio of documents already reviewed to the overall number.

- **Validation in progress**

- a. Review the model's tag selection. To confirm the model's prediction, accept the tag setting. Otherwise, reject it.
- b. Continue with the next document. You can do so until no documents are left for review but you can also leave the review whenever you like.

When the validation is done, the **Contribute** button is replaced with the **Show contribution** button. Click that button if you're interested in some statistics about your contribution or the overall model quality.

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Index

A

administration
tag groups [4](#)
tags [4](#)

C

contributing
training [8](#)
training project [8](#)
validation [8](#)

L

legal
notices [10](#)

M

model
applying [8](#)
publishing [8](#)
step-up analytics action [8](#)
uploading [8](#)

N

notices
legal [10](#)

R

resetting [7](#)

T

tags
administration [4](#)
tag groups [4](#)
training
contributing [8](#)
training cycle [7](#)
training project
managing [5](#)

V

validation
contributing [8](#)
validation cycle [7](#)

