



ABBYY Vantage

Release Notes

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ABBYY Vantage 2.4 release notes About ABBYY Vantage

ABBYY Vantage is a comprehensive intelligent document processing (IDP) platform that provides Alpowered cognitive services, as well as pre-trained and trainable skills that can 'understand' business documents and extract actionable data and insights.

ABBYY Vantage is a no-code / low-code platform that makes today's digital worker and processes smarter and empowers the new citizen developer to accelerate digital transformation initiatives and expand automation to new processes in a fast and simple way, making an immediate impact on business results and customer experience.

To facilitate the exchange and use of Vantage skills and other technology assets, including connectors, demo apps, and custom activities, ABBYY offers a Marketplace to its customers, partners, and the wider public. The ABBYY Marketplace can be accessed at https://markeplace.abbyy.com. The ABBYY Marketplace can be accessed at https://markeplace.abbyy.com. The ABBYY Marketplace can be accessed at https://markeplace.abbyy.com. The ABBYY Marketplace is designed to share knowledge and solutions, as well as increase re-use to accelerate implementation and reduce effort. Assets acquired from the ABBYY Marketplace can be used in ABBYY Vantage via the Vantage Skill Catalog.

About the release

This is a major Vantage release that introduces new features and bug fixes.

The <u>Main features</u> section describes updates to the product's functionality.User documentation is available at <u>https://vantage-eu.abbyy.com/help/English/</u> for users in Western Europe, at <u>https://vantage-us.abbyy.com/help/English/</u> for users in North America, and at <u>https://vantage-au.abbyy.com/help/English</u> for users in Australia. It is also available locally in on-prem Vantage installations.

The **<u>Bug fixes</u>** section contains a detailed list of issues that have been fixed in this release.

This release has some known limitations and issues, which are described in the <u>Limitations and known</u> issues section.

Main features Document skill Forms processing

ABBYY Vantage offers a machine learning mode for processing structured documents, i.e., documents where the location of the fields is the same on each document instance. Examples of such documents include questionnaires, application forms, and tax return forms. Some structured documents may have multiple variants, with slight differences in fields and their locations (for example, the IRS Form 1040 for different years).

To process structured documents in Vantage, you need to create a skill and turn on the **Fixed-form documents** toggle for that skill. You will also need to upload and label some blank forms (in the case of forms with variants, you will need to upload a blank form for each variant).

To test your skill, add some completed forms and label them. If you have trained your skill on blank forms, the program will automatically suggest labels for the completed forms, and you will just need to confirm the automatic suggestions.

Note: When labeling fields on a blank form, be sure to mark out the entire area where text can be filled in, but do not include any other objects, such as key words or separators.

If your form may have multiple variants, add and label a blank form for each variant. However, we do not recommend adding more than 10 variants, as this may slow down the processing.

When processing structured documents, Vantage can handle tables and repeating groups if the maximum number of table rows or group instances is known in advance and the boundaries of the table or group are fixed. You will need to label all the rows that may possibly occur on all variants of the form.

Note: Only non-empty rows will be displayed in the processing results.

If the number of rows or instances in a group is not known in advance, you must use another Vantage technology.

Note: Currently, only tables with text values can be handled. If your table has columns with checkboxes or barcodes, use a repeating group instead.

While processing your documents, you may discover that they should be more properly treated as semistructured rather than structured documents. In this case, turn off the **Fixed-form documents** toggle. You will also need to retrain your skill. All documents that were used for training and testing will be used to re-train the skill using the technology for processing semi-structured documents.

Note: You can also switch from semi-structured to fixed-form documents technology, but make sure that you have a blank form on which to re-train the skill. All labeling will be preserved when you switch between the two technologies.

Skills for processing forms cannot be trained "online." To improve such skills, you will need to edit them and make corrections to the blank form or add other variants of blank forms. Derived skills created from forms processing skills will not be trainable either.

For more information about processing forms in ABBYY Vantage, see:

- <u>https://vantage-eu.abbyy.com/help/english/SkillDesigner/?topic=docskill_settingup</u> if you are in Western Europe
- <u>https://vantage-us.abbyy.com/help/english/SkillDesigner/?topic=docskill_settingup</u> if you are in North America
- <u>https://vantage-au.abbyy.com/help/english/SkillDesigner/?topic=docskill_settingup</u> if you are in Australia

Skills for processing forms can also be created and edited in Advanced Designer. You may need to edit a form processing skill in Advanced Designer in one of the following scenarios: (i) your form has elements with no fixed location, such as barcodes or stamps; or (ii) you have a mixture of forms and semi-structured or unstructured documents (e.g., some respondents filled out questionnaires, while others wrote statements in free form). In Advanced Designer, you will be able to combine ABBYY technologies to address such cases.

When you open a skill created in Vantage for processing forms, it will contain one Forms activity. Likewise, you can create a new skill in Advanced Designer and add the same Forms activity to process forms. Then follow the same steps as in Vantage: add and label some blank forms, train the activity, add some test documents, correct the labeling, and test the activity.

Use the **Activities** tab to combine form processing technologies with other technologies, such as Extraction Rules, Fast Learning, or NLP. If necessary, you can also add several Forms activities to the same skill. Remember, however, that skills created in Advanced Designer cannot be fully edited in

Vantage: you will not be able to re-train them or change their technology in Vantage. Such skills should be edited in Advanced Designer if you need to have access to all the available functionality.

For more information about processing forms in Vantage Advanced Designer, see:

- <u>https://vantage-eu.abbyy.com/help/english/AdvancedDesigner/?topic=ad_usecases_fixed</u> if you are in Western Europe
- <u>https://vantage-us.abbyy.com/help/english/AdvancedDesigner/?topic=ad_usecases_fixed</u> if you are in North America
- <u>https://vantage-au.abbyy.com/help/english/AdvancedDesigner/?topic=ad_usecases_fixed</u> if you are in Australia

Derived skills

When working with read-only skills, you may need to adjust them to your specific business needs. A list of fields, business rules, and recognition settings may require changes. Or a skill may require training on documents relevant to a specific scenario. Additionally, there are cases when a skill should be shared among multiple end-users, with each end-user requiring slightly different sets of fields and business rules, as well as training when using OnlineML.

In previous versions of Vantage, it was possible to adjust built-in and read-only skills by creating and editing their copies. Copies, however, do not allow you to use all the benefits of an upgraded original skill when its new version becomes available. For example, copies will not get updated models, business rules, and newly supported fields.

To solve this issue, Vantage 2.4 now supports creating derived skills from any Document skill. A derived skill will inherit all the fields, training results, and business rules from its base skill. Derived skills can be adjusted to suit your needs and can be upgraded to the latest version of their base skills, preserving all the changes you may have made.

Existing copies of built-in and read-only skills that were created in previous versions of Vantage will be automatically converted into derived skills.

For more information about derived skills, see:

- <u>https://vantage-eu.abbyy.com/help/english/SkillCatalog/?topic=skillcatalog_derivedskill</u> if you are in Western Europe
- <u>https://vantage-us.abbyy.com/help/english/SkillCatalog/?topic=skillcatalog_derivedskill</u> if you are in North America
- <u>https://vantage-au.abbyy.com/help/english/SkillCatalog/?topic=skillcatalog_derivedskill</u> if you are in Australia

Skill parameters

Sharing the same skill among multiple end-users is a common scenario for software developers. Multiple users may need to process documents of the same type, and the same logic may be applied to extract data from them. Depending on the user or document, however, the skill's logic may require some adjustments. For example, different data catalogs may be used by different users.

Vantage supports skill parameters, which allow adjusting the behavior of a skill without having to change, retrain, and publish it again. For example, skill parameters allow changing the data catalog used in

business rules depending on the customer, skipping the classification of a document by specifying its type, or assigning a value to a field.

Note: A skill can have no more than 100 parameters

Vantage built-in skills have parameters that allow changing their behavior on the fly. The following built-in skills have such parameters: all Invoice skills, all Purchase Orders skills, the Commercial Invoice skill, and Receipt skills. For more information about the parameters of built-in skills, see the documentation for each skill.

Process skills also support parameters that allow changing the behavior of the Document skills they contain. Process skill parameters are declared in the skill's settings, and their values can be specified when creating a new transaction using the Vantage API.

Note: When specifying skill parameters using the API, you can specify no more than 10 key-value skill parameters, with each key containing up to 128 characters and each value containing up to 256 characters.

For more information about the parameters of Document skills, see:

- <u>https://vantage-eu.abbyy.com/help/english/SkillDesigner/?topic=skillparameters</u> if you are in Western Europe
- <u>https://vantage-us.abbyy.com/help/english/SkillDesigner/?topic=skillparameters</u> if you are in North America
- <u>https://vantage-au.abbyy.com/help/English/SkillDesigner/?topic=skillparameters</u> if you are in Australia

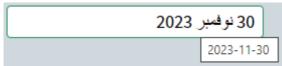
Normalization of data types

Vantage 2.4 supports the following new types of normalization of dates, numbers, and amounts of money:

• Indian format for Indian numbers



Arabic dates



• Dates, numbers, and amount of money in unstructured documents (English only)



For more information about normalization, see:

- <u>https://vantage-eu.abbyy.com/help/english/SkillDesigner/?topic=docskill_fields_text_normalization</u> if you are in Western Europe
- <u>https://vantage-us.abbyy.com/help/english/SkillDesigner/?topic=docskill_fields_text_normalization</u> if you are in North America
- <u>https://vantage-au.abbyy.com/help/english/SkillDesigner/?topic=docskill_fields_text_normalization</u> if you are in Australia

Available Document skills

ABBYY Vantage includes multiple Document skills in the Skill Catalog designed to handle different types of documents from various industries: customer onboarding, accounts payable, transportation, insurance, etc.

For more information about ABBYY Vantage skills, see:

- <u>https://vantage-eu.abbyy.com/help/english/SkillCatalog/?topic=abbyyskills</u> if you are in Western Europe
- <u>https://vantage-us.abbyy.com/help/english/SkillCatalog/?topic=abbyyskills</u> if you are in North America
- https://vantage-au.abbyy.com/help/English/SkillDesigner/?topic=abbyyskills if you are in Australia

Updates to existing built-in skills

- Invoices
 - Indian invoices
 - Improved quality for Taxes and Additional Costs
 - Improved quality for complex Line Items (invoices from ICON)
 - Total Price column is automatically extracted if present on the document (Total including taxes)
- Brokerage Statement
 - Improvements by feedback, production quality (KeyBank)
 - Splitter skill to deal with multiple accounts

New built-in skills

The following new skills have been added in version 2.4:

- Basic Contract
- Process skill for Expense Management
- Hotel Invoices

- Taxi Receipts
- Form 1099-K, Payment Card and Third Party Network Transactions Document Skill
- Broker Slip, SVU variety
- ACORD 2 Automobile Loss Notice
- ACORD 25 Certificate of Liability Insurance
- ACORD 125 Commercial Insurance Application

Built-in skills parameters

Parameters allow changing how a skill works without editing the skill. Catalog parameters are designed to select a catalog depending on the customer. Text parameters allow passing to the skill external information which affects extraction.

The following built-in skills all have catalog parameters: all Invoice skills, all Purchase Orders skills, and the Commercial Invoice skill.

Receipt skills also have text parameters:

- PredefinedCountries limits the list of possible countries
- PredefinedExenseType limits the list of possible expense types

For example, if you are going process only retail receipts from Germany, specify the values of these parameters as follows: PredefinedCountries = DE, PredefinedExenseType = GeneralRetail. This will save processing time and avoid unnecessary mistakes. Use a semi-colon as a separator if you need to add several values.

Classification skill

Classification skill can now work with documents in any language

We have introduced a Universal mode for classifying documents in languages without built-in dictionaries. Our tests show that the accuracy of this mode is comparable to classification using dictionaries.

In Vantage 2.4, dictionary support for Arabic and Thai has been added, which means that a total of 40 languages now have dictionary support. For all other languages, the Universal mode will be activated when you train a Classify activity in a Classification skill, a Classify activity in a Document skill, or a Classify activity in a Document Splitter skill.

Handwriting

Vantage 2.4 supports the following four languages for ICR:

- English
- German
- French
- Spanish

• Japanese - new

The Handwritten option is enabled by default for Document skills and disabled by default for the OCR skill.

Users can select several recognition languages and enable the Handwritten option. The system will automatically select the best approach to process each document.

Additionally, starting from version 2.3.1, multiline handwritten fields are supported.

Note: For all languages, the Handwritten text recognition option works best if only the target language is selected in the list of recognition languages for the skill.

Handwriting recognition quality has been improved for documents with handwritten text in tables and documents with overlapping handwriting.

Improvements in OCR technologies

Tables detection improvements

Table detection has been improved for different table types, including tables with separators, tables without separators, and combinations of these two types.

This improvement is relevant to the following export formats that preserve the document structure:

- JSON (Preserve Document Structure)
- XML (Preserve Document Structure)
- DOCX
- XLSX
- PPTX
- ALTOXML (Preserve Document Structure)
- HTML

Enhanced export to PDF with MRC compression – less aggressive compression

Export to PDF with smaller image size has been improved by using less aggressive compression for some images.

PDFs with text under image are now subject to OCR

Starting from Vantage 2.4, PDFs with text under image are always subject to OCR to prevent re-use of low-quality text layers.

Digital-born PDFs and PDFs with visible text layers will be detected automatically and the OCR step will be skipped.

OCR quality improvement on B&W images

OCR quality has been improved on B&W documents with complicated backgrounds and layout, such as:

• Birth certificates

- Certificates of origin
- Documents with watermarks

According to our tests, Vantage 2.4 has 12% less OCR errors on such documents compared to Vantage 2.3.2.

OCR skill

New export formats in OCR skill and Output activity

OCR skill and Output activity have new export formats:

- HTML preserving text order for use in OCR in further extraction scenarios
- ALTO with Text Only and Preserve document structure options
- PPTX

New PDF export options

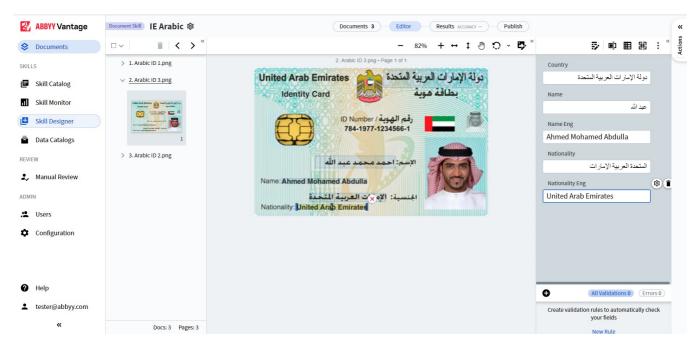
PDF export has received two new options:

- Smaller size. This is the default option for export to PDF. With this option selected, image compression is used to reduce PDF size for faster opening and long-term preservation scenarios. This setting provides optimal balance between size and quality of images.
- Maximum quality. Using this option selected, the output PDF will contain an image of better visual quality, but the file size will be bigger.

Arabic support

Vantage 2.4 offers improved support for the Arabic language. The following Vantage components fully support documents in Arabic:

- Classification skill and Classify activity
- Extraction Rules activity
- Fast Learning activity and Online Learning
- Manual Review client



Arabic support includes the correct display of right-to-left Arabic text and expected behavior of cursors, arrow keys, the Home button, and the End button. The cursor moves from right to left in Arabic text and starts moving from left to right when working with English or other left-to-right languages. Text alignment in fields on the data form depends on the language: for left-to-right languages, the text is lift-aligned, and for Arabic the text is right-aligned.

We do not recommend creating fields with mixed contents both in a left-to-right language and Arabic, because the extracted text may be shown in the wrong order during skill creation, skill testing, or manual review. Instead, create separate fields for texts in each language.

When you are processing a document with Arabic text, please consider the following:

- Arabic dates are not normalized but extracted as they appear on the document.
- If a skill name contains both Arabic and Latin characters, the parts in Arabic and Latin may be written in different order on some screens.

There are also the following limitations when creating a skill in Advanced Designer:

- In an Extraction Rules activity, search elements cannot have Arabic names. Fields extracted by the skill, however, can have Arabic names.
- In an Extraction Rules activity, a Static Text search element can contain both Arabic and Latin characters. Such text may have issues with the cursor moving right to left in Latin characters or left to right in Arabic (i.e., the reverse of the correct cursor movement).

Technology Core Version 2.4

Technology Core is a set of technology-related workers for OCR, classification, extraction, and NLP.

This version of Vantage is the first to use Technology Core version 2.4. Each skill is compatible with only one Technology Core version, which is used to train the skill. At the same time, Vantage can operate using several Technology Cores at once. For example, this version of Vantage Cloud uses both Technology Core versions 2 and 2.4, meaning it can run skills intended to work with both Technology Core versions.

Skills developed in previous Vantage versions will continue to work in Vantage 2.4 using Technology Core version 2 by default. However, these skills will not benefit from the new functionality and technology advancements that have been added in the Technology Core version 2.4 version until they are upgraded to a new Technology Core version.

Please note that skills created in Advanced Designer can only be upgraded within Advanced Designer and not the Vantage Skill Designer.

Built-in skills are upgraded automatically – the new Technology Core contains new versions of built-in skills compatible with this Technology Core.

For more information about technology cores, see:

- <u>https://vantage-eu.abbyy.com/help/english/SkillCatalog/?topic=skillcatalog_technologycoreversions</u> if you are in Western Europe
- <u>https://vantage-us.abbyy.com/help/english/SkillCatalog/?topic=skillcatalog_technologycoreversions</u> if you are in North America
- <u>https://vantage-au.abbyy.com/help/English/SkillCatalog/?topic=skillcatalog_technologycoreversions</u> if you are in Australia

Manual Review

Show documents with errors on manual review

Documents with errors are now designated with special icons depending on the type of error. Documents with validation errors are marked with a red flag, and documents that contain low-confidence characters are marked with a red dot. When a task is received for verification, the first document containing errors will be opened.

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Cursor mode for unstructured documents

There are three methods to select a region that contains a field value.

The first method is to hover over a word and click on it. This will create a region and copy the text to the field.

The second method is to draw a rectangle around some words. All the words inside this rectangle will be copied to the field.

In Vantage 2.4, a third method has been added. Now you can select an interval of text by clicking on the first word of the interval and, while holding down the left mouse button, dragging the cursor to the last word of the interval and releasing the mouse button. This will create a region, or several regions, containing the selected phrase and copy the text to the field.

DOI: 10.2174/0929867329666220104111949 CrossMark are discussed to realize "stealth" systems suitable for parenteral administration. The requirements and applications of parenteral lipid nanoparticles are reviewed for the delivery of natural compounds, synthetic drugs and genetic materials. Recently, the latter application has been of remarkable interest due to the numerous benefits of mRNA vaccines to fight the Covid-19 pandemic.

Keywords: Lipid nanoparticles, phytocompounds, synthetic drugs, parenteral drug delivery, mRNA vaccine, Covid-19.

1. INTRODUCTION

The history of nanoparticles in pharmaceutical research began with polymeric nanoparticles, which are carriers with submicron dimensions made up of biodegradable and non-biodegradable polymers. Advantages of these carriers are site-specific targeting and controlled release of the drugs [1, 2]. However, they showed significant problems, such as the cytotoxicity of polymers used and a complex industrial scale-up [3]. Therefore, these nanoparticles are not suitable for the pharmaceutical market. Alternative nanoparticles made from solid lipids called lipid-based nanocarriers (LNCs) have been used as a new colloidal carrier since 1990 [4]. LNCs are colloidal carrier systems composed of a lipid matrix, and they are divided into first (Solid Lipid Nanoparticles - SLNs) and second-generation (Nanostructured Lipid Carriers - NLCs) [5-7].

ranging from 50 and 1000 nm. They are formulated using biodegradable lipids that are Generally Recognized As Safe (GRAS). The matrix of SLNs includes solid lipids such as triglycerides (trimyristin, tripalmitin, tristearin), glyceryl behenate, glyceryl palmitostearate, fatty acids (stearic acid) or the wax (cetyl palmitate) [8, 9]. Usually, lipid concentration ranges between 0.1 and 30% (w/w) [10], while surfactant added for physical stabilization had a concentration ranging from 0.5 to 5% (w/w). The most used emulsifiers are poloxamer 188, polysorbate 80, soybean and egg lecithin. SLNs are able to solubilize hydrophilic and lipophilic molecules in a physiologic environment, controlling their delivery and protecting them from degradation [11].

Compared with other systems (nanoemulsions, polymeric nanoparticles and liposomes), SLNs have many benefits such as ease of preparation. low cost, high-s-



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This third method will work for documents processed with Document skills that contain NLP activities (e.g., Lease Agreement US).

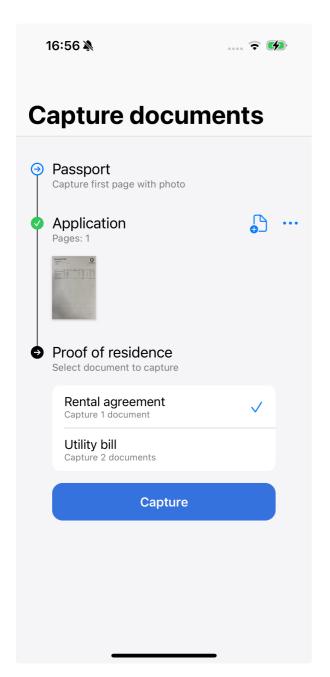
Mobile Input

Vantage Mobile Input provides a simple and user-friendly mobile experience to capture and send document images for further processing in Vantage. Depending on the document type expected, Vantage Mobile Input adjusts its appearance and gives users hints on how to capture documents with the best accuracy. Finally, Vantage Mobile Input provides an auto-capture feature for taking a picture of a document automatically to achieve the best quality of the image.

Customizing the interface to capture a specific set of documents

There are scenarios where a specific set of documents is expected to be processed. For example, an application for opening a new bank account requires a set of supporting documents to be uploaded. Earlier, when such documents were uploaded using Vantage Mobile Input, developers had to give users additional instructions on what specific documents should be captured because Vantage Mobile Input allowed uploading any number of any sorts of documents.

Vantage 2.4 allows skill designers to specify what documents should be provided to start a transaction. It is possible to specify the structure of documents to be captured: document types (ID cards, passports, or A4 documents) and names, page numbers, and page names. The Vantage Mobile Input interface will be customized according to these settings to show the user what documents should be captured. Additionally, Vantage Mobile Input will not allow the user to upload any documents and start the transaction until all the required documents have been prepared.



For more information about customizing the set of documents expected by Vantage Mobile Input, see:

- <u>https://vantage-eu.abbyy.com/help/english/QuickStart/?topic=mobileupload</u> if you are in Western Europe
- <u>https://vantage-us.abbyy.com/help/english/QuickStart/?topic=mobileupload</u> if you are in North America
- https://vantage-au.abbyy.com/help/English/QuickStart/?topic=mobileupload if you are in Australia

Monitoring and Reporting

Warehouse for Quality Analytics

Vantage 2.4 now includes a Warehouse for Quality Analytics, designed to enhance your document processing efficiency. This feature offers key insights, allowing you to pinpoint and address areas that require manual effort.

The warehouse is accessible via an API, which allows you to retrieve basic information about processed documents and fields for a selected period.

The following information about documents is available:

- Whether the document was seen by a manual review operator.
- Whether the document type was changed.
- The number of extracted and changed field values.

The following information about document fields is available:

• Whether the field is correct, has recognition issues, has been located incorrectly, or has not been detected.

The following document properties can be used as filters to quickly identify and resolve issues in specific documents or fields:

- Page Size
- B&W vs. Color Image
- Image Source
- Image Type
- DPI
- Transaction Parameters
- Dimension Field Values

This basic information will allow you to calculate target metrics, such as:

- Straight-Through Processing (STP) Rate: Estimate your process efficiency with clear STP metrics.
- Classification and Field Extraction Accuracy: Ensure accurate document categorization and data extraction with advanced accuracy metrics.

The Vantage API introduces two new methods – for documents and fields. For documents, you can download information for a selected period within the last 12 months. For fields, you can download information for a selected period within the last 14 days. Documents and fields are considered as belonging to a period if the transaction they were part of was completed within that period.

For more information, see:

- <u>https://vantage-eu.abbyy.com/help/english/Runtime/?topic=reportingservice_qualityanalytics</u> if you are in Western Europe
- <u>https://vantage-us.abbyy.com/help/english/Runtime/?topic=reportingservice_qualityanalytics</u> if you are in North America
- <u>https://vantage-au.abbyy.com/help/English/Runtime/?topic=reportingservice_qualityanalytics</u> if you are in Australia

Listing tenant transactions using the Vantage API

Some Vantage users build their tools and dashboards for monitoring Vantage operations to integrate them into corporate tools and quickly react to events requiring attention. They need to monitor the system performance (i.e., the number of documents and transactions processed within a period) and the queues in the system (i.e., the number of documents and transactions that are still in progress or require manual review).

Vantage API has two new methods to list transactions in the system – those that are still in progress, and those that are completed. Both methods allow filtering transactions by their status, processing stage and name, applied skill, time period, and registration parameters.

For more information, see:

- <u>https://vantage-eu.abbyy.com/help/english/DevGuide/?topic=developer_transactions</u> if you are in Western Europe
- <u>https://vantage-us.abbyy.com/help/english/DevGuide/?topic=developer_transactions</u> if you are in North America
- <u>https://vantage-au.abbyy.com/help/english/DevGuide/?topic=developer_transactions</u> if you are in Australia

Administrating Vantage

Restricting access to a Vantage tenant by IP address

In high-security situations, it may be required to restrict access to Vantage by allowing connections only from a safelist of IP addresses.

Vantage 2.4 allows Tenant Administrators to specify a list of IP addresses that can access their tenant. Users with IP addresses not in the safelist will not be able to access the tenant.

For more information about IP restrictions, see:

- <u>https://vantage-eu.abbyy.com/help/english/AdminGuide/?topic=admin_setipsafelist</u> if you are in Western Europe
- <u>https://vantage-us.abbyy.com/help/english/AdminGuide/?topic=admin_setipsafelist</u> if you are in North America
- <u>https://vantage-au.abbyy.com/help/english/AdminGuide/?topic=admin_setipsafelist</u> if you are in Australia

ABBYY Vantage Advanced Designer

For detailed instructions on working with Vantage Advanced Designer, see the ABBYY Vantage Advanced Designer section in online Help:

- <u>https://vantage-eu.abbyy.com/help/English/AdvancedDesigner/?topic=ad_introduction</u> if you are in Western Europe
- <u>https://vantage-us.abbyy.com/help/English/AdvancedDesigner/?topic=ad_introduction</u> if you are in North America

• <u>https://vantage-au.abbyy.com/help/English/AdvancedDesigner/?topic=ad_introduction</u> if you are in Australia

Deep Learning Al

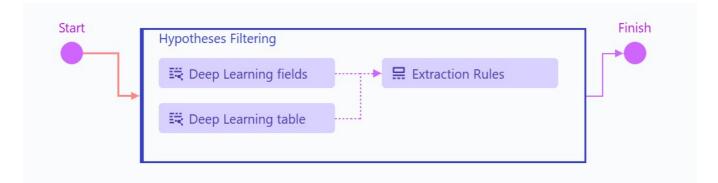
Hypothesis filtering for greater control over Al output

Machine learning allows the program to achieve very high quality of field extraction; however, in some cases, it is necessary to control the neural network's output.

Output control is essential when the neural network produces entire words, but you only need specific parts, or when you need to filter out accidentally captured noise. It can also be useful for identifying parts of larger fields, such as addresses, which may be overlooked by the neural network. Additionally, it enables you to choose the best hypothesis for different occurrences of the same value. For instance, when a vendor name is printed multiple times on a document, you can select the most accurate extraction from among the various instances.

Vantage 2.4 allows you to control NN output by filtering hypotheses generated by the neural network. It comprises one or more Deep Learning activities and an Extraction Rules activity, which has access to all neural network elements.

To create a hypothesis filtering container, start by creating a Deep Learning activity and train it (you can also do this after adding the other activities). Right-click on it and create a container for hypothesis filtering. Then, add the extraction rules to this container. If you have more than one trained neural network, drag all the Deep Learning activities into the container.

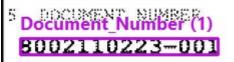


This approach allows for a comprehensive handling of hypotheses, utilizing both deep learning and extraction rules to refine and control the output of the neural network.

To work with hypotheses, open the extraction rules editor and create a special element that will allow you to work with hypotheses generated for a specific field. To do this, select **Create element > Deep Learning > Deep Learning activity name**. Next, select all or several fields to work with hypotheses.

Sample scenario of working with hypotheses

Often the neural network will find entire words and you will want to get rid of the redundant word parts. This often happens if a number and unit of measurement are written close together, or if only the part of a number without the postfix is needed. In the example below, the network has found the entire number.



If you don't need the part after the hyphen, create a Character string element with the search area equal to the region of the element found by Deep Learning (you can use the code RSA: <element_name>.rect;). Limit the length of the element to 10 characters (Character count = { 1, 1, 10, 11 }). It is also recommended to set a condition instructing that the element should be found only if the Deep Learning element is found (Do not find element if... Other element is not found, and select the Deep Learning element). After matching, you will see that the new element finds only the part of the number preceding the hyphen.

CharacterString (1) B002110223-001

You can change any property of Deep Learning elements and additional elements to cut off redundant parts, add lost parts, select the best hypothesis for repeated fields, and cover many other scenarios that require taking Al under control.

Automatic division of document sets

Deep learning always involves working with large volumes of documents. You can create different collections of documents for testing and training. Large document sets can be automatically divided in a certain ratio.

New document sets can be created on the **All Documents** tab in the skill editor. Use the **Divide Set** button to divide a set in a certain ratio. In the editor of each activity, you can select a set to be used for training or testing.

Importing/exporting labeling to a folder

Another useful feature added in Vantage 2.4 is the ability to export labeled documents to a folder and load them into another or the same skill. This allows you to reuse labeling obtained during the input process or labeling created in a similar skill. If you are a skill developer, you can send your skill to production without documents, storing the set of training documents locally.

To export a document set, select it in the list, click on the vertical dots and select **Export Set with Labeling**. To import documents, use the **Upload > Import Labeled Documents from Folder...** command.

Before importing labeled documents, note the following:

- a) The values from the source fields will be written to the respective target fields with the same names, if available. If there are no matching target fields with the same names, they will be created automatically.
- b) If the name of a target field is the same but its data type (i.e., text, number, amount, date) is different, the target field will still be considered a good match and the labeling will be imported into that field.
- c) If there are differences in other properties between a source and target field, a new target field will be created.

Importing/exporting semi-structured activities in JSON format

To import or export an Extraction Rules activity in JSON, open the extraction rules editor and click on the vertical dots next to the elements and fields.

Improving classification by company with regular expressions and keywords

The Classify by Company activity has received the ability to complement company searches with regular expressions and keywords. You can search for TaxID, National TaxId, and IBAN fields. Regular expressions and keywords can be added when editing the mapping in this activity. Values for regular expressions can be entered directly, or via a parameter, which makes it easier to edit and reuse search settings.

Activity Settings				>
Search Conditions Ou	utput Fields			
pressions or keywords fo	values are compared against field values are compared against field valuer company identifiers which you expect pecified as skill parameters.			
Column	Regular expression 0		Keywords 🛈	
 Vendors Invoice CA ((сору)			
			VATIO	
Tax ID	C{2}N{6-12}	- <i>i</i>	VATID	
Tax ID National Tax ID	C{2}N{6-12} Type or select parameter	+ / + /	Type or select parameter	
National Tax ID	Type or select parameter	• <i>i</i>	Type or select parameter	,

Manage Fields	Save	Cancel

Deep Learning for Segmentation

Vantage 2.4 includes a new enhanced mode, called "Thorough," for the Segmentation activity. This mode trains a Deep Learning LLM-equivalent model to find relevant paragraphs.

We recommend using this mode if:

- You have more than 150 documents in the training set.
- There is a lot of variability in how segments look.

This mode is only supported for the English language.

NLP Extraction Rules

Vantage 2.4 now includes NLP Extraction Rules. This feature is designed for handling complex text-based documents and allows combining any of the NLP capabilities available in Vantage Advanced Designer.

NLP Extraction Rules have three primary objectives:

- Put Al under control. By allowing limitations within document contexts, this tool enables skill designers to filter and correct incorrectly extracted values, putting Al under rigorous control.
- Overcoming training limitations. This feature proves useful in scenarios where documents lack clear segments or require grouping of extracted values. It uses previously extracted information as input fields, utilizing their relative positions and textual context to refine grouping logic.
- Efficiency with minimal data. Even with a handful of documents, NLP Extraction Rules allow quick setup of extraction logic, ideal for Proof of Concept (POC) stages and for automatically labeling documents to create training sets.

NLP Extraction Rules offer the following capabilities to set up extraction logic:

- Use previously extracted information as input fields to combine the outputs of various activities. This could include fields extracted through other NLP activities.
- Pre-trained Named Entities (NER) provide a solid foundation for extraction logic, enhancing the accuracy and relevance of the data extracted.
- NLP Extraction Rules can search for static text, values from dictionaries, and patterns defined by Regular Expressions.
- By combining elements relative to each other, a skill designer can group and extract information more effectively.

Run tests with a set of documents to evaluate the effectiveness of your rules. Refine the logic as needed to ensure maximum accuracy of the extracted data.

For more information, see:

- <u>https://vantage-eu.abbyy.com/help/english/AdvancedDesigner/?topic=ad_extractionrulesnlp</u> if you are in Western Europe
- <u>https://vantage-us.abbyy.com/help/english/AdvancedDesigner/?topic=ad_extractionrulesnlp</u> if you are in North America
- <u>https://vantage-au.abbyy.com/help/English/AdvancedDesigner/?topic=ad_extractionrulesnlp</u> if you are in Australia

NLP Language Support

Vantage 2.4 now supports the "Duration" named entity in Dutch documents.

Example: Dit contract heeft een looptijd van 10 jaar.

Vantage offers full NLP support* for:

- English
- French
- Spanish
- German
- Russian
- Japanese (preview)
- Portuguese
- Italian
- Dutch

*Full NLP support means support for Segmentation, Named Entities (NER), NLP Deep Learning, and NLP Extraction Rules activities.

Localization

This release has been localized into the following languages:

- 1. Portuguese (Brazilian) Vantage UI and documentation. Advanced Designer localization will be added in upcoming releases.
- 2. Chinese Traditional Vantage UI and documentation. Advanced Designer localization will be added in upcoming releases.
- 3. Italian Vantage UI only.

For more information, see the article about localization in online Help:

- <u>https://vantage-eu.abbyy.com/help/English/AdminGuide/?topic=specifications_uilanguages</u> if you are in Western Europe
- <u>https://vantage-us.abbyy.com/help/English/AdminGuide/?topic=specifications_uilanguages</u> if you are in North America
- <u>https://vantage-au.abbyy.com/help/English/AdminGuide/?topic=specifications_uilanguages</u> if you are in Australia

Bug fixes

In Vantage 2.4, the following bugs have been fixed:

Zendesk Ticket #	Description
555631, 565123, 538838, 547894, 550786, 507212	ABBYY Vantage failed when when processing large documents.
574709	There was no ResultClassName in output JSON file if the document was created during manual review.
573917	The Line Items could not be deleted on manual review if they were matched with the data catalog.
570241, 570696, 571881, 574519, 576407, 577013	Incorrect status was shown for canceled transactions in the Skill Monitor.
569221	Some documents could not be opened in the Editor in the Skill Designer.
569400	It was impossible to get transaction results via the API if the original skill was deleted after the transaction finished.
572029	A "Proxy 'http://localhost:3238/' failed" error occurred while processing documents using the skill with a Custom activity.
562779	Vantage indicated low confidence for document type (displaying a red question mark) on manual review even if there was only one document type in the skill.
565926	Complex skill operation remained active even if one of its parts failed.
566025	An error occurred when uploading a skill with errors in its workflow.
565802	A non-informative error message was shown when uploading a skill.
564793, 575230	The Enter key on the numerical pad did not work in Vantage.
563631	Importing a Process skill in "Create new version" mode without embedded skills failed if the "Discard changes" option was used before/during the import.
562995	The Vantage report API did not return "Document_source_name and Source_type" columns in the result if no "Skillid" parameter was specified.
561153, 563346, 564659	If an extracted field value was ambiguous, the respective field was left empty in an exported JSON file. Ambiguity occurred, for example, if a field of the "Amount of Money" type contained a numerical value with three decimal digits.
537461	Enabling the OCR-A type font option did not affect the recognition results in full-text recognition mode, which could result in poor quality of extraction training.
556659	An outdated Alteryx Connector version was posted on the ABBYY Marketplace.
554276, 564969	Some Process skills were not shown in the Skill Monitor after publishing.

Zendesk Ticket #	Description
546722	For Japanese documents, after the region of a field was adjusted, the field's value did not correspond to the text selected within the field's region and became empty.
546292	Text order was incorrect in full-text recognition results for Thai.
528639	Document pages were shown at different scale on preview although they all had the same size.
435227, 457427, 463916, 488205, 491061, 500180, 501266, 501821	Line items were not supported for field mapping in the ABBYY Vantage Connector for UiPath.
576969, 553580	For PDF documents with a text layer, the quality of full-text recognition was not good enough.
576954	Transactions with single-page documents failed when performing OCR.
576867	An "IPE/ROOT/OCRT/Image/Services/Advanced/src/IsolineUtils.cpp, 107" error occurred when processing some documents.
572535, 571478	Some large documents failed to load or loaded slowly on manual review.
568236, 572998, 516528, 539563	Field regions were detected incorrectly when processing documents with handwritten text.
574855	Spaces were missing in recognition results when processing certain documents.
558880, 569260, 562061	After the region of a field was adjusted, the field's value did not correspond to the text selected within the field's region and/or became empty.
569325	Field values were duplicated in extraction results for certain documents.
568756	Recognition of PDF files containing A1 pages has become faster. Previously, recognition of such PDF files took about 30 minutes.
567414	Dates were not extracted when processing certain documents using the Invoice skill.
567411, 565943	Some numbers were not recognized or recognized incorrectly on certain documents.
566998	Text with umlauts was recognized incorrectly when processing certain PDF documents.
566267	Vertical columns of numbers were wrongly recognized as text instead of numbers.
566246	An error occurred while importing certain images when processing documents using the Document skill.

Zendesk Ticket #	Description
574507	For certain PDF documents, the quality of full-text recognition was not good enough.
563617, 560588	The values of certain fields were extracted incorrectly when processing PDF documents with a text layer.
549374	Underscore ("_") and pipe (" ") symbols were not recognized correctly.
561346	Uploaded images were rotated incorrectly when processing certain documents.
558053	An "Internal program error: Rational.h, 179" error occurred when processing certain PDF documents.
555573	There were unknown symbols in exported JSON files.
553730	A large number of correctly recognized characters were marked as low-confidence, which resulted in unnecessary manual review.
537160	Text was recognized incorrectly when processing certain documents with handwritten text.
540457	There were redundant spaces in full-text recognition results for Thai.
539564, 569267	A regular expression did not affect recognition results if it was applied to a field with handwritten text.
527548	Text in line items was recognized incorrectly if there were no spaces between columns.
520652	Rows were detected incorrectly when recognizing tables with handwritten text.
473317	Data was not extracted from tables when processing certain documents.
500613	An "IPE: /Builds/TfsAgents/Linux- OCRT0/_work/1/s/ROOT/FineObjects/Inc/Rational.h, 179" error occurred when processing certain documents.
427699	For Chinese documents, the quality of full-text recognition was not good enough.
551493	Incorrect training statistics were shown for skills with Deep Learning activities.
574331	MAWB number was extracted incorrectly when processing certain documents using the Air Waybill skill.
572848	Country was detected incorrectly when processing certain documents using the Invoice skill.
572433	The value of the Total field was extracted incorrectly if space was used as a thousands delimiter when processing documents using the Remittance Advice skill.

Zendesk Ticket #	Description
566406	The value of the Vendor Name field was extracted incorrectly when processing certain documents using the Invoice skill.
568468	Line items were not extracted by the Remittance Advice skill.
558875	Currency was detected incorrectly when processing documents using the Invoice Au-Nz skill.
554114, 572463	Some fields were locked after processing, even though the data in them did not match any record in the data catalog.
569348	Accuracy for the Air Waybill skill decreased if new samples of the same type were added to the document set, and the skill was retrained on those documents.
555943	An "IPE: /Builds/TfsAgents/build 555631 - ocr000001/_work/1/s/ROOT/FineObjects/Inc/Errors.h, 140" error occurred while training the Classification skill.
542369	The Amount of Money field was not normalized if the value of the field was AUD\$.
570750	Field values were not extracted after training a skill with a Deep Learning activity, even if field regions were detected.
567757	The last row in a line item was not fully extracted when processing certain documents using the Invoice skill.
562629, 457601	Field regions were detected incorrectly when processing certain documents.
561553	Processing some documents took too long (e.g., more than 20 seconds for 2-page document) when processing certain documents using the Purchase Order skill.
557527	The number field value was not extracted if the number format in the line items column differed from the number format in the documents used to train the skill.
551841	Rows were in the wrong order when a table field was extracted by a repeating group when processing certain documents.
552882	Training never ended when trying to train the Document skill on certain documents.
548902	The sizes of trained skills were too big after exporting a skill.
545939	The DataCatalog rule to populate Vendor fields did not work if it was set up to use the 'Company Correlation ID' column with an exact match against the Business Unit ID when processing documents using the Invoice skill.
535860, 529411, 539757	Training did not improve extraction results for tables on some documents.
550809	Training did not work properly for certain fields on some documents.

Zendesk Ticket #	Description
482831, 487338, 495097, 511923, 519287, 547452, 566084	Training did not work for Total fields in built-in skills.
523886	Training did not work for fields with handwritten text.
514010	Rows were detected incorrectly when recognizing tables on some documents.
558545, 575216	A "Blob creation error: The specified blob already exists" error occurred when processing certain documents or training certain skills.
572029, 572041, 572183	A "Connection refused (localhost:3238)" error occurred after external HTTP requests when processing documents using a skill with a Custom activity.
569592	Large mailboxes with 150+ folders could not be connected to ABBYY Vantage.
553967	The original file name was wrongly preserved when processing documents using a skill with a Custom activity script.
548311	A "Missing Parent Extracted Object" JavaScript error occurred when processing documents with an instance of nested repeating group using a skill with a Custom activity.
574013	An error occurred when creating a skill using a FlexiLayout in Advanced Designer.
571672	The order of fields of a repeating group was wrong, even if the elements were found in the correct order.
567358	The box for renaming a data set appeared under the data set name with the offset of the scrollbar when the scrollbar position was not set to the very top.
559515	Fields disabled in a Fast Learning activity were extracted by it anyway.
558980	It was not possible to close an error window in Advanced Designer if it was opened and left idle for a while.
569285, 547768, 561590, 568600, 571375, 575955	Some user documentation inaccuracies were fixed.
577454	If there were more than 100 data catalogs in a tenant, only 100 were shown in Vantage.
574877	There were no error messages in the logs when Online Learning failed.
561483	Different data for Estimated Manual Review Time was shown on the Overview and Transaction dashboards in Skill Monitor.

Zendesk Ticket #	Description
574597	Field text was recognized incorrectly when a field region was manually created around the text; however, during full-text recognition, the same text was recognized correctly.
570443	The text was recognized incorrectly when processing certain documents using the Document skill.
568691	Images uploaded via Mobile Capture were rotated incorrectly when processing certain documents using the Identity skill.
575026	An "IPE: File: /Builds/TfsAgents/build- ocr000005/_work/1/s/ROOT/OCRT/Image/Analysis/src/OrientationDetector.cpp Line: 230" error occurred when importing certain files.
551099	The number "3" was recognized as "S" when processing certain documents.
566227	In Advanced Designer, no list of suggestions was shown for a field with a script rule with suggestions.
573001	In the document editor, an item was translated incorrectly into German.
525296, 510319, 492170, 462151, 443616	Text for RTL languages was displayed incorrectly in the document skill editor and in the Manual Review client.

Limitations and known issues

In this release, there are the following limitations and known issues that will be addressed in future releases:

General

- The maximum number of files that can be added to a transaction is 1,000.
- If more than one file is added to OCR, Document, or Classification skill, they will be merged and processed as a single document.
- Each imported file should not exceed 2 GB.
- This release has only been tested with Google Chrome and Safari. Some issues may be encountered when using Firefox, Opera, and other browsers. These browsers will be fully supported in future releases.
- Automatic skill selection for the files uploaded into **Documents** currently only works for the following languages: English, French, German, and Spanish.
- Excel files (*.xls, *.xlsx) can be imported with the following limitations:

o If an imported file contains a chart with text (for example, a title), this text won't be extracted.

- Vantage automatically selects a page size from a set of standard sizes. If the contents of an imported Excel file don't match any standard size (for example, doesn't fit in terms of width), it may be displayed incorrectly.
- If an imported file contains slicers with data outside the visible area (for example, items that need to be scrolled to), this data isn't displayed.
- Vantage ignores the Excel 'Scale to Fit' option, which reduces the size of the worksheet to better fit the printed page. If the imported table has too many rows, it will be split across multiple pages.
- Vantage may not preserve the relative positioning of a table and an object outside the table. For example, text within the table may shift to the right in relation to a shape above the text.

Process skill

- If a Process skill contains multiple **Classify/Extract** activities, online machine learning will be applied to the last activity.
- Manual Review, Input/Output, Assemble, and For each document activities cannot be wrapped in a For each document activity. Wrapping some of them in a For each document activity will be supported in future releases.
- Each ZIP archive to be imported by ABBYY Vantage from a shared folder should not exceed 1.5 GB. Each file inside a ZIP archive should not exceed 100 MB. A ZIP archive must contain files in supported formats only, otherwise the import of the ZIP archive will fail.
- Custom activity supports only synchronous Vantage API calls. A synchronous call implies that processing in the external system takes only a few seconds and that processing results are sent in the third-party system response almost instantly. Asynchronous methods will be implemented in future releases.
- Process skills support no more than 50 Document skills in one Extract activity.
- When importing from an e-mail, only first-level attachments are processed as transaction documents. If there is an attached e-mail file, its attachments will not be imported as files of the transaction.
- When importing from an e-mail, the "FilePath" document registration parameter will not be specified, while the "FileName" document registration parameter will be specified.
- Image fields cannot be exported to CSV. If there is an image field in the Document skill, the value of such field will always be empty in the export results.
- When specifying skill parameters using the API, you can specify no more than 10 key-value pairs in one transaction, with each key containing up to 128 characters and each value containing up to 256 characters.

OCR skill and OCR activity in the Process skill

- Selecting too many languages (more than 20) may slow down performance and impair the OCR skill.
- The maximum recommended number of pages to be processed with an OCR skill is 3,000 pages per file.

• Objects like stamps and stickers in some cases may be skewed on output PDFs.

Document and Classification skills

- ABBYY Vantage can work with training sets of up to 10,000 documents.
- Classification and Document skills support files containing up to 100 pages. Bigger documents may cause RAM issues and long processing times.
- When new documents are added into a trained Document or Classification skill, the **Results** tab will show outdated information until the new documents are labeled and the skill is retrained.
- When comparing training results to reference in the Document skill, the **Difference** tab will not show the error type and reference value for repeating fields.
- A skill can have no more than 100 parameters.

Document Splitter skill

- Reference labeling and statistics are not yet supported for the Document Splitter skill.
- It is not possible to revert to a previous version of the Document Splitter skill.
- Documents processed with the Document Splitter skill should not contain more than 1000 pages each.

Online Learning

- Online Learning does not support the following types of fields:
 - \circ Image fields
 - Repeating groups containing image fields, nested repeating groups, groups inside repeating groups or tables
- Generally, the results of Online Learning for checkmark fields are of a sufficiently high quality. However, sometimes checkmarks may not be detected or trained properly because of either the geometric shape of the checkmark field (e.g. round or square) or the way the user chose to select the checkmark field (e.g. if the user crossed or underlined the field instead of placing a checkmark inside). Detection and training of such checkmarks will be improved in future releases.
- The maximum number of documents is 10,000 for the training set and 1,000 for the testing set.

Fast Learning in Advanced Designer

• Deleting a Fast Learning activity from the skill deletes the database lookup rules as well.

Deep Learning in Advanced Designer

- Deep Learning works for text fields only.
- One Deep Learning activity can be trained for 50 fields, including repeating groups and fields, or for one table of up to 32 columns.

• It is not possible to train nested repeating groups and groups inside repeating groups.

Data catalogs

• A data catalog cannot be deleted or changed if it is used in any skills, including any versions of a skill. To delete a data catalog that you do not need anymore, you must stop using it in the skill (i.e. by deleting or modifying the corresponding rule) and delete all the previous versions of the corresponding skill. Skill versions can be deleted in skill settings. If you do not want to delete old skill versions but want to change the data catalog, simply create a new data catalog.

Skill Monitor

• Only the latest 10,000 errors can be exported to a CSV file from the Error Log. You can use filters and search for specific lines in the Error Log to reduce the number of errors to be exported.

Advanced Designer

- The Number must be within interval property is disabled for the Number and Amount of money field types in the Manage Fields dialog box. You can set this property in the Reference section of the Fields tab or in Vantage.
- Field settings edited and saved in the Manage Fields dialog box are not synchronized with the reference labeling section. To overcome this limitation, edit the field settings either in Vantage or in the Reference section of the Fields tab in Advanced Designer.

Built-in skills

- It is not possible to enable additional languages in copies of a built-in skill. Built-in skills are intended to process documents in specific languages. Enabling additional languages in a built-in skill will not let you extract fields from documents in such languages. You can disable any of the supported languages, and we recommend disabling any languages that will not be used in your documents.
- For the Identity Document skill, Manual Review will not display the regions of the extracted fields.

Mobile Input

• The capture of passports is not currently automated. Users should manually capture the document image once the document has been centered on the screen.

Scanning Station

 When installing the Scanning Station without administrative permissions, it will be installed with the English UI, even if a different UI language was selected during setup.
 To overcome this limitation, use one the following workarounds: (a) secure administrative

permissions prior to installing the Scanning Station; (b) reinstall the Scanning Station; or (c) modify the following registry key after installing:

[HKEY_CURRENT_USER\SOFTWARE\ABBYY\ScanStationVantage\5.0\Fine Objects] "InterfaceLanguage"="X" where X = 64 for Chinese (Simplified) X = 3 for French X = 2 for German

X = 6 for Italian

X = 26 for Japanese

X = 63 for Korean

X = 27 for Portuguese (Brazil)

X = 5 for Spanish

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