**Accounts Payable Automation**

**Technical Requirements v.5**



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| --- | --- | --- | --- |
| **Revisions** | | | |
| **Date** | **Version Number** | **Revised By** | **Reason for Changes** |
| 2020-01-14 | v.1 | Alex Peker | Initial Draft |
| 2020-01-26 | v.2 | Alex Peker | Changes and additions according to Imran, Tao and Faisal review |
| 2020-01-26 | v.2 | Alex Peker | Values added to apai\_model\_def\_field\_source table. |
| 2020-01-26 | v.2 | Alex Peker | Company Setup screen more detailed now. |
| 2020-01-26 | v.2 | Alex Peker | is\_admin\_role column added to apad\_user\_roles table |
| 2020-01-27 | v.2 | Alex Peker | apad\_invoice\_scanner\_monitor and apai\_invoice\_document\_scan\_status tables added, apam\_master\_document\_model\_field\_detail. confidence\_level, apam\_company. s3\_storage\_invoices\_failed\_scan\_folder, apam\_company. s3\_storage\_invoices\_failed\_scan\_folder fields are added |  | *Alex Peker* | *is\_admin\_role column added to apad\_user\_roles table* |
| 2020-01-29 | v.3 | Alex Peker | apad\_po\_header, apad\_po\_detail integration tables added.  apad\_invoice\_document, apam\_company, apam\_document\_model\_request tables changed.  Workflow process has been more detailed.  Manage Non-Mapped Invoices screen changed. |  | *Alex Peker* | *is\_admin\_role column added to apad\_user\_roles table* |
| 2020-02-09 | v.4 | Alex Peker | * s3\_storage\_root\_folder column added to apam\_registration table * s3\_storage 4 columns have been removed from apam\_company table and corresponding entries has been removed from Company Setup screen * manual\_upload\_flag column has been added to apam\_invoice\_scanner\_monitor table * apad\_document\_manual\_upload table added * Manual Invoice document Upload functionality introduced. See section 16 Manage Non-Mapped Invoices for details. |  | *Alex Peker* | *is\_admin\_role column added to apad\_user\_roles table* |
| 2020-02-16 | v.5 | Alex Peker | * Post Failed status added to list of invoice document statuses * duplicate\_invoice\_flag added to apad\_invoice\_document table to handle duplicate invoices * apad\_invoice\_posting\_monitor along with apai\_invoice\_document\_posting\_status tables have been added to keep track of posting invoices. * apad\_invoice\_document\_routing\_history table has been added to track routing sequence along with approval/rejection comments, who approved/rejected and when. * View Routing History action has been added on Manage Invoice Documents screen * Description of how to deal with duplicates added to Manage Invoice Documents screen * Refer to V5\_Alter\_script.sql for database changes |  | *Alex Peker* | *is\_admin\_role column added to apad\_user\_roles table* |

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| **Open Items** | |
| **Location** | **Description** |
| Section 7 Routing Setup | Approval threshold needed. apad\_user\_roles table will be extended with threshold amounts – available in Phase II of APAutomation system |
| Section 7 Routing Setup | MC considerations with reference to the ERP/Nexelus system – will be addressed in Phase II |
| Section 11 New Invoice Model Setup | Implementing “smart” predictions/mapping suggestions on Invoice Model Setup screen based on mapping data collected for other models (invoice mapping pattern recognition) – design and implementation postponed until Phase II |

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# Introduction

AP Automation system will utilize Amazon Textract text detection and analysis API to recognize and identify specific AP Invoice elements that are at interest to AP Automation system. AP Automation system background process (AP Invoice Scanner – APIS process) running at predefined intervals of time (e.g. once an hour) will scan preconfigured client directory that is setup in advance to collect initially all client AP invoices. The results of scanning are fall into two broad categories:

* Recognized (mapped) AP Invoice documents
* Unrecognized (non-mapped) AP Invoice documents

Recognized AP Invoices can be further classified as follows (in order of “flawlessness”):

* Verified Successfully. All the conditions below are satisfied:
* Invoice vendor name (vendor identifier text elements) is found, recognized and mapped to one of the predefined Invoice Models and successfully mapped to ERP Vendor/Vendor Site combination
* All the required AP Invoice elements (Vendor Name, Vendor Invoice Number, Invoice Date, Due Date, Payment Term, Service Term (Start/End Dates), Currency, IO/PO Number(s), IO/PO Net Amount(s) are found on a scanned document
* IO/PO(s) are found for this vendor in integrated AP system these IO(s) are not closed (completed or ended)
* IO/PO Invoice amount(s) are less than IO/PO amount less already delivered amount
* Payment Term and Currency are found in the ERP system applying configured maps between ERP and AP Automation systems, Service Term is correctly verified.
* Verified with Errors. All the conditions below are satisfied:
* Invoice vendor name (vendor identifier text elements) is found, recognized and mapped to one of the predefined Invoice Models and successfully mapped to ERP Vendor/Vendor Site combination
* All the required AP Invoice elements (Vendor Name, Vendor Invoice Number, Invoice Date, Due Date, Payment Term, Service Term (Start/End Dates), Currency, IO/PO Number(s), IO/PO Net Amount(s) are found on a scanned document
* Missing Info. All the conditions below are satisfied:
* Invoice vendor name (vendor identifier text elements) is found, recognized and mapped to one of the predefined Invoice Models and successfully mapped to ERP Vendor/Vendor Site combination
* Some of required AP Invoice elements (Vendor Name, Vendor Invoice Number, Invoice Date, Due Date, Payment Term, Service Term (Start/End Dates), Currency, IO/PO Number(s), IO/PO Net Amount(s) are found on a scanned document
* Missing Vendor Assignment. All the conditions below are satisfied:
* Invoice vendor name (vendor identifier text elements) is found, recognized and mapped to one of the predefined Invoice Models (apam\_master\_document\_model) but ERP Vendor/Vendor Site combination is not assigned for this model - mapping is not entered yet in this client’s model table (apam\_document\_model table)
* Some of required AP Invoice elements (Vendor Name, Vendor Invoice Number, Invoice Date, Due Date, Payment Term, Service Term (Start/End Dates), Currency, IO/PO Number(s), IO/PO Net Amount(s) are found on a scanned document

These recognized AP Invoices will be listed on AP Invoices -> Manage Invoice Documents screen (see below) where user depending on the status of the AP Invoice can either manually enter missing information, correct errors or review invoice and route for approval.

Unrecognized AP Invoices and Recognized AP Invoices with Missing Vendor Assignment are as such that vendor name on an invoice (vendor identifier text elements) could not be successfully mapped to any one of the predefined Invoice Models or it mapped successfully but generic Invoice Model (from common database) has never been used and never been mapped to Vendor/Site combination . These AP Invoice documents will be listed on AP Invoices -> Manage Non-Mapped Invoices screen (see below) where user can decide what to do with them further – either requesting new mapping (request for creating new Invoice Model), assign vendor/site, route for manual processing or remove as an erroneous file.

# System Requirements, Scope, Assumptions

AP Automation System will be released in two phases: Phase I and Phase II. Phase I will not contain Registration, Trial Accounts, Licensing, Subscription and Billing setup screens. All these elements will be maintained by Nexelus personnel on database level.

Invoice input documents (scanned images or generated) are supported only in PDF, JPEG or PNG formats. AP Automation system will not convert input files from other formats.

Phase I assumes that IO/PO number must be delivered on invoice document and if it is not found, invoice document is considered to have ‘missing info’. Phase II will provide an intelligence to extract IO/PO number from Invoice detail lines description, recognize it and map it to ERP system Campaign/Media Plan to obtain missing IO/PO number.

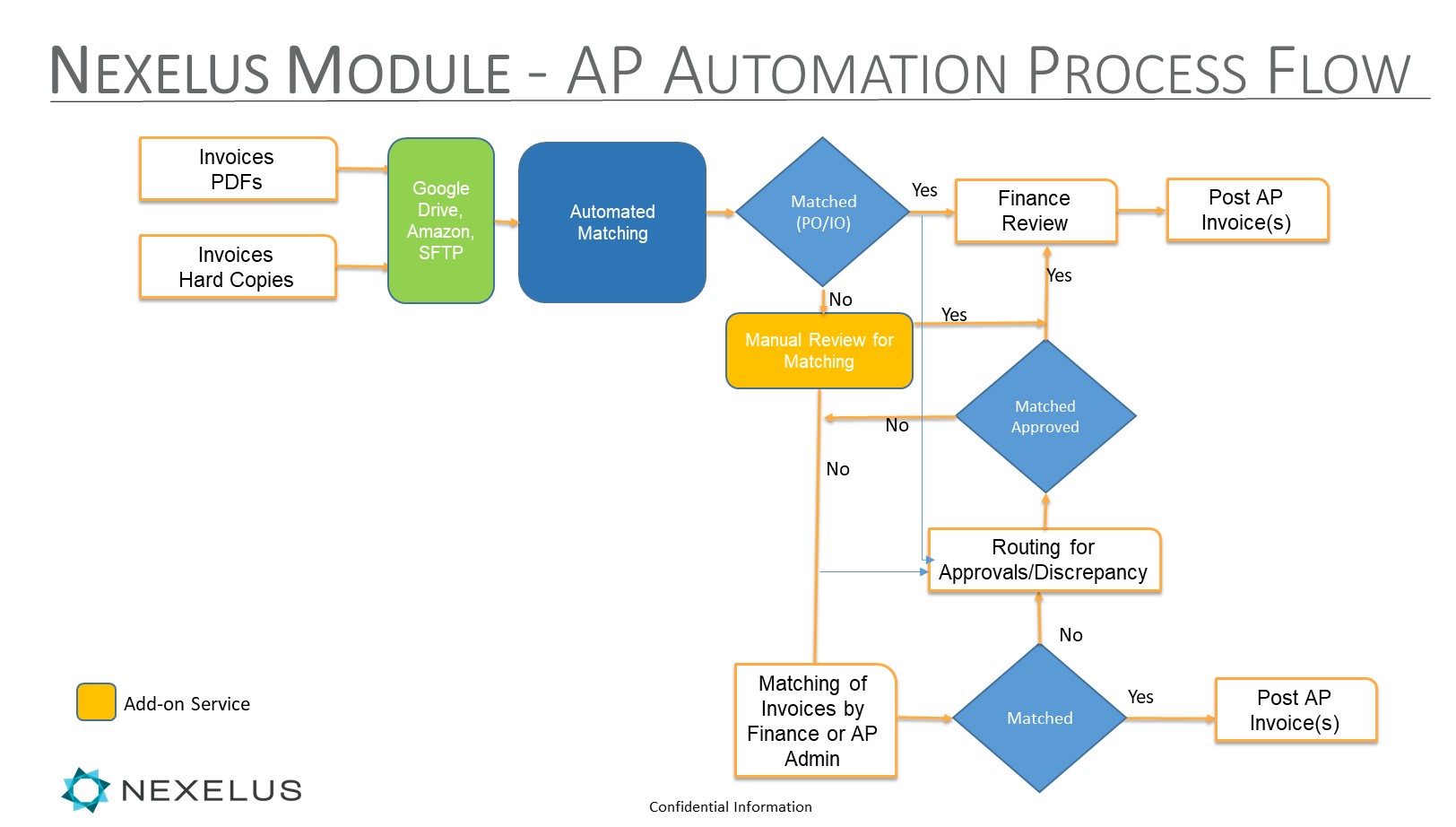
AP Automation System is designed as totally disconnected, self-sufficient application but it does require data feed from the other system – client’s ERP system, not in a real-time though. AP Automation heavily relies on the data provided by client’s ERP system such as employees, vendor/sites, IO entries, delivery transactional data and organizational position categories to properly function. Thus, AP Automation System will be integrated with ERP system using ERP System API to periodically, on a scheduling basis, fetch required data elements from ERP system. Automatic setup and configuration of ERP system API to feed and update AP Automation tables is not part of Phase I deliverables. Phase I of AP Automation system will proved and integration module with Nexelus ERP only that utilizes Nexelus API to fetch all necessary entities and feed them into AP Automation system integration tables. Phase II will use Celigo API integration platform to automate data feeds into AP Automation system for other ERPs. In short, Phase I assumes integration with Nexelus ERP system only. Phase II will allow integration with other ERP systems of client’s choice.

AP Automation system needs to deliver (post) processed AP Invoices into ERP system. Phase I will push all processed and approved invoice records into AP Automation system AP Posted Invoices table and Nexelus personnel will configure procedures to fetch these posted AP Invoices on a periodic basis and push it into ERP System tables. Phase II will provide formal AP Automation System API that can be used by any integrated ERP system to fetch processed and approved AP invoices.

AP Automation database design will utilize multi-tenant database approach using Amazon Aurora MySQL database engine initially deployed on a single database instance. Common schema to maintain sharable set of model definitions and corresponding reference data will be reused across client’s dedicated schemas. Each client schema will maintain client setup information, routing setup data, processed invoices, etc.

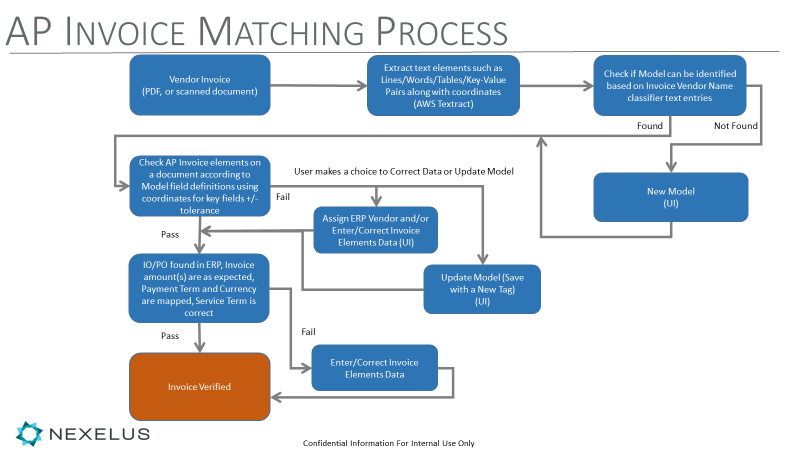
# System Data Flow Design

Below is high level diagram that shows overall data flow within an application.



Initially, all client invoices will be accumulated into single dedicated client directory. Automated Matching Process (AP Invoice Scanner – APIS) will periodically scan this directory to process each invoice document. After successful processing invoice document will be archived into another directory within S3 storage and AP Invoice record will be posted to ERP system.

Below is a diagram describing Matching Process.



The purpose of invoice matching process is to find appropriate Invoice Model with mapped ERP Vendor/Site and extract all necessary invoice data elements to be able to generate invoice record which can be further routed through approval process and finally posted to ERP System without errors and/or missing information.

# Database Design

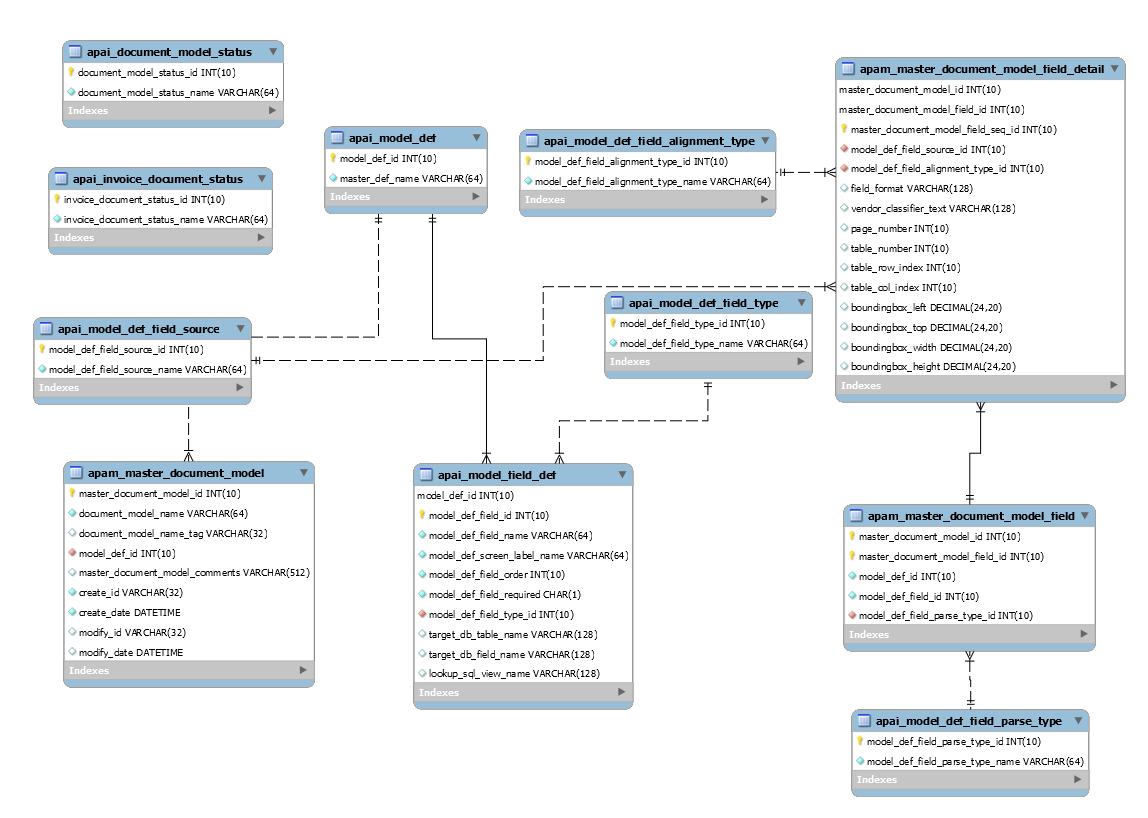
Tables are designed and seed data entered in Aurora MySQL database auroratest.cluster-caridxswhlir.us-east-1.rds.amazonaws.com server. Two schemas are designed:

* apautomation\_common – sharable schema across multiple clients
* apautomation\_360i – individual client schema

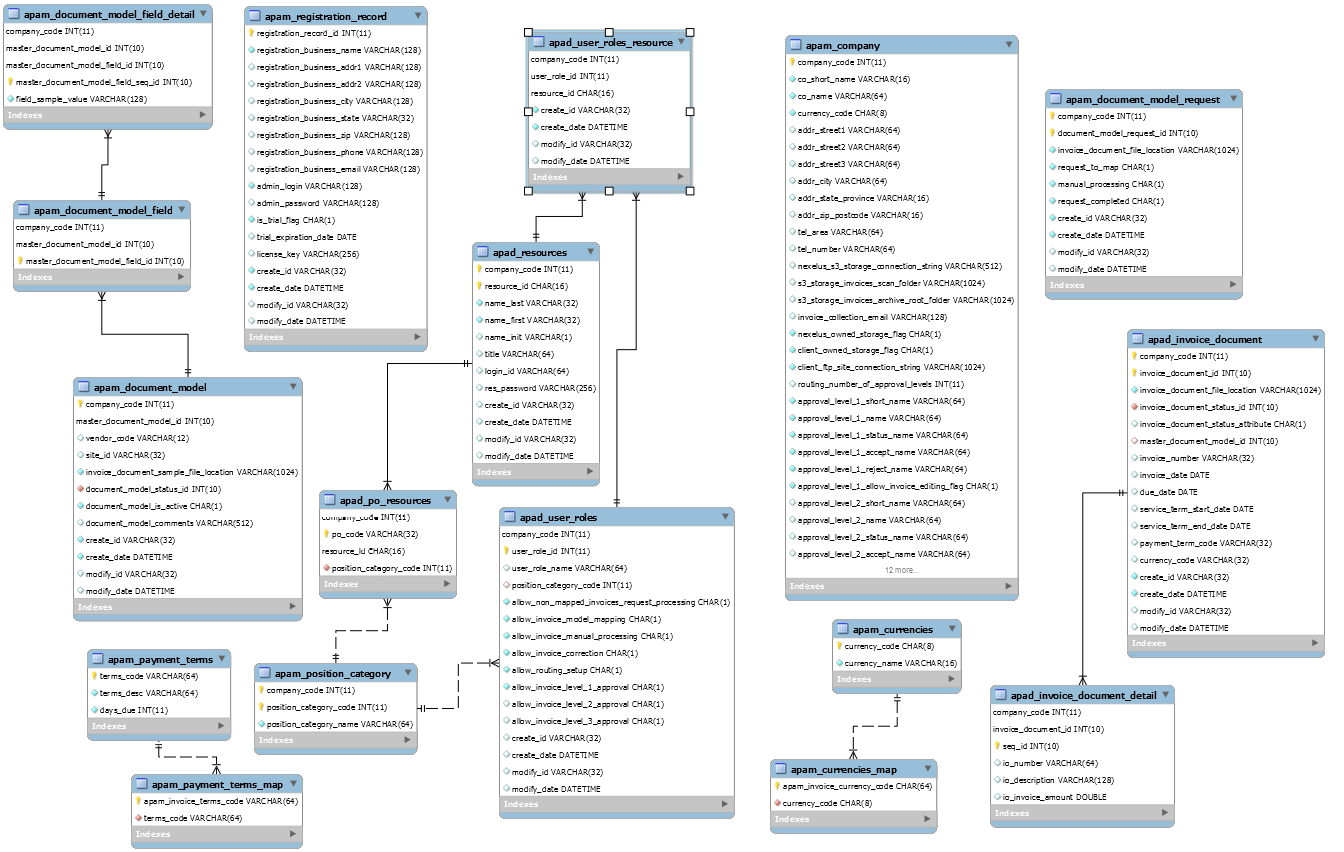
Below is 2 ERD diagram for common database and company database. See Additional Documents section for details. Please not, these diagrams for illustration purposes only. Database tables structure is evolving matter during course of the project development and what is shown below is ERDs in its initial stage. The tables and their relationships are always current and latest in Aurora MySQL database auroratest.cluster-caridxswhlir.us-east-1.rds.amazonaws.com server apautomation\_common and apautomation\_360i schemas.

When AP Automation system needs to scale and one instance of MySQL database is not sufficient to handle a load, apautomation\_common database schema will be replicated among across multiple MySQL instances. This way, invoice models defined in apautomation\_common schema are available across all the client schemas across all MySQL instances.

Common Database ERD

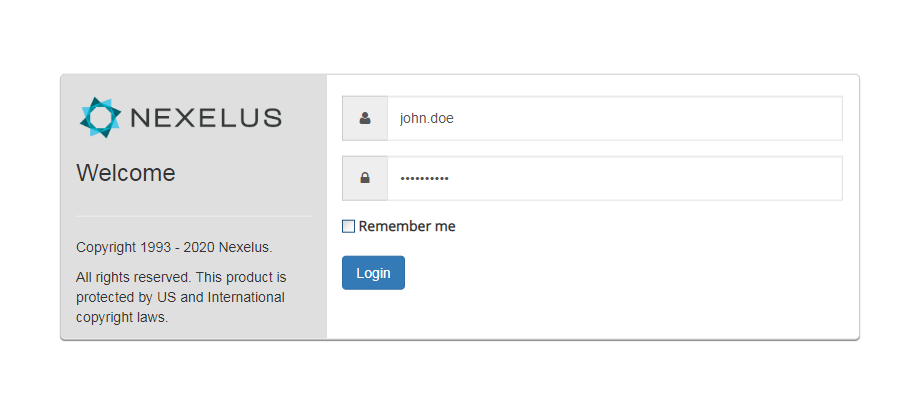


Company database ERD



# Login Process

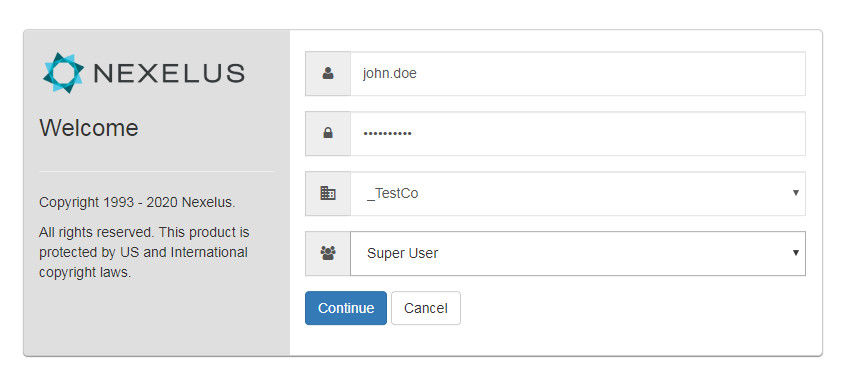
User logs in into AP Automation System using User Name/Password screen similar to Nexelus Login screen



Configuration settings for AP Automation System specify type of authentication – AD integration or password based.

If user is a Super User (login entered on the screen is found in apam\_registration\_record table) then this user has full rights to the system automatically, can access any company, can introduce and configure user roles for any company and assign other users to be admins as well. AP Automation System apam\_registration\_record table always contains single record – registration record.

If user is a regular user then AP Automation System look into apad\_resources table across all the companies and if login found for more than one company then screen below will be displayed where user chooses the company. Similar logic exists for User Role dropdown (company dependent dropdown) – if user for the given company is assigned to more than one role then User Role dropdown is displayed:



After successful login, user will be presented with the floating menu on the left and Dashboard screen (not configurable in Phase I – **Tao will design basic 3 or 4 dashboard gadgets what makes sense to display to the user after login).**

# Workflow Step 1 - System Initiation

Below is a list of tables which must be prep-populated (or partially populated) by reference (internal, system values) data or integration data fetched from ERP system in order AP Automation System becomes functional. This is considered AP Automation System Phase I implementation task. For Phase II, this list may change.

## 6.1 apautomation\_common database

All tables below are internal reference tables. Please consult Aurora MySQL database instance hosted on auroratest.cluster-caridxswhlir.us-east-1.rds.amazonaws.com server, port 3306 for actual values populated in the tables list below.

1. Various codes lookup tables

apai\_model\_def\_field\_alignment\_type

apai\_model\_def\_field\_parse\_type

apai\_model\_def\_field\_source

apai\_model\_def\_field\_source

apai\_document\_model\_status

apai\_invoice\_document\_status

1. Preestablished definitions for various document type fields to be mapped and their attributes. Currently, only AP Invoice mapping fields are defined

apai\_model\_def

apai\_model\_field\_def

## apautomation\_<client> database

Please consult Aurora MySQL database instance hosted on auroratest.cluster-caridxswhlir.us-east-1.rds.amazonaws.com server, port 3306 for actual sample values populated in the tables list below

* apam\_registration\_record. This table contains single record and for Phase I must be prepopulated before users start using the system.
* apam\_company. The records in this table list all client’s companies, at least one record must be initiated (at least first 4 fields must be entered) and the rest of the fields are maintained on AP Automation System Company Setup screen.
* apam\_currencies – currencies integration table, maintained by ERP fetch API
* apam\_payment\_terms – payment terms integration tables, maintained by ERP fetch API
* apam\_currencies\_map – maintained on Currencies Mapping screen in AP Automation system
* apam\_payment\_terms\_map - maintained on Currencies Mapping screen in AP Automation system
* apad\_user\_roles - maintained on Routing Setup screen
* apad\_resources – users list available for AP Automation system, maintained by ERP fetch API
* apad\_user\_roles\_resource – link table between roles and resources, maintained on Routing Setup screen
* apam\_position\_category – master list of position categories defined in ERP system, maintained by ERP fetch API
* apad\_user\_role\_position\_categories – link table between user roles and position categories, maintained on Routing Setup screen

When all the tables above have data that conform to AP Automation system integrity rules, all /S3 directories are defined, Client AP Invoice Delivery mechanism into AWS /S3 directory is created and tested, Company Configuration and Routing Setup data is entered and verified, first invoice can be mapped and/or invoice models can be created when no existing models exist in common database.

# Workflow Step 2 - AP Invoice Mapping

Assuming there is no single model exist in apautomation\_common schema and no invoices are delivered in /S3 scanned folder (client just started working with the system), user may click New button on Manage Invoice Model screen (list of models is empty on this screen).

After successful mapping performed by user using uploaded invoice, the following table will be filled after user clicks Save button:

* apautomation\_common. apam\_master\_document\_model
* apautomation\_common. apam\_master\_document\_model\_field
* apautomation\_common. apam\_master\_document\_model\_field\_detail
* apautomation\_<client>. apam\_document\_model (active\_flag=N)
* apautomation\_<client>. apam\_document\_model\_field
* apautomation\_<client>. apam\_document\_model\_field\_detail

# Workflow Step 3 – Scanner

After models exist in apautomation\_common database tables and corresponding linked model records exist in apautomation\_<client> table and invoice document are being delivered into /S3 scan directory, the following tables start getting filled in and apautomation\_<client> schema:

Successful and complete invoice parsing and complete verification or partial verification performed (invoice\_document\_status\_id = 40, 50, 60)

* apad\_invoice\_scanner\_monitor
* apad\_invoice\_document
* apad\_invoice\_document\_detail

# Workflow Step 4 – Invoice Requests

When Invoice document is not recognized or partially recognized by scanner (model found in common schema but not in client schema – invoice has been mapped by another client and ERP Vendor/Site ID is not setup for this client), they will be displayed in Manage Non-Mapped Invoices screen and when user clicks Submit button on Manage Non-Mapped Invoice screen “Scanned Successfully” tab for checked “Request for Mapping and/or Vendor Assignment” or “Route for Manual Processing” requests rows then records are inserted in the tables:

* apam\_document\_model\_request
* apad\_invoice\_document

If invoice failed scan and when user clicks Submit button on “Scan Failed” tab on Manage Non-Mapped Invoice screen for checked “Route for Manual Processing” rows then records are inserted in the tables:

* apam\_document\_model\_request
* apad\_invoice\_document

# Workflow Step 5 – Create Manual Invoice

If not recognized or not mapped to vendor invoice is routed for manual processing on a Manage Non-Mapped Invoices screen, or scanner failed completely to process invoice and user routed this invoice for manual processing as well, then user may create manual invoice entry clicking “Manual Entry” link on Manage Invoice Document screen. Link calls Manual Entry screen (see section 22 of the current document) and then updates invoice records in the tables:

* apad\_invoice\_document
* apad\_invoice\_document\_detail

User also may click “Create New Invoice” button on Manage Non-Mapped Invoices screen. Button calls Manual Entry screen (see section 22 of the current document) and then records will be inserted into the tables:

* apad\_invoice\_document
* apad\_invoice\_document\_detail

Note, that in this case (“Create New Invoice” button), no request record generated.

# Workflow Step 6 – Invoice Approval and Posting

After invoice has been parsed or partially parsed, it goes through correction and approval process. Manage Invoice Document screen handles this operation and various actions on this screen update records in the following apautomation\_<client> schema tables:

* apad\_invoice\_document
* apad\_invoice\_document\_detail

# User Menu

Floating User Menu will be located on the left side of the screen. The same design, colors scheme, style and navigation flow should be used as in NEXELUS application.

System Setup

Company Configuration

Routing Setup

Payment Terms Mapping

Currencies Mapping

AP Invoices

Manage Non-Mapped Invoices

Manage Invoice Models

Manage Invoice Documents

# Company Configuration

This screen lists all the fields from apam\_company table for logged in company\_code. Only AP Automation application admin user is allowed to access this screen in full edit mode. No add/delete record needed. The screen always refers to single record on this screen depending to what Company user logged in.

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| AP Automation John Doe |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Company Configuration  General Info  The following fields are read-only (fetched from ERP system):   * Company\_code * Co\_short\_name * Co\_name * Currency\_code * Addr\_street1 * Addr\_street2 * Addr\_street3 * Addr\_city * Addr\_state\_province * Addr\_zip\_postcode * Tel\_area * Tel\_number   Routing Setup  Depending of number of routing\_number\_of\_approval\_levels entered by user (1, 2 or 3 only) set of approval\_level\_<N>… field will be displayed  AP Invoices Landing Setup     |  |  | | --- | --- | | [ ] Nexelus owned storage FTP connection string: |  | |  |  | | [ ] Client owned storage FTP connection string: |  | |  |  | | [ ] Nexelus e-mail to route AP Invoices: |  | |  |  | |  |  | | [ ] Use Delivery Amount as basis for matching |  |   Update |

If any of AP Invoices Landing Setup section 3 checkboxes on the left are unchecked, the corresponding text boxes on the right are disabled. These 3 checkboxes are mutually exclusive. Either Nexelus owned storage is used to collect invoices and client can FTP invoices there and then move it to AWS /S3 location or, Client owned storage is used and AP Automation system must login periodically to client’s FTP site, download invoices and move it /S3 location, or Nexelus provides e-mail to the client which can be used to send AP Invoices and script (**Tao probably the best person to write this script**) will be used to download attachments and move them to /S3 location.

S3 Storage AP Invoices Archive Folder is the repository of invoice files after invoice is finished processing, i.e. has been posted to ERP system. Files are preserved in Vendor Code sub-directories based on values in apam\_document\_model.vendor\_code field.

# Routing Setup

This screen is a selection screen from apad\_user\_roles table. Along with the next screen it allows to maintain user roles introduced in the system. This is so called Routing Setup functionality which allows users to “route” invoice (request for model mapping, manual processing, vendor assignment, editing, approvals, etc.) to the next processing step before getting posted to ERP integrated system.

Position Category Code is an interesting field here… It maps (through lookup) to ERP system position category list through apam\_position\_category imported from ERP table and provides automatic users assignment to the operations allowed with AP Invoices. Mapping is established between IO/PO numbers recognized on invoices and apad\_po\_resources imported from ERP table (query based). Essentially, apad\_po\_resources table contains link between resource\_id and IO number through linked Level2/Level3 resources list to PO record.

There could be more than one position category code assigned to the AP Automation user role. Edit User Role screen, along with other User Role properties, should displays all Nexelus position category codes available for selection for the given role assignment.

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| AP Automation John Doe |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Routing Setup **New Role**  Search   |  |  |  | | --- | --- | --- | |  | Search: |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | | User Role ID | User Role Name | Position Cat Code | Number of Active Users | Delete | | 1 | Finance-Admin | Finance | 3 | *Delete* | | 2 | Customer Service |  | 10 | *Delete* | | 3 | Media Manager | Media Services  Media Approver | 20 | *Delete* | |

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| AP Automation John Doe |

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| Manage User Role Routing   |  |  |  | | --- | --- | --- | | User Role Properties | Users List |  |   Allows editing all the fields from apad\_user\_roles table.  allow\_invoice\_level\_1\_approval always shown (check box)  allow\_invoice\_level\_2\_approval and allow\_invoice\_level\_2\_approval shown only if Number of Approval levels on a Company Setup is set to 2 or 3.  Update  Position Categories list with selection choices |

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| AP Automation John Doe |

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| Manage Users List for the Role   |  |  |  | | --- | --- | --- | | User Role Properties | Users List |  |   Allows adding and removing user to the role from apad\_resource\_table. Results are preserved in apad\_user\_roles\_resource table.  Update |

# Payment Terms Mapping/Currencies Mapping

These mapping screens allow user to establish a map between ERP system Payment Terms and Currencies and AP Automation system Payment Terms and Currencies. AP Automation system Payment Terms map and Currencies map (maintained in apam\_payment\_terms\_map and apam\_currencies\_map tables) contain entries (apam\_invoice\_terms\_code and apam\_invoice\_currency\_code) that have been found on invoices across the board and they have been added to these map tables in order to map them to ERP system currency\_code and payment\_term\_code values.

# Manage Non-Mapped Invoices

This screen is invoked when user clicks on AP Invoices -> Manage Non-Mapped Invoices.

All the invoice documents are initially collected into predefined directory (Scanned Folder) on Amazon S3 storage. The way how invoice documents get there is configured on Company Configuration screen. In order to avoid name clashes, the original file name will be augmented to include GUID at the beginning of the name, e.g. <GUID>\_Invoice123.pdf. When file name needs to be displayed on the screen, GUID will be stripped and if original file name already exists, it will be appended with (N) where N=1,2,3… to distinguish them on the screen.

While APIS process monitors scanning operation in apad\_invoice\_scanner\_monitor table. As long as scanner starts processing invoice, it inserts record in this table with invoice\_document\_scan\_status\_id = 30 (Scan In Progress). When APIS process is done with the invoice document, it reflects the results filling the rest of the fields.

When APIS process finds a model with matching vendor name classifier in apam\_master\_document\_model table and no corresponding record exist in apam\_document\_model table, the record will be inserted automatically into apam\_document\_model table and invoice\_document\_sample\_file\_location field will be populated with the file name. document\_model\_status\_id will be populated with either Not Mapped status if no single invoice attribute found on an invoice, Incomplete Mapping or Fully Mapped depending if all the attributes or some invoice attributes are mapped.

This screen on “Scanned Successfully” tab lists all the invoices that have been successfully scanned by APIS (apad\_invoice\_scanner\_monitor. invoice\_document\_scan\_status\_id = 10) but could not be recognized (Vendor Name Classifier did not match any model in apam\_master\_document\_model table) as well as recognized invoices but with ERP Vendor/Site missing. The latter can happen when apam\_master\_document\_model record is found based on the Vendor Name Classifier match but no corresponding record found in apam\_document\_model table (invoice has been mapped by another client). The screen displays all the files within Scanned Folder except the files that exist in apam\_document\_model where invoice\_document\_sample\_file\_location is populated with this file name and vendor\_code/site\_id is populated as well (sample invoice).

Search button filters file names in Scanned Folder. Submit button generates records in apam\_document\_model\_request table. document\_model\_request\_id is automatically generated, request\_to\_map and manual\_processing are Y/N columns depending on checkboxes set on the screen for the given file name, request\_completed is set to N. Remove checkbox simply removes a file from the Scanned Folder, no record in apam\_document\_model\_request is generated.

View link displays invoice image/PDF on the left with highlighted fields that scanner has been able to parse successfully and on the right side – lists these fields with corresponding values, so user can make a judgment what to do with this invoice: route for manual processing, request for mapping/vendor assignment or remove completely.

This screen on “Scan Failed” tab lists all the invoices that failed scanning (apad\_invoice\_scanner\_monitor. invoice\_document\_scan\_status\_id = 20). manual\_processing=Y. Remove checkbox simply removes a file from the Scanned Folder, no record in apam\_document\_model\_request is generated. View link displays invoice image/PDF.

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| AP Automation John Doe |

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| Manage Non-Mapped Invoices   |  | | --- | |  |   Search   |  |  |  | | --- | --- | --- | |  | Search: |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | Scanned successfully | Scanner Failed | Manual Upload | |  |  | | File Name | Timestamp | View Invoice | Request for Mapping and/or Vendor Assignment | Route for Manual Processing | Remove | | 5678.pdf | 2020-01-03 4:15:45 PM | View | [X] | [ ] | [ ] | | ABC\_123.pdf (Manual Upload) | 2020-02-08 4:16:56 PM | View | [X] | [ ] | [ ] | | Foo\_3355\_1.jpg | 2020-01-03 2:45:03 PM | View | [ ] | [X] | [ ] | | 360i\_10\_Dec\_2019\_Twitter\_Inv.pdf | 2020-01-03 6:01:03 AM | View | [X] | [ ] | [ ] | | 360i\_BBDO\_0001.pdf | 2020-01-13 7:44:56 PM | View | [X] | [ ] | [ ] |   Submit |

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| Manage Non-Mapped Invoices   |  | | --- | |  |   Search   |  |  |  | | --- | --- | --- | |  | Search: |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | | Scanned successfully | Scanner Failed | Manual Upload | |  | | File Name | Timestamp | View Invoice | Route for Manual Processing | Remove | | 5678.pdf | 2020-01-03 4:15:45 PM | View | [ ] | [ ] | | Foo\_3355\_1.jpg | 2020-01-03 2:45:03 PM | View | [X] | [ ] | | 360i\_10\_Dec\_2019\_Twitter\_Inv.pdf | 2020-01-03 6:01:03 AM | View | [ ] | [ ] | | 360i\_BBDO\_0001.pdf | 2020-01-13 7:44:56 PM | View | [ ] | [ ] |   Submit |

The screen below is dedicated to manually uploaded documents. It is displayed when user clicks on Manual Upload tab of Manage Non-Mapped Invoices form. It lists all manually uploaded files by logged in user from apad\_document\_manual\_upload table where scanned\_flag=’N’ (user never clicked Scan action). User may upload multiple files from local drive using Upload Invoice Documents button. The uploaded files will be collected in MANUAL\_UPLOAD folder in/S3 under company directory. As long as document(s) are uploaded, record(s) in apad\_document\_manual\_upload table are inserted and shown on the screen along with other not scanned files for the logged in user.

Now, user may choose to click Scan action for the chosen file and in this case record is inserted into apad\_invoice\_scanner\_monitor table APIS with manual\_upload\_flag=’Y’, and APIS service is called immediately and results of processing are recorded into apam\_document\_model\_request table if invoice is scanned but mapping cannot be established and/or vendor info is missing (regular normal processing), so user can see them on Scanned Successfully table of the same screen. Or, if invoice is mapped and vendor is recognized during scanning, records will be added to apad\_invoice\_document and apad\_invoice\_document \_detail tables and . Apad\_document\_manual\_upload table scanned\_flag is updated to ’Y’.

Please note, Manage Invoice Models screen where user see invoice mapping/vendor assignment requests should reflect if request is generated as a result of Manual Upload process.

If invoice is scanned and mapped to the vendor then user can be redirected to Manage Invoice Documents screen with this invoice highlighted using *Manage Invoice Documents* link in Status column. If invoice scanned successfully but could not be mapped and/or vendor not found, then by clicking on *Scanned Successfully* tab link, user will be redirected to Scanned Successfully tab of this screen with respective file name record is highlighted in a table on a screen and user can decide what to do next – Request for Mapping, Route for Manual Processing or remove document.

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| Manage Non-Mapped Invoices   |  | | --- | |  |   Upload Invoice Documents   |  |  | | --- | --- | |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | | Scanned successfully | Scanner Failed | Manual Upload |  |  | | Uploaded File Name | Timestamp | View Invoice | Action | Status | | ABC\_123.pdf | 2020-02-08 4:15:45 PM | View | Scan/Remove | Not processed | | Foo111.jpg | 2020-02-08 2:45:03 PM | View | Scan/Remove | Not processed | | Opa\_1122.pdf | 2020-02-07 2:45:03 PM | View |  | Scan in Progress | | Meow\_4567.pdf | 2020-02-07 2:45:03 PM | View |  | Scanned, Invoice could not be mapped. Open in *Scanned Successfully* tab | | Uhh\_465.pdf | 2020-02-06 2:45:03 PM | View |  | Scanned and mapped successfully. Open in *Manage Invoice Documents* screen | | NotGood\_333.pdf | 2020-02-06 2:45:03 PM | View |  | Scan failed. Open in *Scanner Failed* tab | |

# Manage Invoice Models

The screen below lists all the models as defined in apam\_master\_document\_model, apam\_document\_model and apam\_document\_model\_request tables. Active column can be clicked to toggle Active and not Active mapped to vendor/site models. Switching Active flag to Yes allows model to be used for parsing by APIS process and to No to hold processing for this model. Only models that have ERP Vendor/Site assigned can be set as Active. Not all the models from apam\_master\_document\_model will be shown on this screen. Only models that have corresponding record in apam\_document\_model table are shown. Also, apam\_document\_model\_request records with request\_completed=N are displayed. If record exists in in apam\_master\_document\_model, apam\_document\_model and apam\_document\_model\_request with the same file name in apam\_document\_model and apam\_document\_model\_request tables and request\_completed=N, that means the invoice model is recognized using Invoice Name Classifier text - Request 2 (abc.pdf) example – and Vendor/Site Id mapping needs to be assigned. When invoice not recognized (no model match) then New model needs to be created.

Model definition cannot be updated under the same Model Name/Tag combination if at least one invoice record exists for this model in apad\_invoice\_document table (apad\_invoice\_document. master\_document\_model\_id) – that means at least one invoice has been processed using this model and update is not allowed. However, user can introduce new Tag with the same Model Name. Tag is equivalent to Model version here.

View action allows to view invoice document on the left and model on the right for the invoice that has been used to create model.

All the actions View, Edit, Copy, New, Assign Vendor and Reassign Vendor as well as New button will redirect user to Invoice Model Setup Screen (see New Invoice Model Setup section for details).

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| Manage Invoice Models  Search   |  |  |  | | --- | --- | --- | |  | Search: |  |  |  |  | | --- | --- | |  | New Model |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | ID | Model Name | Model Tag | Model Status | Active | ERP Vendor | ERP Vendor Site | Actions | | 1 | Facebook | V1 | Fully Mapped | Yes | 10025 – Facebook | 001 | View / Copy | | 2 | Facebook | V2 | Forced Mapped | Yes | 10025 – Facebook | 001 | View / Copy | | 23 | Facebook | V3 | Forced Mapped | No | 10025 – Facebook | 002 | Edit / Copy / Reassign Vendor | | 3 | TradeDesk | V1 | Fully Mapped | No | 1125 – TradeDesk | 001 | Edit / Copy / Reassign Vendor | | 4 | TradeDesk | V2 | Forced Mapped | No | 1125 – TradeDesk | 002 | Edit / Copy / Reassign Vendor | | Request 1 (5678.pdf) |  |  |  |  |  |  | New | | Request 2 (abc.pdf) | 33ACROSS | V1 | Fully Mapped | No |  |  | Edit / Copy / Assign Vendor | | 5 | Twitter | V1 | Incomplete Mapping | No | Twitter | 001 | Edit / Copy / Reassign Vendor | | Request 3 (360i\_BBDO\_0001.pdf) | BBDO | V1 | Not Mapped | No |  |  | New | | Request 4 – Manual Upload (ABC\_123.pdf) |  |  |  | No |  |  | New | |

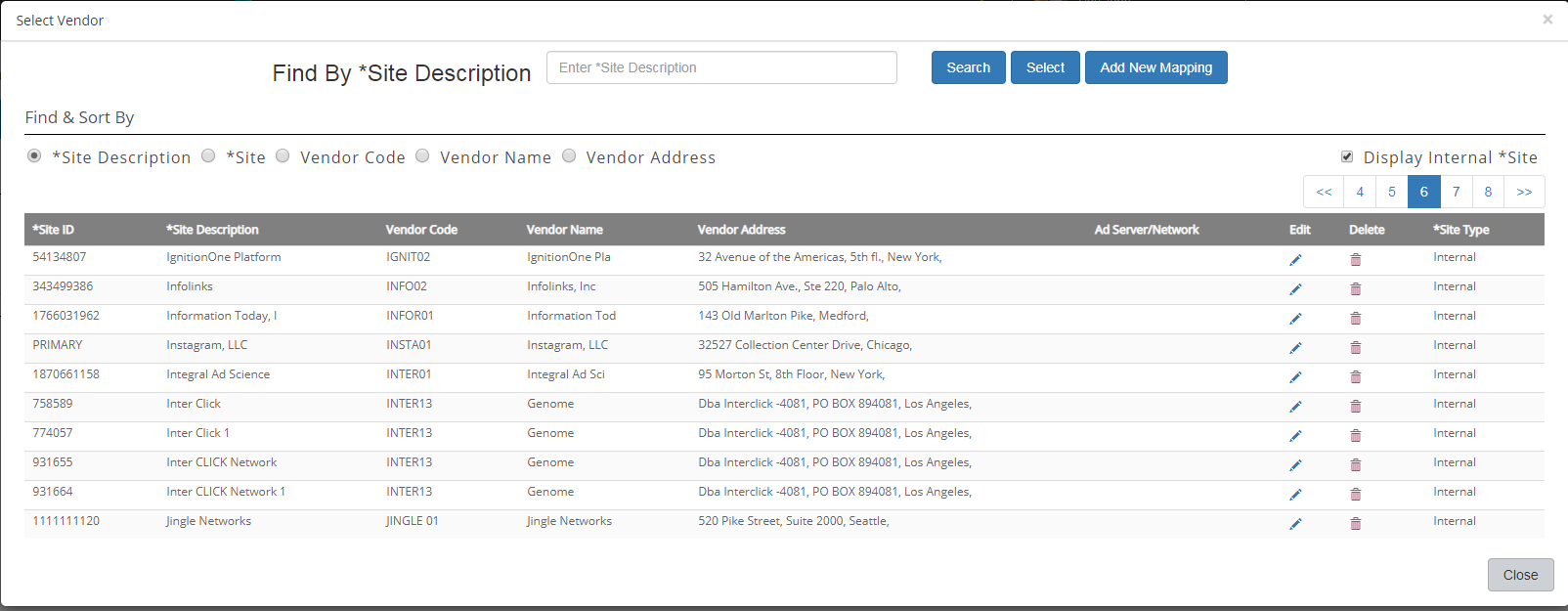
# New Invoice Model Setup

This is the main “core” application screen where mapping between some text elements on parsed invoice document (PDF or image) and AP Invoice attributes is defined by the user. The left side of the screen always reserved for the invoice document, either raw or parsed with overlaying rectangles around parsed lines (Markup – Lines button), words Markup – Words button), key-value pairs (Markup – Key-Value Pairs button) or highlighted table cells if user choose to view invoice with table markup (Markup – Tables button). If user clicks on New Model button on Manage Invoice Model screen (above) then screen will look like a screen below where user can explicitly upload invoice document from the local machine using Upload Invoice Document button. If screen is displayed as result of calling one of the View, Edit, Copy, New, Assign Vendor or Reassign Vendor actions on the previous screen then Model Setup screen will have preloaded already raw invoice from the mapped model or the request and will look similar to the screen described in Invoice Model Setup – Request\_<N> section of the current document.

Below are the rules for the right part of the screen for different actions initiated from the Manage Invoice Models screen:

1. New Model – user clicks on New Model button on Manage Invoice Model screen

* Upload Invoice Document button is visible and enabled. This button selects a file from user’s local drive (it could be an option to select a file from client’s /S3 folder where all the invoice documents are delivered as pertained by Company Configuration setup), only pdf and jpg file extensions are supported. As long as user selects a file, it is being parsed immediately by Textract API using all four Textract parsing types: Lines, Words, Tables and Key-Pairs and initially Invoice Image is shown on the left, View Raw Invoice option is highlighted, Pages entry is set to the first page (if file is a JPEG image, Pages entry is hidden because image ss always a single page).
* When user clicks on of the four options Markup – Lines, Markup – Words, Markup – Tables, Markup Key-Value Pairs, the left pane becomes outlined with rectangles for words, lines, key-value pairs and for the tables, tables are highlighted and each cell in each table is additionally highlighted when user hoovers mouse over the cell. Then, user can drag the item from the left pane to the right pane invoice elements and drop them there. Additional information is preserved, such as geometry, page\_number, table\_number, table\_row\_index, table\_col\_index if needed.
* There are two outcomes of the file parsing results: document is recognized and it matches to the existing model(s) or it is not recognized – no match to existing model found. If document is recognized then all recognized/matched fields will be populated on the right side of the screen from apam\_master\_document\_model, apam\_document\_model, apam\_master\_document\_model\_field and apam\_master\_document\_model\_field\_detail tables. The data, however, will be pushed directly from invoice pdf/image for recognized fields.
* Below are criteria and business logic for invoice document recognition or “best matching”:
* First, all the models are scanned to find matching Vendor Classifier entries. Vendor Classifier entries (as any other entry) can be set as Lines, Words, Tables and Key-Pairs type of parsing. If they set as Words or Lines and there is only single entry then text has to match exactly and bounding box values (left, top, width, height) must match (**2% tolerance criteria should be initially set, some R&D needs to be done to identify more precise and appropriate setting. This setting must be global – there is no way to define this setting per model. Same goes for Textract Confidence attribute – only R&D can reveal the proper Confidence threshold**) to the values preserved in apam\_master\_document\_model\_field\_detail table for field which is defined as AP Invoice model/Vendor Classifier field in apam\_master\_document\_model\_field table (model\_def\_id = 1, model\_def\_field\_id = 1). Also, page\_number field must match as well to the parsed value. If type of parsing is Table then text, page\_number, table\_number, table\_row\_index and table\_col\_index must match to the parsed values. Key-Value pairs will not be supported for Vendor Classifier (meaning if user clicks on Markup – Key-Value Pairs button, user will not be able to drag anything from left to Vendor Classifier entries.
* If there are multiple entries for Vendor classifier, then all above has to be verified for each entry. In addition to that, “distance” between entries (top, left corner) has to be checked (2% tolerance is allowed) – see <https://www.calculatorsoup.com/calculators/geometry-plane/distance-two-points.php> for details - this may give better recognition results.
* There are two outcomes for matching (recognition) – match to a single model or multiple models. If match is found for the single model then all other fields are populated according to the model definition (invoice data is extracted directly from the parsed document on the left and overrides sample data from model definition). If there more than a single model match, we have to find “the best” matching model. All other fields have to checked as well (see details below for specifics of each field type) and the model with the most fields matched (geometry tolerance level and confidence level do not need to be taken into account here, i.e. model is not considered “better match” if all geometry data is “closer”/confidence level higher to the parsed invoice on the left in one model than in another model) is considered a best match. Then this model is populated on the screen. If we found two models with the same number of match fields then any model is picked.
* If this model is Active model, it cannot be edited and saved, but different Model Name/Tag can be entered and when user saves this model, new master\_document\_model\_id is generated and new entries will be made in six tables – apam\_master\_document\_model, apam\_master\_document\_model\_field, apam\_master\_document\_model\_field\_detail, apam\_document\_model, apam\_document\_model\_field, apam\_document\_model\_field\_detail.
* Model Properties section on the right pane.
* Model Name is text entry with search capabilities displaying list of apam\_master\_document\_model. document\_model\_name field values. Search screen may also display vendor\_code, site\_id, invoice\_document\_sample\_file\_location, document\_model\_status\_id/name fields from left join of apam\_master\_document\_model table to apam\_document\_model. Blank for unrecognized invoice or apam\_master\_document\_model.document\_model\_name for found matched model.
* Model Tag is a free entry text field. Please note Model Name/Model Tag combination must be unique in apam\_master\_document\_model table. Blank for unrecognized invoice or apam\_master\_document\_model.document\_model\_name\_tag for found matched model.
* Status is blank for unrecognized invoice or apam\_document\_model.document\_model\_status\_id/name for found matched model.
* Active checkbox is unchecked for unrecognized invoice or apam\_document\_model.document\_model\_is\_active for found matched model.
* ERP Vendor/ERP Vendor Site is a lookup that should look similar to the Nexelus lookup below



**Tao would be the best person to design APAutomation Vendor/Sites integration table in MySQL database and prepare synchronization routines to fetch and update this table from ERP system.** Blank for unrecognized invoice or apam\_document\_model.vendor\_code/site\_id for found matched model.

* Mapped Invoice Fields section on the right pane
* The fields in this section are built dynamically based on the entries in apai\_model\_field\_def table. apai\_model\_field\_def.model\_def\_field\_type\_id dictates specifics for each field.
* Vendor Classifier (apai\_model\_field\_def.model\_def\_field\_type\_id=10) is initially displayed as a single text box (if invoice is not recognized) or as defined in apam\_master\_document\_model\_field and apam\_master\_document\_model\_field\_detail tables. These text box(es) are not editable and can only accept “drop” of the content from the left pane. For Vendor Classifier user can only drop markups as Lines, Words and Tables. If user switches from Lines to Words, for example but content of Vendor Classifier entries was dropped as Lines, “drop” operation is disabled. User has to start all over again with Vendor Classifier clearing up (deleting) all entries using *Remove All* link. *Remove All* link removes all textboxes and creates single empty box (Keyword 1). + and – buttons to the right allow user add/remove individual entries. apam\_master\_document\_model\_field\_detail.model\_def\_field\_source\_id will be set to 10 for Lines or Words markup and to 50 for table markup.
* Vendor Invoice Number (apai\_model\_field\_def.model\_def\_field\_type\_id=20) is set as defined in apam\_master\_document\_model\_field and apam\_master\_document\_model\_field\_detail tables for recognized models. Even for recognized models there could be a case when Vendor Invoice Number is not defined (Forced Mapping or Incomplete) - then single line is displayed in Vendor Invoice Number table with empty Invoice Input, Source set to Label and Alignment set to Left. Below are allowed values for Source depending on Parse Type (Parse Type is Textract terminology denoting type of document parsing – either by lines, or by words, or finding tables in the document or identifying key-value pairs across the document). Source is APAutomation terminology denoting what is parsed element used for – label like Invoice No, or Value, like INV00023 and where it is found while parsing – in lines, words, in tables, or within key-value pairs. While parsing the document, all 4 types of document parsing will be used internally and then user may choose what type to use for mapping, whatever fits mapping the best.

|  |  |
| --- | --- |
| Parse Type | Source |
| Lines | Label – Page Defined  Value – Page Defined  Label – First Page  Value – First Page  Label – Any Page  Value – Any Page  Label – Last Page  Value – Last Page |
| Words | Label – Page Defined  Value – Page Defined  Label – First Page  Value – First Page  Label – Any Page  Value – Any Page  Label – Last Page  Value – Last Page |
| Tables | |  | | --- | | Label-Table-Header | | Value-Table-Header | | Label-Table-Detail | | Value-Table-Detail | | Label-Table-Footer | | Value-Table-Footer | |
| Key-Value Pairs | |  | | --- | | Key-Value-Pair (Single) | | Key-Value-Pair (Multi) | |

Label sources are as such that content defined in apam\_master\_document\_model\_field\_detail.field\_sample\_value must match exactly to the parsed invoice field. Elements with Value sources types are actual data like invoice numbers, currency code, invoice date, etc. They have to match to their geometry attributes, table, row/col index, etc. and value cannot be blank. For Label and Value Source, there could be variations such as Page Defined, First Page, Last Page, Any Page is Any Page. If Source is not Label – Page Defined or Value – Page Defined then apam\_master\_document\_model\_field\_detail.page\_number and apam\_master\_document\_model\_field\_detail.table\_number set to null. This is useful for multi-page documents where sometimes specific element can exist on any page of the document (e.g. footer of the document - last page).

Label-Table-Detail, Value-Table-Detail and Key-Value-Pair (Multi) Source types represent multi-entries such as invoice detail lines with IO Number and IO Amount. These elements will be recognized as follows:

* Tables. Both Label-Table-Detail and Value-Table-Detail must be defined on a right side. Label-Table-Detail and Value-Table-Detail table\_col\_index must match exactly. Label-Table-Detail must match exactly to the sample text defined for the model (apam\_document\_model\_field\_detail.field\_sample\_value) and the only values that will be taken into consideration are the values that match respective labels across all pages and tables. apam\_master\_document\_model\_field\_detail.page\_number and apam\_master\_document\_model\_field\_detail.table\_number set to null.
* Key-Value-Pair (Multi). Key-Value pairs are dropped together as key~value into single line on a right pane field entry. No alignment column displayed if Source is Key-Value-Pair. All the values with the same key and non-blank value from the whole invoice across all pages will be taken into consideration. […] denotes on the screen that there are multiple values parsed and user can view them clicking on this.

If Parse Type are Lines or Words and Source is Value then alignment influences geometry calculations. To calculate match, for left alignment, only top, left, bottom coordinates have to be used and for distance calculations top, left have to be used. For right alignment, only top, right, bottom coordinates have to be used and for distance calculations top, right have to be used. For center alignments, top, (right-left)/2, bottom have to be used and for distance calculations top, (right-left)/2 have to be used.

* Vendor Invoice Date and Due Date (apai\_model\_field\_def.model\_def\_field\_type\_id=30). In addition to the Vendor Invoice Number functionality date format is added – this is free entry text but it’s validated against using only DD DDD D YY YYYY MM MMM strings with / <space>, <comma> and – (dash) combinations as single delimiter. For example, MM-DD-YYYY, MMDDYYYY and D MMM YYYY are valid but MM—DD-YYYY or MM-DD- YYYY or MMMM-DD-YYYY are not valid.
* Service Term (Start/End Dates) (apai\_model\_field\_def.model\_def\_field\_type\_id=40). In addition to the previous fields this range type of fields supports from/to values at the same time. This is controlled using filed format attribute. In addition to Date formats, FULL:, FROM: and TO: prefixes are allowed to denote a date range.
* Payment Term and Currency fields. These are lookup fields. (apai\_model\_field\_def.model\_def\_field\_type\_id=50
* IO/PO Number and IO/PO Description. apai\_model\_field\_def.model\_def\_field\_type\_id=20.
* IO/PO Net Amount. Numeric field. Validation required for Value source type. apai\_model\_field\_def.model\_def\_field\_type\_id=60.
* Mark as completed checkbox. User checks this box to denote that the Model is Forced Mapped, meaning that not all required fields are defined and mapped but model will be used nether the less and invoices matching this model will be parsed with Missing Info status (apad\_invoice\_document.invoice\_document\_status\_id = 40).
* Save button. When user clicks Save button, six tables – apam\_master\_document\_model, apam\_master\_document\_model\_field, apam\_master\_document\_model\_field\_detail, apam\_document\_model, apam\_document\_model\_field, apam\_document\_model\_field\_detail – will be updated or new records inserted depending on whether entered Model Name/Model Tag combination already exists in apam\_master\_document\_model table or not. Physical invoice file that was used for mapping will be preserved in apam\_company. s3\_storage\_model\_samples\_invoices\_folder location – if invoice was uploaded from user’s local machine, it will be saved there, if invoice that was used for mapping was taken from /S3 scanned folder, it will be copied to apam\_company. s3\_storage\_model\_samples\_invoices\_folder location. Please note, in this case, mapped invoice is not considered as “scanned” or processed invoice, the original invoice document will be processed again by APIS service during normal run of APIS process.

1. New action – user clicks on New action for submitted request.

* In the header, the requested file name full path is displayed, Upload button is hidden, invoice document parsed and loaded on the left. Invoice Models are searched (just in case) and most likely, no model found for this invoice, so all the invoice entries on the left are blank.
* After user maps the model and saves it to 6 database tables (see above), invoice map request marked as Completed only if ERP Vendor/Site is mapped, otherwise Completed flag is still N.
* Invoice document record is updated in apad\_invoice\_document and record(s) are created in apad\_invoice\_document\_detail table as needed. apad\_invoice\_document.invoice\_document\_status\_id is set accordingly (Missing Vendor Assignment, Verified Successfully, Verified with Errors or Missing Info)

1. Assign Vendor action – user clicks on Assign Vendor action for submitted request and mapped models. The same screen as in New action is displayed and user assigns Vendor/Site and saves changes under the same Model Name/Tag – these are not editable fields. It’s allowed to make changes to invoice elements if needed.
2. Reassign Vendor action – user clicks on Reassign Vendor action for non-active models. The same screen as in New action is displayed and user reassigns Vendor/Site and saves changes under the same Model Name/Tag – these are not editable fields as well all other invoice elements.
3. Edit action - user clicks on Edit action for non-active models. The same screen as in New action is displayed. The system must check if this model was used for parsing invoices: apad\_invoice\_document.invoice\_document\_model\_id (samples are excluded – apam\_document\_model.invoice\_document\_sample\_file\_location). If it was used, then user must enter new Model Name/Model Tag combination after making changes to invoice elements.
4. Copy action - user clicks on Copy action. The same screen as in New action is displayed with Model Name/Model Tag prefixed with Copy of text.
5. View action - user clicks on View action. The same screen as in New action is displayed. No editing is allowed. Save button is disabled.

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| New Invoice Model Setup  File Name: TD\_123.pdf (uploaded)   |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | View Raw Invoice | Markup - Lines | Markup - Words | Markup - Tables | Markup - Key-Value Pairs | Upload Invoice Document |  |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | |  | **Model Properties**   |  |  |  | | --- | --- | --- | | Model Name: | Enter new model or select from list |  |  |  |  | | --- | --- | | Model Tag: |  |  |  |  | | --- | --- | | Status: | Unknown |  |  |  | | --- | --- | | Active: | [ ] |  |  |  |  | | --- | --- | --- | | ERP Vendor: | Select ERP Vendor from list |  |  |  |  |  | | --- | --- | --- | | ERP Vendor Site: | Select ERP Vendor Site from list |  |   **Mapped Invoice Fields**  **Vendor Classifier \*** *Remove All*1     |  |  |  | | --- | --- | --- | | Keyword 1: | *theTradeDes* | - |      |  |  |  | | --- | --- | --- | | Keyword 2: | *The* | - |      |  |  |  | | --- | --- | --- | | Keyword 3: | *Trade* | **-** |      |  |  |  | | --- | --- | --- | | Keyword 4: | *Desk* | **+** |     **Vendor Invoice Number \*** *Remove All*   |  |  |  |  | | --- | --- | --- | --- | | **Invoice Input** | Source | Alignment |  | | *Invoice* | Label – First Page ▼ | Left | **-** | | *#:* | Label – First Page ▼ | Left | **-** | | *INV-0085778* | Value – First Page ▼ | Left | **+** |   **Vendor Invoice Date \*** *Remove All*   |  |  |  |  |  | | --- | --- | --- | --- | --- | | **Invoice Input** | Source | Alignment | Format |  | | *Invoice* | Label – First Page▼ | Left |  | **-** | | *Date:* | Label – First Page ▼ | Left |  | **-** | | *05/31/2018* | Value – First Page▼ | Left | MM/DD/YYYY | **+** |   **Due Date \*** *Remove All*   |  |  |  |  |  | | --- | --- | --- | --- | --- | | **Invoice Input** | Source | Alignment | Format |  | | *Due* | Label – First Page ▼ | Left |  | **-** | | *Date:* | Label – First Page ▼ | Left |  | **-** | | *07/15/2018* | Value – First Page ▼ | Left | MM/DD/YYYY | **+** |   **Service Term (Start/End Dates) \*** *Remove All*   |  |  |  |  | | --- | --- | --- | --- | | **Invoice Input** | Source | Format |  | | *Month* | Label – First Page ▼ |  | **-** | | *of* | Label – First Page ▼ |  | **-** | | *service:* | Label – First Page ▼ |  | **-** | | *May* | Value – First Page ▼ | FULL:MMM | **-** | | *2018* | Value – First Page ▼ | FULL:YYYY | **+** |   **Payment Term \*** *Remove All*   |  |  |  |  | | --- | --- | --- | --- | | **Invoice Input** | Source | Alignment |  | | *Term:* | Label – First Page ▼ | Left | **-** | | *Net 45* | Value – First Page ▼ | Left | **-** |   **Currency** *Remove All*   |  |  |  |  | | --- | --- | --- | --- | | **Invoice Input** | Source | Alignment |  | | *Invoice* | Label – First Page ▼ | Left | **-** | | *Currency:* | Label – First Page ▼ | Left | **-** | | *USD* | Value – First Page ▼ | Left | **+** |   **IO/PO Number \*** *Remove All*   |  |  |  | | --- | --- | --- | | **Invoice Input** | Source |  | | *IO#* | Label-Table-Header ▼ | **-** | | *123456* | Value-Table-Detail ▼ | **+ […]** |   **IO/PO Description** *Remove All*   |  |  |  | | --- | --- | --- | | **Invoice Input** | Source |  | | *CAMPAIGN* | Label-Table-Header ▼ | **-** | | *CANON EOS-Q2-2018* | Value-Table-Detail ▼ | **+ […]** |   **IO/PO Net Amount \*** *Remove All*   |  |  |  |  | | --- | --- | --- | --- | | **Invoice Input** | Source | Alignment |  | | *AMOUNT* | Label-Table-Header ▼ |  | **-** | | *$15,133.41* | Value-Table-Detail ▼ | Right Justified | **+ […]** | |  |  |  | | --- | --- | | Mark as Completed  (Forced Mapped): | [X] | | Comments: |  |   Test  Save  Cancel |

When user clicks Test button, the pop-up screen below is displayed:

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| Test the same Invoice Document  Upload and Test another Invoice Document  Find Invoice Document in stage directory matching to this Model directory  Close |

# New Invoice Model Setup (Test)

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| AP Automation John Doe |

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| New Invoice Model Setup – Testing on TD\_555\_TEST.pdf file (another Invoice Document)   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | **View Raw Invoice** | **Show Markup Fields** | **Show Tables** | **Show Key-Value Pairs** |  |  |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | |  | **Model Properties**   |  |  |  | | --- | --- | --- | | Model Name: | Trade Desk Model |  |  |  |  | | --- | --- | | Model Tag: | V2 |  |  |  | | --- | --- | | Status: | Testing… |  |  |  | | --- | --- | | Is Active: | [ ] |  |  |  |  | | --- | --- | --- | | ERP Vendor: | TD0025 |  |  |  |  |  | | --- | --- | --- | | ERP Vendor Site: | 0001 |  |   **Mapped Invoice Fields**  **Vendor Classifier \*** *Remove All*1     |  |  |  | | --- | --- | --- | | Keyword 1: | *theTradeDesk* |  |      |  |  |  | | --- | --- | --- | | Keyword 2: | *The Trade Desk* |  |       **Vendor Invoice Number**   |  |  |  |  | | --- | --- | --- | --- | | **Invoice Input** | Source | Alignment |  | | *Invoice* | Label ▼ | Left |  | | *#:* | Label ▼ | Left |  | | *INV-0085778* | Value ▼ | Left |  |   **Vendor Invoice Date \*** *Remove All*   |  |  |  |  |  | | --- | --- | --- | --- | --- | | **Invoice Input** | Source | Alignment | Format |  | | *Invoice* | Label ▼ | Left |  |  | | *Date:* | Label ▼ | Left |  |  | | *05/31/2018* | Value ▼ | Left | MM/DD/YYYY |  |   **Due Date \***   |  |  |  |  |  | | --- | --- | --- | --- | --- | | **Invoice Input** | Source | Alignment | Format |  | | *Due* | Label ▼ | Left |  |  | | *Date:* | Label ▼ | Left |  |  | | *07/15/2018* | Value ▼ | Left | MM/DD/YYYY |  |   **Service Term (Start/End Dates) \***   |  |  |  |  | | --- | --- | --- | --- | | **Invoice Input** | Source | Format |  | | *Month* | Label ▼ |  |  | | *of* | Label ▼ |  |  | | *service:* | Label ▼ |  |  | | *May* | Value ▼ | FULL:MMM |  | | *2018* | Value ▼ | FULL:YYYY |  |   **Payment Term \***   |  |  |  |  | | --- | --- | --- | --- | | **Invoice Input** | Source | Alignment |  | | *Term:* | Label ▼ | Left |  | | *Net 45* | Value ▼ | Left |  |   **Currency**   |  |  |  |  | | --- | --- | --- | --- | | **Invoice Input** | Source | Alignment |  | | *Invoice* | Label ▼ | Left |  | | *Currency:* | Label ▼ | Left |  | | *USD* | Value ▼ | Left |  |   **IO/PO Number \***   |  |  |  | | --- | --- | --- | | **Invoice Input** | Source |  | | *IO#* | Label-Table-Header ▼ |  | | *123456* | Value-Table-Detail ▼ | **[…]** |   **IO/PO Description**   |  |  |  | | --- | --- | --- | | **Invoice Input** | Source |  | | *CAMPAIGN* | Label-Table-Header ▼ |  | | *CANON EOS-Q2-2018* | Value-Table-Detail ▼ | **[…]** |   **IO/PO Net Amount \***   |  |  |  |  | | --- | --- | --- | --- | | **Invoice Input** | Source | Alignment |  | | *AMOUNT* | Label-Table-Header ▼ |  |  | | *$15,133.41* | Value-Table-Detail ▼ | Right Justified | **[…]** | |   Back |

# Invoice Model Setup - Request\_<N>

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| AP Automation John Doe |

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| Invoice Model Setup – Request\_123  Loaded File Name: /S3/360I/Staged\_AP\_Invoices/TD\_123334455.pdf   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | **View Raw Invoice** | **Show Markup Fields** | **Show Tables** | **Show Key-Value Pairs** |  |  |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | |  | **Model Properties**   |  |  |  | | --- | --- | --- | | Model Name: | Enter new model or select from list |  |  |  |  | | --- | --- | | Model Tag: |  |  |  |  | | --- | --- | | Status: | Unknown |  |  |  | | --- | --- | | Is Active: | [ ] |  |  |  |  | | --- | --- | --- | | ERP Vendor: | Select ERP Vendor from list |  |  |  |  |  | | --- | --- | --- | | ERP Vendor Site: | Select ERP Vendor Site from list |  |   **Mapped Invoice Fields**  **Vendor Invoice Number \*** *Remove All*   |  |  |  |  | | --- | --- | --- | --- | | **Invoice Input** | Source | Alignment |  | | *Invoice* | Label ▼ | Left | **-** | | *#:* | Label ▼ | Left | **-** | | *INV-0085778* | Value ▼ | Left | **+** |   **Vendor Invoice Date \*** *Remove All*   |  |  |  |  |  | | --- | --- | --- | --- | --- | | **Invoice Input** | Source | Alignment | Format |  | | *Invoice* | Label ▼ | Left |  | **-** | | *Date:* | Label ▼ | Left |  | **-** | | *05/31/2018* | Value ▼ | Left | MM/DD/YYYY | **+** |   **Due Date \*** *Remove All*   |  |  |  |  |  | | --- | --- | --- | --- | --- | | **Invoice Input** | Source | Alignment | Format |  | | *Due* | Label ▼ | Left |  | **-** | | *Date:* | Label ▼ | Left |  | **-** | | *07/15/2018* | Value ▼ | Left | MM/DD/YYYY | **+** |   **Service Term (Start/End Dates) \*** *Remove All*   |  |  |  |  | | --- | --- | --- | --- | | **Invoice Input** | Source | Format |  | | *Month* | Label ▼ |  | **-** | | *of* | Label ▼ |  | **-** | | *service:* | Label ▼ |  | **-** | | *May* | Value ▼ | FULL:MMM | **-** | | *2018* | Value ▼ | FULL:YYYY | **+** |   **Payment Term \*** *Remove All*   |  |  |  |  | | --- | --- | --- | --- | | **Invoice Input** | Source | Alignment |  | | *Term:* | Label ▼ | Left | **-** | | *Net 45* | Value ▼ | Left | **-** |   **Currency** *Remove All*   |  |  |  |  | | --- | --- | --- | --- | | **Invoice Input** | Source | Alignment |  | | *Invoice* | Label ▼ | Left | **-** | | *Currency:* | Label ▼ | Left | **-** | | *USD* | Value ▼ | Left | **+** |   **IO/PO Number \*** *Remove All*   |  |  |  | | --- | --- | --- | | **Invoice Input** | Source |  | | *IO#* | Label-Table-Header ▼ | **-** | | *123456* | Value-Table-Detail ▼ | **+ […]** |   **IO/PO Description** *Remove All*   |  |  |  | | --- | --- | --- | | **Invoice Input** | Source |  | | *CAMPAIGN* | Label-Table-Header ▼ | **-** | | *CANON EOS-Q2-2018* | Value-Table-Detail ▼ | **+ […]** |   **IO/PO Net Amount \*** *Remove All*   |  |  |  |  | | --- | --- | --- | --- | | **Invoice Input** | Source | Alignment |  | | *AMOUNT* | Label-Table-Header ▼ |  | **-** | | *$15,133.41* | Value-Table-Detail ▼ | Right Justified | **+ […]** | |  |  |  | | --- | --- | | Mark as Completed  (Forced Mapped): | [X] | | Comments: |  |   Test  Save  Cancel |

# Manage Invoice Documents

This screen displays the list of all invoices from apad\_invoice\_document table.

View Invoice action allows user to view raw invoice document file (pdf or jpg)

Review / Make Corrections / Manual Entry displays screen described in section Review Invoice Document with various degree of invoice element populated.

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| AP Automation John Doe |

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| Manage Invoice Documents   |  | | --- | |  |   Search   |  |  |  | | --- | --- | --- | |  | Search: |  |   Create New Invoice   |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | File Name | Timestamp | ERP Vendor/Site | Status | Total Invoice Amount | Due Date | Actions | | 5678.pdf | 2020-01-03 4:15:45 PM | Facebook - V0001/0001 | Verified Successfully (A) | $250,900.02 | 01/15/2020 | View Invoice / Review | | 5678\_1a.pdf | 2020-02-03 4:15:45 PM | Facebook - V0001/0001 | Verified Successfully (A)  (**Duplicate Invoice!**) | $250,900.02 | 01/15/2020 | View Invoice / Review | | Moo\_1243\_2.pdf | 2020-01-01 1:45:03 PM | Google - G0001/0001 | Verified with Errors | $40,110.22 | 01/31/2020 | View Invoice / Make Corrections | | ***User Entry*** |  | Google - G0001/0001 | Verified Successfully (M) | $1,110.22 | 01/31/2020 | Review | | Foo\_3355\_1.jpg | 2020-01-03 2:45:03 PM |  | Routed for Manual Processing (scan failed) |  |  | View Invoice / Manual Entry | | Foo\_3355\_2.jpg | 2020-01-03 2:46:03 PM |  | Routed for Manual Processing (unrecognized model) |  |  | View Invoice / Manual Entry | | 360i\_TD\_112233.pdf | 2020-01-03 6:01:03 AM | TradeDesk – TD002/0001 | Missing Info | $1,450,443.35 |  | View Invoice / Edit Model / Make Corrections | | 360i\_TD\_112233(1).pdf | 2020-01-03 7:01:03 AM | TradeDesk – TD002/0001 | Missing Info  (**Duplicate Invoice!**) | $1,450,443.35 |  | View Invoice / Edit Model / Make Corrections | | 360i\_TD\_112555.pdf | 2020-01-03 6:01:03 AM | TradeDesk – TD002/0001 | Reviewed by AP Admin | $44,022.45 | 01/31/2020 | View Invoice / View Routing History / Approve by MM | | 360i\_TD\_11211.pdf | 2020-01-05 9:01:03 AM | TradeDesk – TD002/0001 | Rejected by MM | $344,022.45 | 01/31/2020 | View Invoice / View Routing History / Make Corrections | | 360i\_TD\_11233.pdf | 2020-01-03 6:01:03 AM | TradeDesk – TD002/0001 | Approved by Finance | $3,022.45 | 01/15/2020 | View Invoice / View Routing History /Post to ERP System | | 360i\_TD\_555.pdf | 2020-01-03 6:01:03 AM | TradeDesk – TD002/0001 | Posted | $6,122.00 | 01/18/2020 | View Invoice / View Routing History | | 360i\_TD\_555.pdf | 2020-01-03 6:01:03 AM | TradeDesk – TD002/0001 | Post Failed | $1,445.00 | 01/18/2020 | View Invoice / View Routing History / Make Corrections | |

**Verified Successfully** Invoice Status will have A, C or M attribute (sub-status) denoting how Invoice has achieved the status of being Verified Successfully: **A**utomatically, **C**orrected or **M**anually processed.

Invoice Processing Statuses

Unrecognized – not used, record never inserted/updated with this status

Routed for Manual Processing

Mapping Requested – not used, record never inserted/updated with this status

Missing Vendor Assignment

Missing Info

Verified Successfully

Verified with Errors (e.g. IO amount is incorrect)

Reviewed by AP Admin (dynamic status) – First Level of Approval (modifications to IO amount(s), Payment Term, Currency, IO/PO Number(s) may be still allowed on this level – this is configured in Routing Setup screen)

Rejected by AP Admin (dynamic status)

Approved by Media Manager (dynamic status) – Second Level of Approval

Rejected by Media Manager (dynamic status)

Approved by Finance (dynamic status) – Third Level of Approval

Rejected by Finance (dynamic status) – Third Level of Approval

Posted

Three Approval levels above are configured on Routing Setup screen that sets up number of Approval Levels, name of Status and Actions for approval levels and user groups (mapped to Position Categories) who can perform approvals on each level. The user groups who can perform correct invoices and have missing info or in Verified with Errors status and user groups who can manually process invoice (map to Vendor/Vendor Site and enter all invoice attributes manually) will be configured on Routing Setup screen as well.

# Review Invoice Document

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| --- |
| AP Automation John Doe |

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| Review Invoice   |  |  |  |  | | --- | --- | --- | --- | | **Show Invoice Document** |  |  |  |  |  |  | | --- | --- | | Invoice Document File: | 5678.pdf 2020-01-03 4:15:45 PM |  |  |  | | --- | --- | | ERP Vendor/Site: | Facebook - V0001/0001 |  |  |  | | --- | --- | | Invoice Status: | Verified Successfully (A) |  |  |  | | --- | --- | | Invoice Model/Tag: | Facebook – V1 |  |  |  | | --- | --- | | Invoice Number: | 456789 |  |  |  | | --- | --- | | Invoice Date: | 01/01/2020 |  |  |  | | --- | --- | | Due Date: | 01/15/2020 |  |  |  | | --- | --- | | Payment Term: | Net45 ▼ |  |  |  |  |  | | --- | --- | --- | --- | | Service Term From: | 12/01/2019 | To: | 12/31/2019 |  |  |  | | --- | --- | | Currency: | USD ▼ |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | IO/PO Number | IO/PO Description | Invoice Net Amount | IO/PO Amount | Consumed Amount | Delivery Amount |  | | PO00001 |  | $210,900.02 | $800,000.00 | $340,250.34 | $200,343.00 | - | | PO00002 |  | $40,000.00 | $100,000.00 | $50,182.50 | $45,000.00 | + |  |  |  | | --- | --- | | Comments: |  |   Close  Reject  Accept |

Show Invoice Document button will flow invoice image or PDF on the left and invoice attribute entries will be shifted to the right to allow invoice preview and entries be displayed side by side. Editing of all or some fields will be allowed here depending on how it is setup in Routing Setup screen.

Make Corrections, Manual Entry, Approve by MM and Approve by Finance Admin actions will display a similar screen with the same set of invoice attributes but different editing capabilities (for example, Manual Entry will allow mapping to ERP Vendor/Site manually and Invoice Model/Tag will be hidden).

Duplicate Invoice flag (apad\_invoice\_document.duplicate\_invoice\_flag) will be raised automatically by the system when Vendor Invoice Number is found for the same company\_code/vendor\_code/site\_id combination. User may reject this invoice or original invoice (for which duplicate was found) during routing of the invoice. The flag will be reset back to N during posting. Posting process will not allow to post invoices with the same Vendor Invoice number for company\_code/vendor\_code/site\_id combination.

If Post Invoice failed, user can make corrections to the invoice and approve it (First Level of Approval) or reject it altogether.

# Additional Documents

Two database script files: common\_ddl.sql and company\_ddl.sql contain database DDLs for

* apautomation common database (including seed data INSERT statements)
* apautomation company database