Predictive Routing Help

Genesys Predictive Routing 9.0.0

12/29/2021

Table of Contents

Welcome

Genesys Predictive Routing (GPR) draws on accumulated agent, customer, and interaction data, enabling you to analyze omnichannel interactions and outcomes and generate models to predict outcomes. From this analysis, combined with machine learning, you can determine the best possible match between waiting interactions and available agents, and then route the interactions accordingly.

In addition, you can report on the predicted versus actual outcomes. The actual outcome is also used to further train the machine-learning model, improving the accuracy of predicted outcomes between similar customer profiles and agent profiles.

- The Genesys Predictive Routing Overview video presents a high-level picture of what Predictive Routing can do for you:
  Link to video

Welcome to the *Predictive Routing Help*. This file provides instructions on using the Genesys Predictive Routing (GPR) application.

- How do I navigate the GPR user interface?
- How do I navigate the Help file?

> **Important**
>
> This Help is provided for on-premises customers, who install, configure, and maintain their own GPR deployment. You can access GPR using the web application or the GPR API. This Help file explains how to use the Predictive Routing web application. Much of the content, which explains GPR objects and concepts, is also essential for those using the API.
>
> - If you plan to use the API, see the *Predictive Routing API Reference*. (Requires a password for access. Please contact your Genesys representative if you need to view this document.)

What Do You Want to Do?

- Set up accounts, users, and groups.
- Import agent, customer, and interaction data.
- Use the Lift Estimation report to generate an estimate of the potential improvement in your KPIs using GPR. Use this report to direct your implementation toward the metrics that show the most promise for immediate results. As you work with GPR, the insights into your data and how your environment functions can open new avenues for improvement in additional areas.
- Use the Feature Analysis report to identify which factors most strongly affect various KPIs. The results enable you to create more effective predictors and models.

- Use the Agent Variance report to determine where differences between agent effectiveness in different scenarios offers potential for improved outcomes.
- Create predictors and models based on your imported data.
  - Model Quality report: Provides an analysis of how well the model is performing.
  - Agent Coverage report: Indicates how many agent models were built, as a function of the total agents available.
- Review and test the performance of your predictors and models.
- Monitor jobs that you are running or have run.
- Create dashboards that enable you to quickly view items you use most often.

> **Important**
>
> - The Predictive Routing interface as shown in this Help file might include features or settings that do not apply to your contact center or your user role.

Looking for Something Else?

You might also find the following information of use:

Genesys Predictive Routing Deployment and Operations Guide enables you to plan, set up, and maintain your Genesys Predictive Routing (GPR) environment.

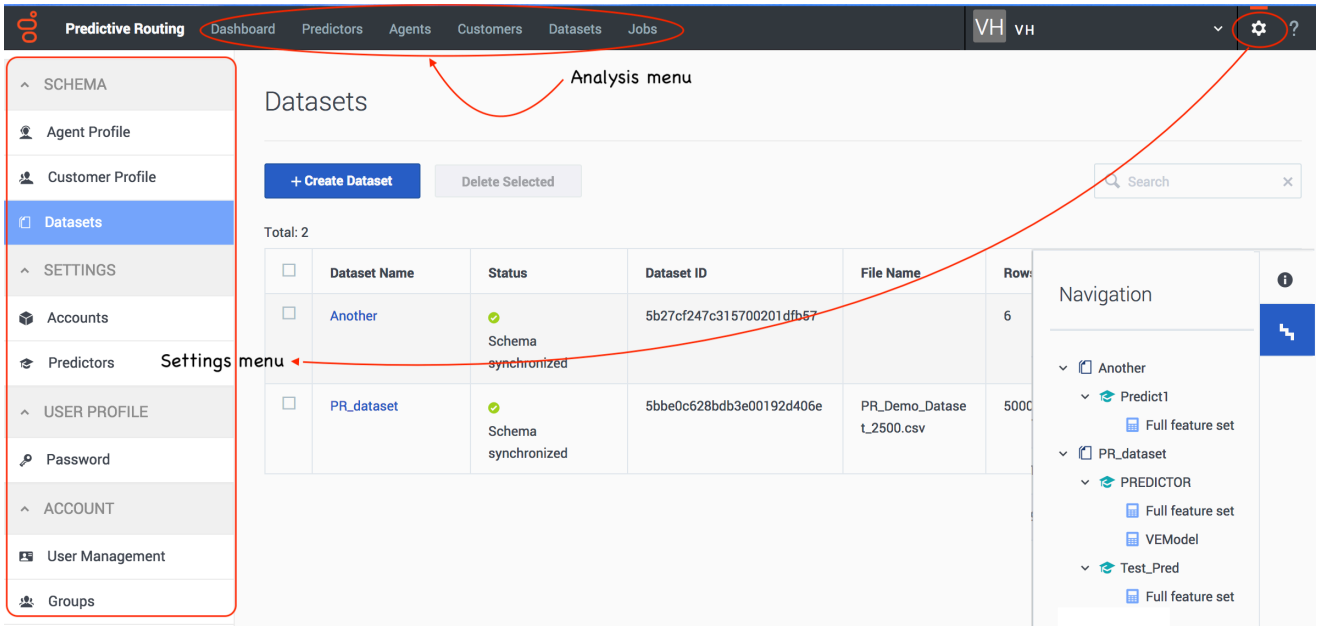
- **Planning:** system requirements, architecture, sizing, data preparation
- **Configuring and installing** AI Core Services (AICS) and Agent State Connector (ASC): single-server and HA environments
- **Operations**: logging, backing up and restoring, troubleshooting
- **Genesys Routing integration**: deploying and optimizing the GPR strategy subroutines components
- **Genesys Reporting integration**: configuring GPR and the Genesys Reporting components
- **Quick Start**: to get new users up and running
- **New Features**: lists all new features and includes links to documentation describing them

The *Predictive Routing API Reference* (Requires a password for access. Please contact your Genesys representative if you need to view this document.)

The home page provides links to the following resources:

- Release Notes for all GPR components
- GPR Read Me

Navigating the Predictive Routing Interface



Predictive Routing has three sets of navigation links: one at the top next to the Predictive Routing product name, one on the left side of the window that is opened from the Gear icon, and icons on the right-hand side of the **Settings > Datasets**, **Settings > Predictors**, and **Settings > Models** windows that can open an information window or a navigation tree.

In addition to the various menus, breadcrumb links appear at the top of the window if you have drilled-down past a top-level page.

- The left-hand navigation bar enables you to import your data and configure the objects you need to match customers and agents. If you do not see this bar:
  - Click the **Settings** Gear wheel in the top right corner to open the **Settings** menu.
- The top navigation bar enables you to view and analyze already created objects.
- The right-hand toggle navigation menu enables you to view a tree view of Datasets, Predictors, and Models.
  - To open or close this navigation menu, click the icon.
  - Composite Predictors, which can be built on data from multiple Datasets, are not shown in this tree-view pane.
- The right-hand toggle Information icon shows a pane containing information about the currently-selected object in the main window.
  - To open or close this information pane, click the icon.

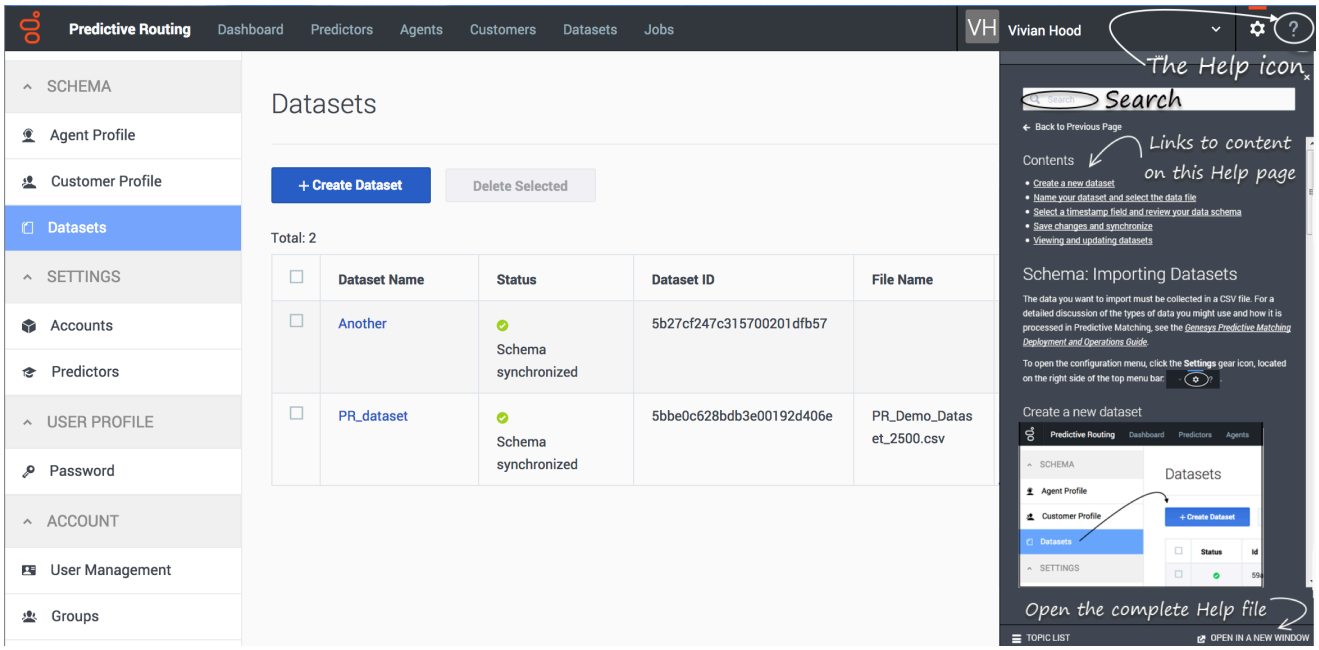
For security reasons, the GPR web application logs out inactive users. This functionality works in the

following way:

- If you do not perform any action in the GPR browser window for fourteen minutes, an inactivity alert opens and displays a sixty-second countdown timer.
- If you then perform any action, such as scrolling, moving or clicking your mouse, or entering keystrokes from your keyboard, the inactivity timer disappears and your session continues.
- If you do nothing, your session ends after the sixty-second timer expires and you are then automatically logged out.

> **Important**
>
> Data uploads are considered activity. GPR does not log you out while data is uploading, even if you are otherwise inactive for more than fifteen minutes.

Navigating This Help File



When you click the **Help** icon from the Predictive Routing interface, the Help widget opens. It is context-sensitive, which means that the most relevant page heads the list of topics.

Navigating the Help Widget

- Click the title of the desired topic to open it in the widget. Links at the top of the page jump directly to specific material.
- Use the **Search** box (at the top of the widget page) to locate information.
- Click **Topic List** (at the foot of the widget page) to return to the topic list visible when you initially

opened the Help widget.

- Click **Open in a New Window** (at the foot of the widget page) to open the complete Help file.

Navigating the Help File

- The left-hand menu lists all topics covered in the Help file. It also links to the *Deployment and Operations Guide*, which provides additional documentation for Predictive Routing.
- The right-hand links take you to the various sections in the current article.
- The Help page provides a **Search** box, where you can either search the current manual or all Genesys documentation.

Creating and Managing Accounts, Roles, Users, and Groups

> **Important**
> The functionality described in this section is provided for on-premises customers, who install, configure, and maintain their own GPR deployment. If you are accessing GPR in a Cloud instance, you can disregard the Accounts functionality.

To open the menu where these objects are managed, click the **Settings** gear icon, located on the right side of the top menu bar:  .

> **Important**
> Start by configuring Accounts.

Accounts

- Create and manage accounts, specify password requirements and settings.

User profiles

- Reset passwords

Accounts

- User management
- User groups

Roles

GPR supports the following roles:

- STAFF - Can configure new accounts and has access to more than one account. STAFF-level users can create, read, update, and delete all objects on the platform, such as, predictors, models and so on. They manage all user roles across all accounts to which they have access, including adding or deleting users, changing user roles, and modifying passwords.
- ADMIN - Can belong to one account only, but within that account has the same complete access as a

STAFF-level user. ADMIN users cannot delete STAFF users or reset STAFF user passwords.

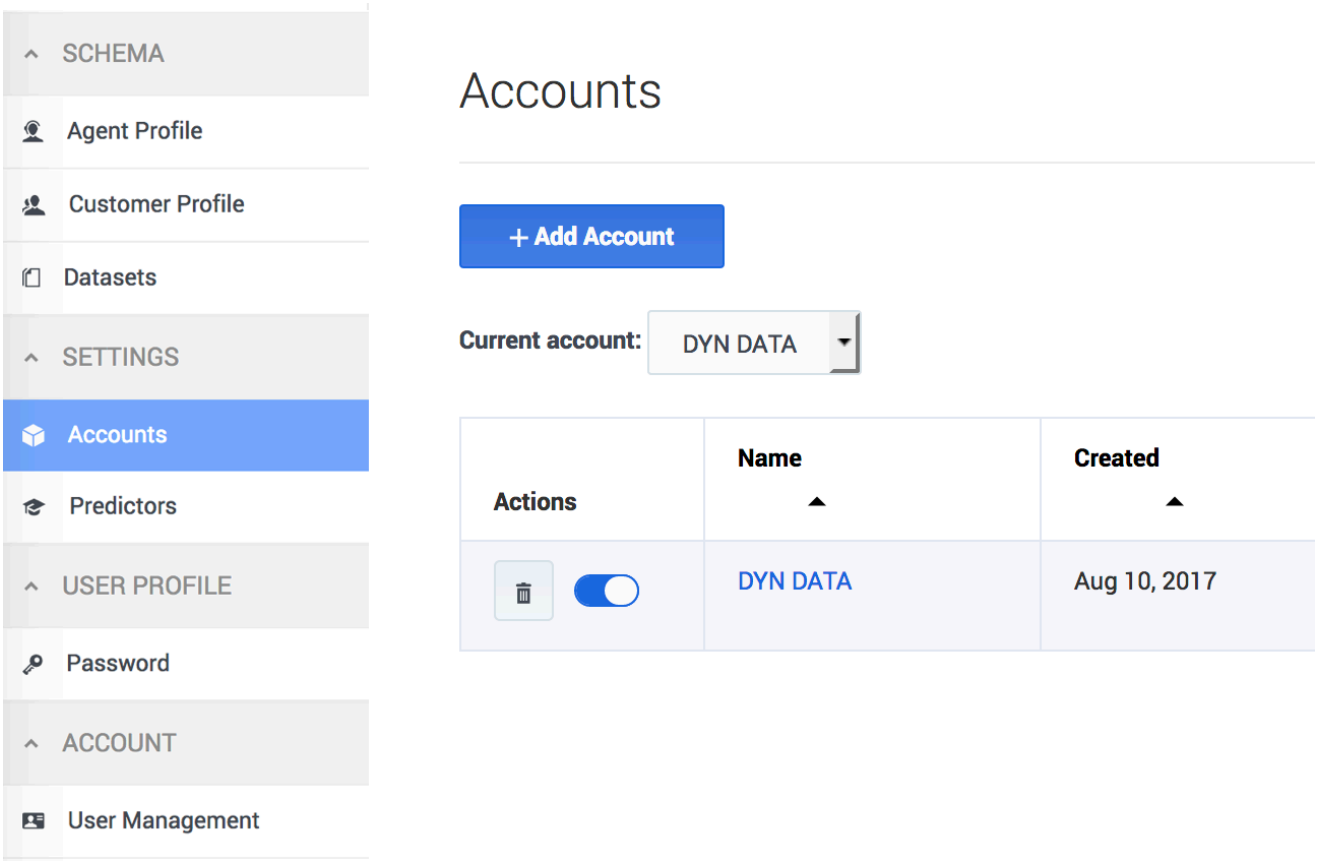
- REVIEWER - Can belong to one account only. Has view-only access to already-created objects, such as predictors, datasets, models, and so on. REVIEWER-level users can run analysis reports on datasets and predictors, such as Lift Estimation reports and Feature Analysis reports, and view all generated reports, but cannot delete any objects, including reports.

Settings: Configure Accounts

Accounts are managed on the **Settings > Accounts** tab. To open the configuration menu, click the **Settings** gear icon, located on the right side of the top menu bar:  .

- Accounts are equivalent to tenants. A user with STAFF or ADMIN rights can manage how the accounts existing in your environment interact with Predictive Routing (GPR).
- GPR supports the following capabilities:
  - LDAP-enabled accounts
  - Audit trails
  - Password policy configuration
  - User role assignments

Adding a new account



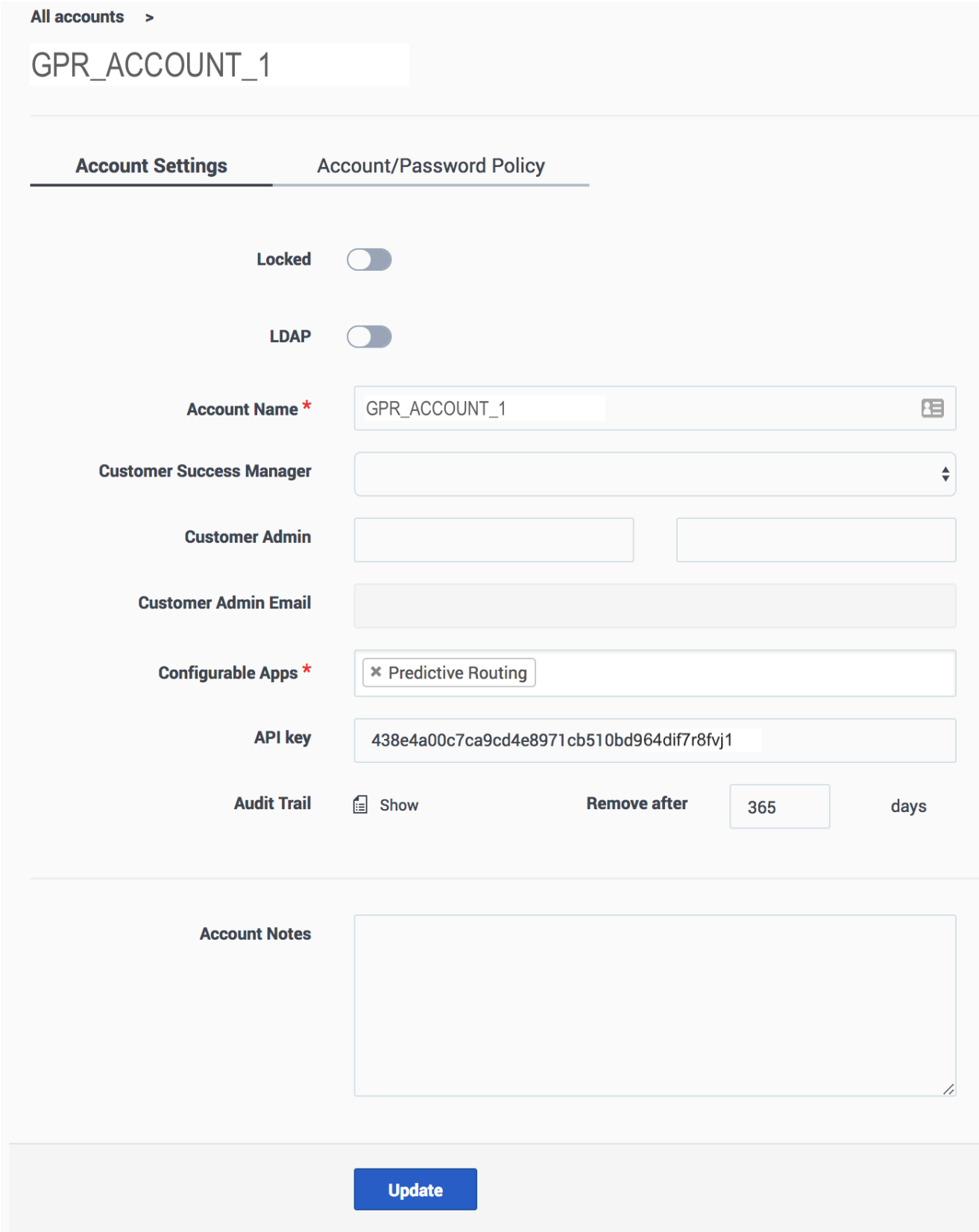
When you initially deploy the AI Core Services (AICS), the set-up process creates a default account with the name "Predictive Routing". The Predictive Routing application is automatically added to this account.

> **Important**
>
> When you initially log into the GPR web application you must use the superuser account set up when you deployed AI Core Services. Genesys strongly advises that you do not use the superuser account for any day-to-day business involving GPR. Use the instructions on this page to create users with the appropriate roles to perform all necessary tasks.

If you need to create additional new accounts, perform the following steps:

1. Click the **Settings** > **Accounts** tab.
2. Click **Add Account**.
3. Specify a name for the account (normally the name of the organization represented by the account).
4. If you are using LDAP authentication, select the **LDAP Authentication** check box. See LDAP-enabled accounts, below, for configuration instructions.
5. Click **Create**.

Configuring or updating an account

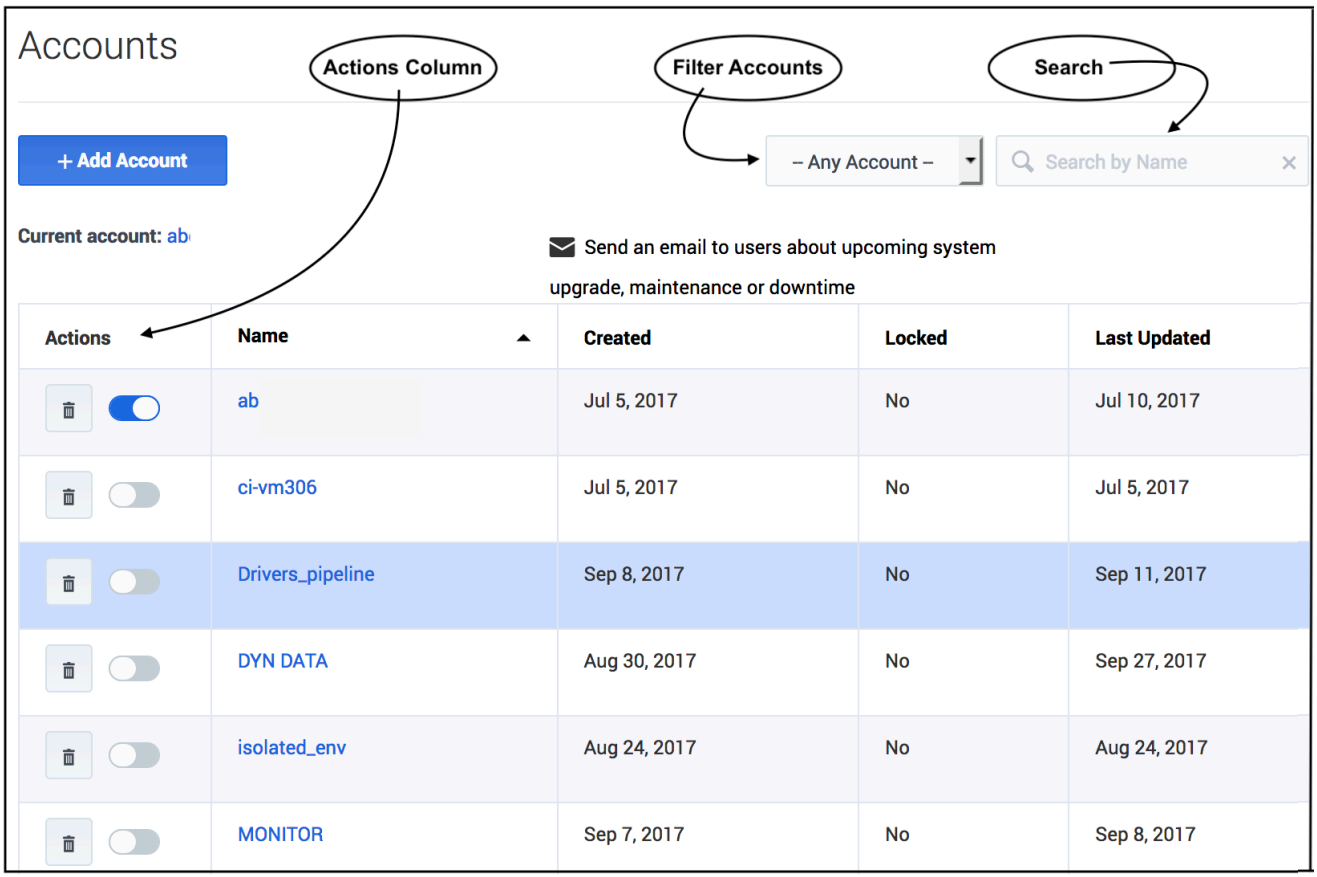

All accounts >
GPR_ACCOUNT_1
Account Settings
Account/Password Policy
Locked
LDAP
Account Name *
GPR_ACCOUNT_1
Customer Success Manager
Customer Admin
Customer Admin Email
Configurable Apps *
Predictive Routing
API key
438e4a00c7ca9cd4e8971cb510bd964dif7r8fvj1
Audit Trail
Show
Remove after
365
days
Account Notes
Update

Click an account name to configure the account. The following parameters are located on the **Accounts Settings** tab. For help with the **Account/Password Policy** tab, see Password policy configuration.

- Locked—Only ADMIN users of an account can lock it. Once locked, the account cannot be edited.
- LDAP—Toggle this control ON to enable LDAP authentication. See LDAP-enabled accounts, below, for configuration instructions.
    - If you convert an account to LDAP authentication, you must also convert the user accounts for those who should use LDAP authentication. User configuration is done in the **Settings > User Management** window.
- Account Name—The name you assigned to the account.
- Customer Success Manager—The person who created the account in Predictive Routing, and who can function as a contact person in case of issues with account configuration.
- Customer Admin and Customer Admin Email—The name and email for the employee who is responsible for making account updates.
- API key—The API key required to access the Predictive Routing API.
- Audit Trail—The information logged that documents actions performed in the current account.
    - To view the audit trail, click **Show**.
    - Enter a number from 1-365 to specify how many days the audit log records should be kept.
    - For details on what is recorded in the audit trail, refer to Audit trails.
- Account Notes—Any information important to keep about this account.

This window also enables you to create a new account instead of editing the currently-selected one.

The accounts list



If your environment includes multiple accounts, they appear in a table when you click **Settings > Accounts**. You can perform the following actions from this table view:

- **Activate/Deactivate** - The radio button in the **Actions** column enables you to activate or deactivate an account.
- **Delete** - Click the trash can icon in the **Actions** column to delete an account.
- **Sort** - Click any column header (except the **Actions** column) to sort the table based on the values in that column.
- **Filter** - Choose whether to view all accounts, test accounts only, or production accounts only, using the drop-down selector above and to the right of the table.
- **Search** - Type an account name into the **Search** field to locate a specific account.

Configuring LDAP-Enabled Accounts

Accounts configured to use LDAP authentication require you to specify the login credentials that Users should enter to gain access to Predictive Routing. The credentials must comply with the LDAP User DN pattern that you establish in the **Account** settings window. This pattern creates a distinguished name (DN) for each user, and has a format similar to the following:

```
cn=*,ou=people,dc=example,dc=com
```

When a user logs in, they enter the actual user ID in place of the asterisk (*) shown in the pattern example above. You can use the following distinguished names in the User DN pattern:

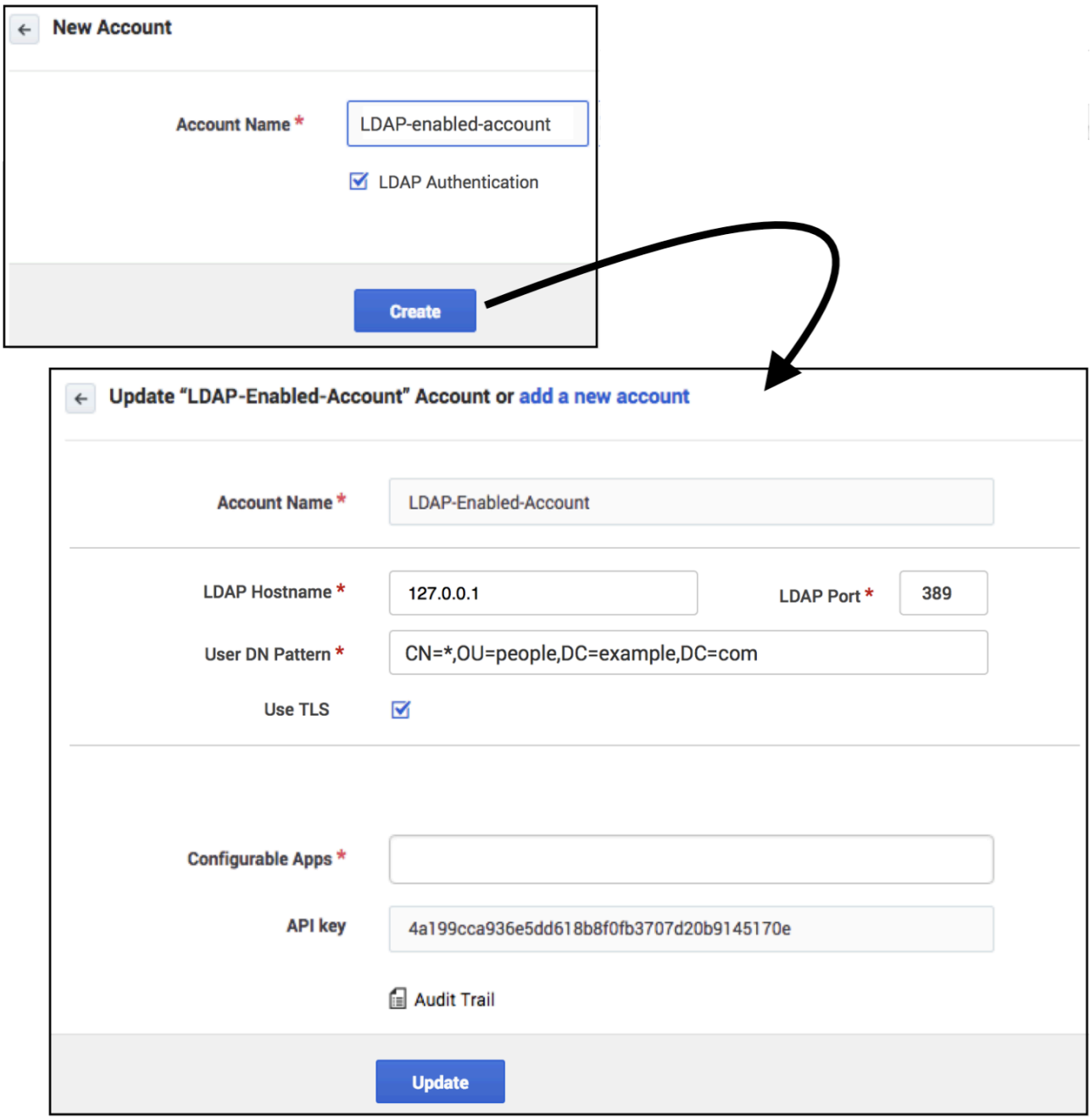
String	Attribute type
DC	Domain Component
CN	Common Name
OU	Organizational Unit Name
O	Organization Name
UID	User ID

The same distinguished name pattern must be configured on the client's LDAP server. Authorized Predictive Routing users should be described at that path.

> **Important**
>
> To configure users who should be enabled for LDAP authentication, or to move a user from one account to another, see the LDAP-specific steps in the Account: User Management topic.

- A single user cannot log in with both LDAP authentication and a standard Predictive Routing username/password combination.
- Only a user with the STAFF role can change a user from one form of authentication to the other.
- If necessary, you can associate STAFF users with multiple LDAP-enabled Predictive Routing accounts. Such users will encounter a two-step login process, during which they select the account they want to log into.

Create an LDAP-enabled account



Use the following steps to create the account:

1. Click the **Settings** > **Accounts** tab.
2. Click **Add Account**.

3. Provide an account name.
4. Select the **LDAP Authentication** check box.
5. Provide the fully qualified hostname or IP address for your LDAP server.
6. Provide the port for your LDAP server. The default value, 389, is used if you do not specify a port number.
7. Provide the User DN Pattern, as explained above.
8. To enable Secure LDAP (LDAPS), select the **Use TLS** check box.
9. Click **Update**.

The new account appears in the **Accounts** list.

The Password Policies Tab

STAFF users can use this tab to specify how GPR handles user passwords and login attempts. It contains the following fields:

Field name	Default Value	Valid Values
Password expires after [x] days	90	1 - 90 days
Password cannot be changed until after [x] hours	24	1 - 72 hours
Show password expiration reminder [x] days before password expiry	7	1 - 14 days
Password cannot be the same as the [x] previous passwords	5	5 - 15 previous passwords
Account is locked after [x] invalid login attempts	6	3 - 6 invalid login attempts
Unlock user account after [x] minutes	60	30 - 300 minutes
Block inactive user after [x] days	45	1 - 90 days
Message to show blocked users:	This user account was blocked due to too many failed login attempts. Please try again later.	Leave the default, edit the message to be displayed to blocked users, or leave the text box empty to omit a notification message.

Using Audit Trails

To view audit trail specifics, click the **Show** icon on the **Accounts Settings** tab. GPR provides an audit record for the following activities:

- Actions (see the list below) carried out by any user who has access to the current account.
- Any time someone accesses the audit trail.
- Login attempts.
- Reset of audit login.
- Creation or deletion of objects in the system.

For each activity the following information is stored:

- The user ID of the person who performed the action.
- The date and time of the action.
- The result of the operation (failure, success).
- What interface was used to initiate the action (the GPR application or the API).
- The GPR components affected by the action.

GPR stores the specified data for the following objects:

- **Datasets**
  - create
  - sync
  - accept/decline sync
  - append
  - delete
- **Agent Profiles and Customer Profiles**
  - create (but only if created using the Predictive Routing application; profiles created using the API are not added to the audit trail)
  - sync
  - accept/decline sync
  - append
- **Users/Accounts**
  - create/update
  - delete
- **Predictors**
  - create
  - update
  - generate training data
  - purge training data
  - copy

- **Models**
  - create
  - delete
  - train
  - activate
  - suspend
  - import

User Profile: Resetting Passwords

> **Important**
> The functionality described in this topic is provided for on-premises customers, who install, configure, and maintain their own GPR deployment. If you are accessing GPR in a Cloud instance, you can disregard this password change functionality.

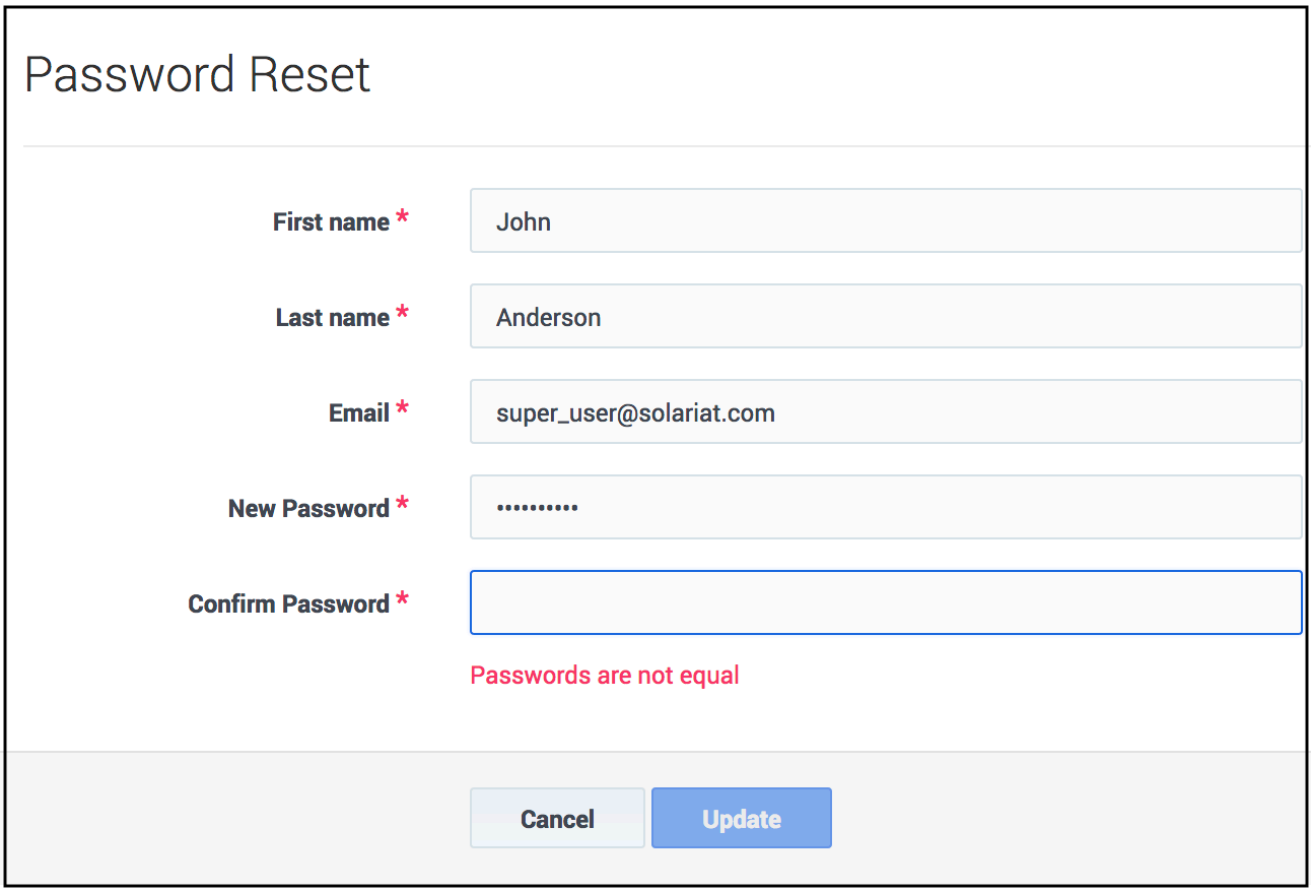
The **Password** tab enables you to change your password.

- You can also reset an existing password from the User table.

To open the configuration menu, click the **Settings** gear icon, located on the right side of the top menu bar:  .

> **Important**
> If you are a STAFF user who needs to configure password policy settings, see The Password Policies Tab.

Resetting your password



To reset your password:

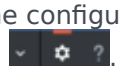
1. Click the **User Profile** > **Password** tab on the left-hand navigation bar.
2. Enter your new password.
3. Re-enter your new password to make sure you entered it correctly.
4. Click **Update** to accept it.

Account: User Management

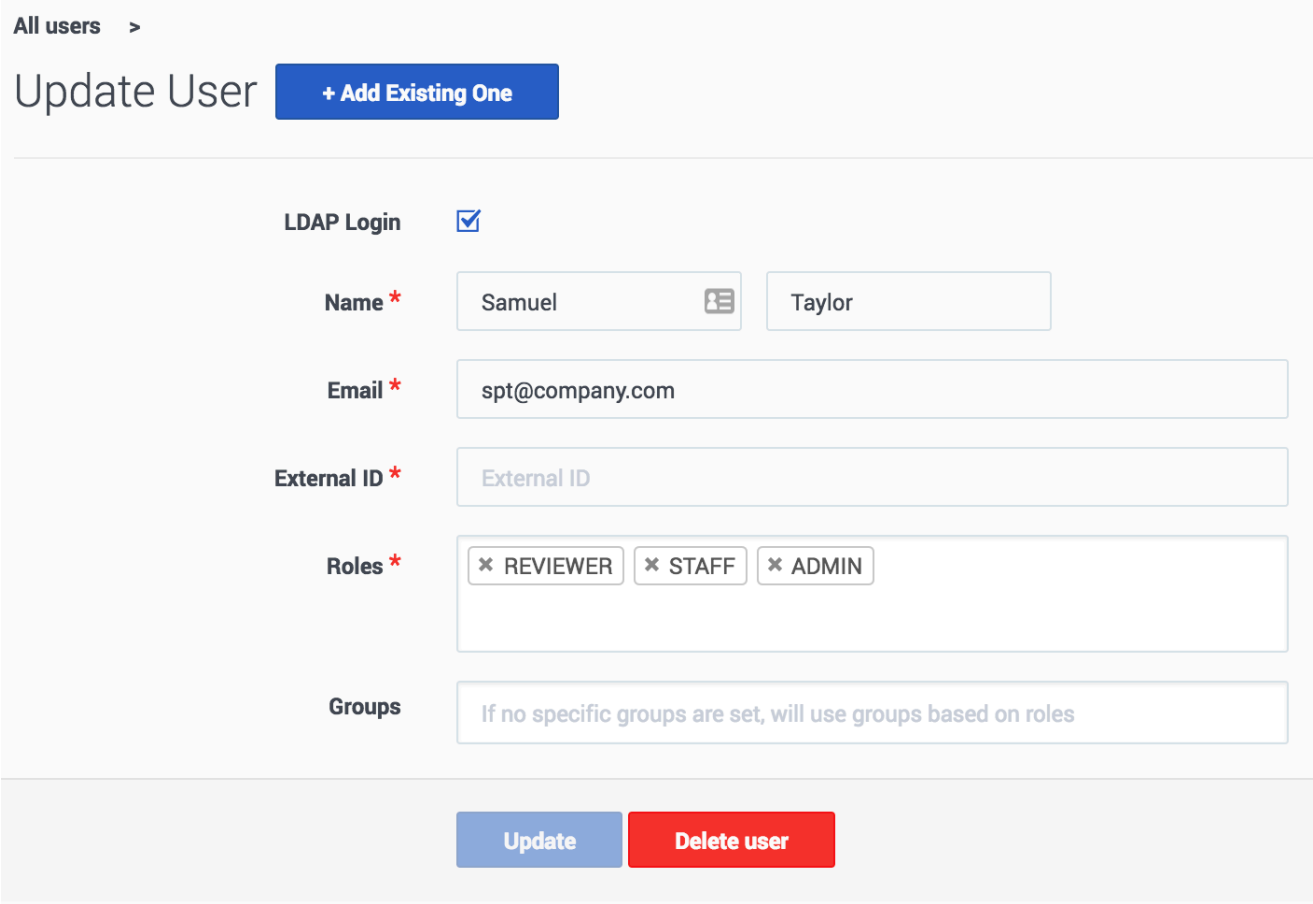
> **Important**
> The functionality described in this topic is provided for on-premises customers, who install, configure, and maintain their own GPR deployment. If you are accessing GPR in a Cloud instance, you can disregard the User Management functionality.

The User Management tab enables users with STAFF or ADMIN privileges to assign users to an account. Users are located by their email address.

> **Important**
> Only STAFF users can belong to more than one account.

To open the configuration menu, click the **Settings** gear icon, located on the right side of the top menu bar:  .

Creating or updating users



To manage users for an account:

1. Click the **Account** > **User Management** tab on the left-hand navigation bar.
2. Select an account from the **Current Account** drop-down menu.
3. Click **New User** to add someone or click an existing user's email address to update their information.
4. When adding a user, either set up an entirely new user or click **Add existing one** to locate an already-configured Staff user by their email address. Only Staff users can belong to more than one account and might already have an email address in the system.
5. If the account to which you are adding a user has LDAP enabled, select the **LDAP Login** check box to use LDAP authentication. If you do *not* select this check box, Genesys Predictive Routing (GPR) uses the stored password for authentication. This check box appears only when the active account has LDAP enabled.

> ### Tip

> You cannot use both LDAP authentication and a standard GPR user name/password combination. Only a user with the STAFF role can change a user from one form of authentication to the other.

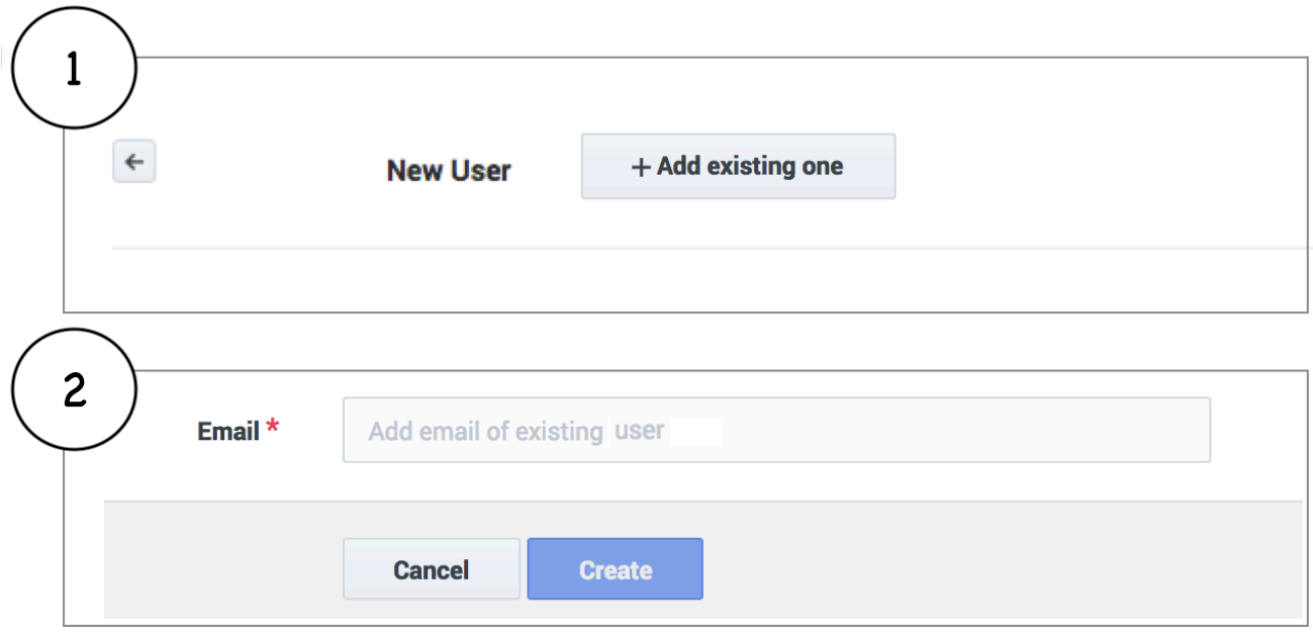
6. Enter the user name, email, and External ID (for LDAP accounts only), and select the appropriate roles.
   - The External ID is one of the following:
     - The user name, if you are using a standard user name-password login.
     - For LDAP authentication, the user CN (common name), which is set as the User DN pattern in the account settings.
   - If you set up a standard user name/password login, GPR sends an email enabling that new account member to change their password.

     To add a role, click in the **Role** text box and select the desired role or roles. If you have already assigned one or more roles, click *below* the assigned roles to add more. Clicking to the right of an assigned role does not enable the selectable list of roles.
7. Click **Create** to finish setting up the user.

Existing users appear in the **Users** table. To update an existing user:

- Click the email address.

Moving a user between accounts



A user with the STAFF role can move a user to a different account, or else delete the first account and add the user to a different one.

> **Important**
> Users (with the exception of STAFF) cannot be associated with more than one account.

To delete an account:

1. Click the **Account** > **User Management** tab on the left-hand navigation bar.
2. Select an account from the **Current Account** drop-down menu.
3. Click the trash can icon in the User Management table row for the user you want to remove.

To move a user, follow the procedure below:

1. Click the **Account** > **User Management** tab on the left-hand navigation bar.
2. Select an account from the **Current Account** drop-down menu.
3. Click **New User**.
4. When the **New User** dialog box opens, click **Add existing one**.
5. Enter the email address of the user you want to move to the current account.
6. Click **Update** to confirm the change. The user is moved to the new account.

> **Important**
> After moving to a different account, the user's previous API key is invalidated. The user must get the API key for the account user now belongs to.

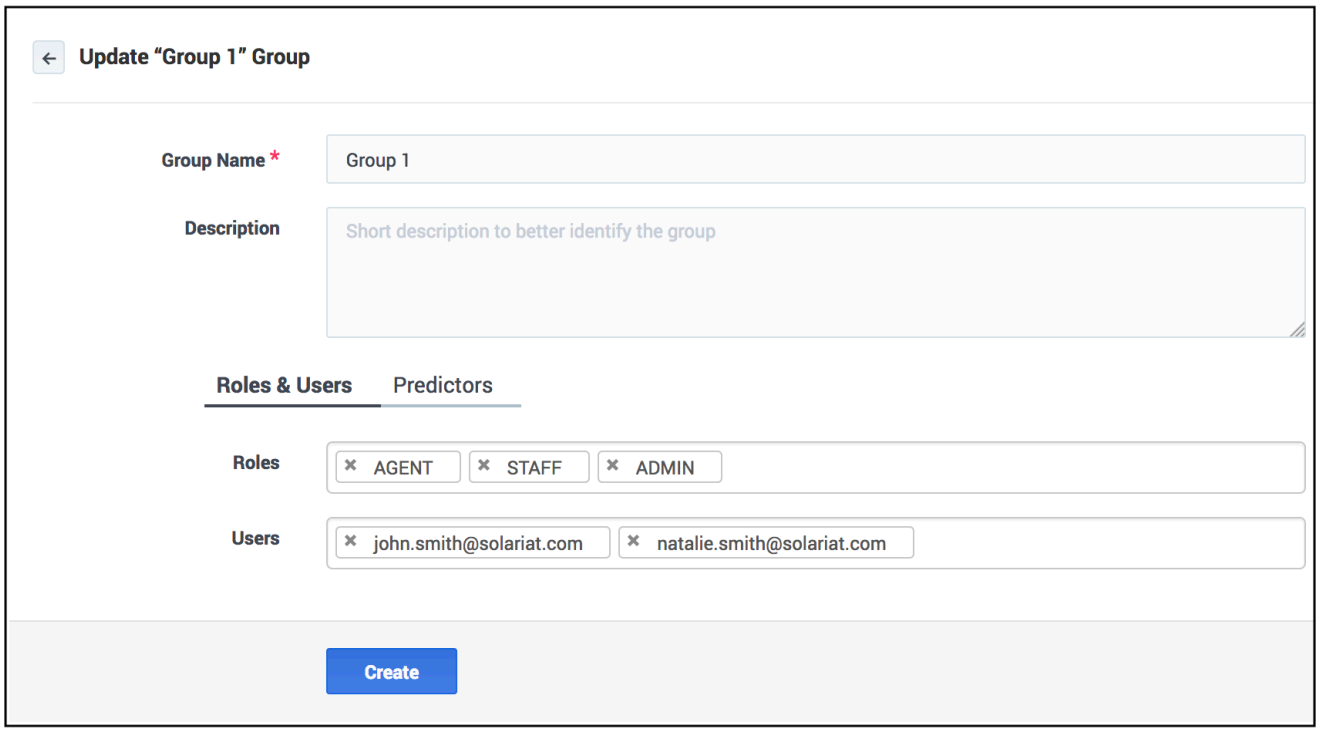
Account: Configuring Groups

> **Important**
> The functionality described in this topic is provided for on-premises customers, who install, configure, and maintain their own GPR deployment. If you are accessing GPR in a Cloud instance, you can disregard the Groups functionality.

Groups enable you to create sets of users who are have specific roles and are assigned to use specific predictors.

To open the configuration menu, click the **Settings** gear icon, located on the right side of the top menu bar:  .

Creating a new group



To create a new group or edit an existing one:

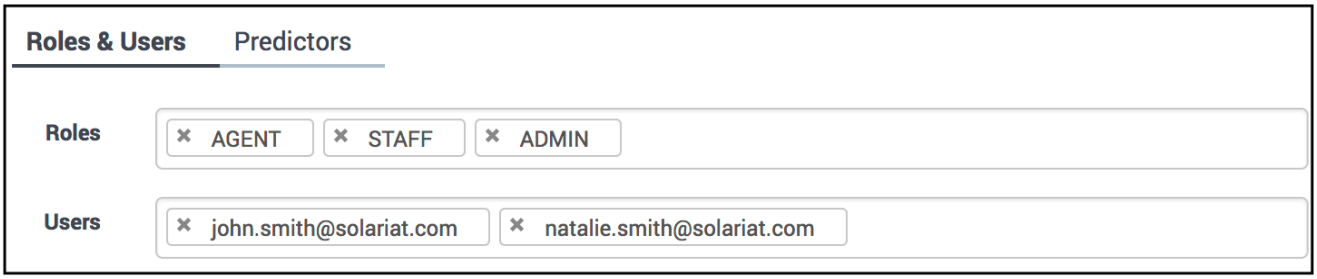
1. Click the **Account** > **Groups** tab on the left-hand navigation bar.

2. Click **Add Group** or, to update an existing group, click its name.
3. Add or edit the group name.
4. (Optional) enter a description for the group.

Groups are assigned one or more roles, users, and predictors.

- *Roles* control which objects or are available for the group to use.
- *Users* are the people who are assigned to the group. Users must be set up in **User Management** before they appear in the drop-down selector.
- *Predictors* are all predictors created for the current account.

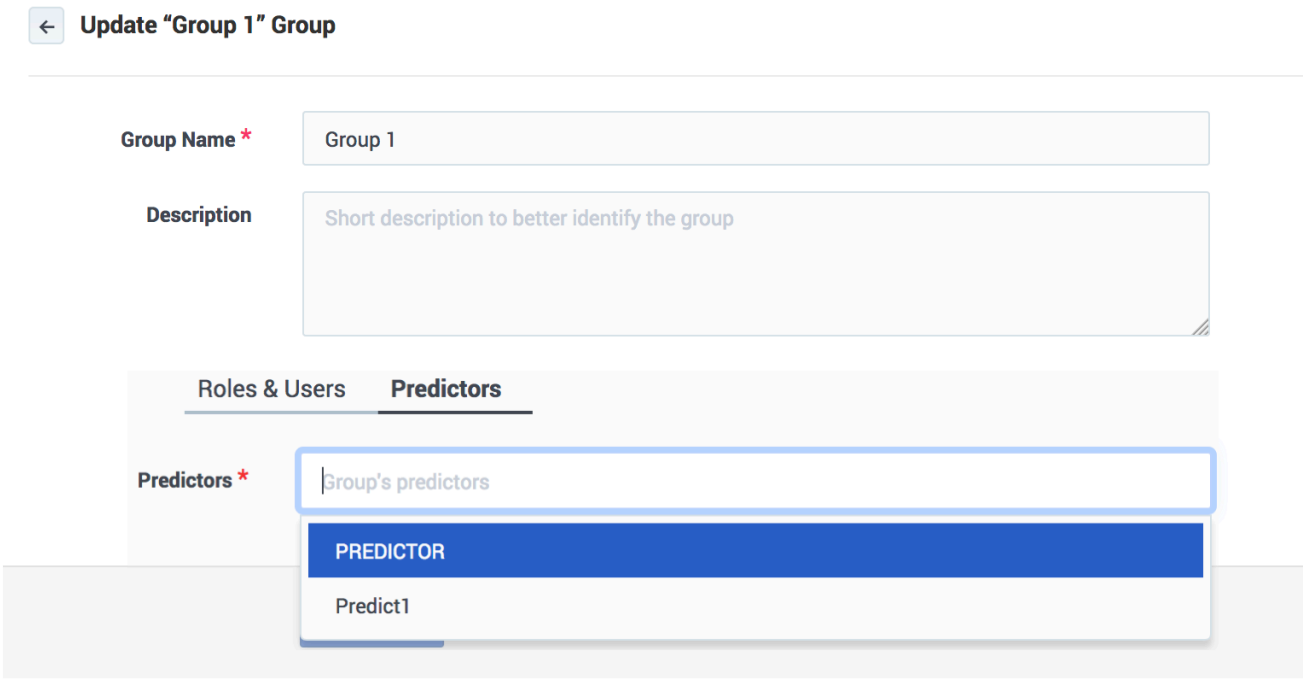
Adding roles and users



To add roles and users to your group:

1. Click the **Roles and Users** tab (open first by default).
2. By default, all available roles are listed. To remove a role, click the *x* in box for that role.
3. To add users, click in the **Users** text box. A drop-down selector shows the users who belong to the current account. Select those you want to add.
4. To remove a user, click the x in the box for that user.
5. To add a previously-removed role or user, click in the associated text-box and a drop-down list of all non-selected items appears.

Adding predictors



To add predictors to your group:

1. Click the **Predictors** tab.
2. Click in the **Predictors** text box. A drop-down selector shows the predictors configured for the current account. Select those you want to add.
3. To remove a predictor, click the **x** in its box.
4. To add a previously-removed predictor, click in the text-box and a drop-down list of all non-selected predictors appears.

Uploading Data: Agent Profiles, Customer Profiles, and Datasets

Use the relevant tabs on the **Settings** menu to upload and format the various types of data you want to score your agents. You use the data uploaded here to construct Predictors and Models.

To open the menu where these objects are managed, click the **Settings** gear icon, located on the right side of the top menu bar:  .

- Configuring Agent Profiles
- Configuring Customer Profiles
- Configuring Datasets

Configuring Agent Profiles

The Agent Profile schema contains all the relevant information about agents and their performance. Predictive Routing (GPR) uses this schema to assess agent performance when handling each virtual queue and ranking the agents based on regularly updated skills and performance results, which are drawn from Stat Server and Configuration Server/Configuration Server Proxy.

> **Important**
>
> This topic explains how to create an Agent Profile using the GPR web application. For the methods and endpoints used to create and update an Agent Profile using the API, see the *Predictive Routing API Reference*. (Requires a password for access. Please contact your Genesys representative if you need to view this document.)

Use the **Agent Profile** tab on the **Settings** navigation bar to import and configure agent-related data that you can then use to create predictors. To open the Settings navigation bar, click the gear icon, located on the right side of the top menu bar:  .

This topic includes the following sections:

How to Create an Agent Profile Schema

You can create your Agent Profile schema using the GPR application or the GPR API. You also have the following choice of methods:

- Enable the **auto-schema-discovery** configuration option and then run Agent State Connector (ASC). ASC creates a schema containing only the mandatory fields.
- Upload a fully-prepared schema in CSV format. You must include the mandatory fields listed below, but uploading your own file enables you to include additional data and data from non-Genesys sources. This method also enables you to upload data in the form of dictionaries, when this is appropriate. For example, you might add a dictionary called VQ_Performance, in which you capture the queues the agent has worked on and the performance result (score) for each.

Important

- If you have dictionary-type fields that use comma separators, use tab separators for your CSV file.
- Currently only one-dimensional dictionaries are supported, with up to 200 key-value pairs where the key is a string and the value is int, float, or Boolean.
- When you are creating the CSV data file for the Agent Profile schema, do not include the following in the column name for the field to be used as the Agent ID: `ID`, `_id`, or any variant of these that changes only the capitalization. Using these strings in the column name results in an error when you try to upload your data.
- If you are using skill names that include a dot (period) or a space in them, use double quotation mark characters to enclose the skill name. For example, a skill named *fluent spanish.8* should be entered as "fluent spanish.8".

With either of these options, you can append data after import, which enables you to make updates.

Procedure: Create your Agent Profile schema

Purpose: To establish a schema where all data falls into a set structure; for example, all data within a certain column must have the same data type. GPR analyzes your data, recognizes the structure, and ensures that all data you upload later complies with the established schema.

Prerequisites

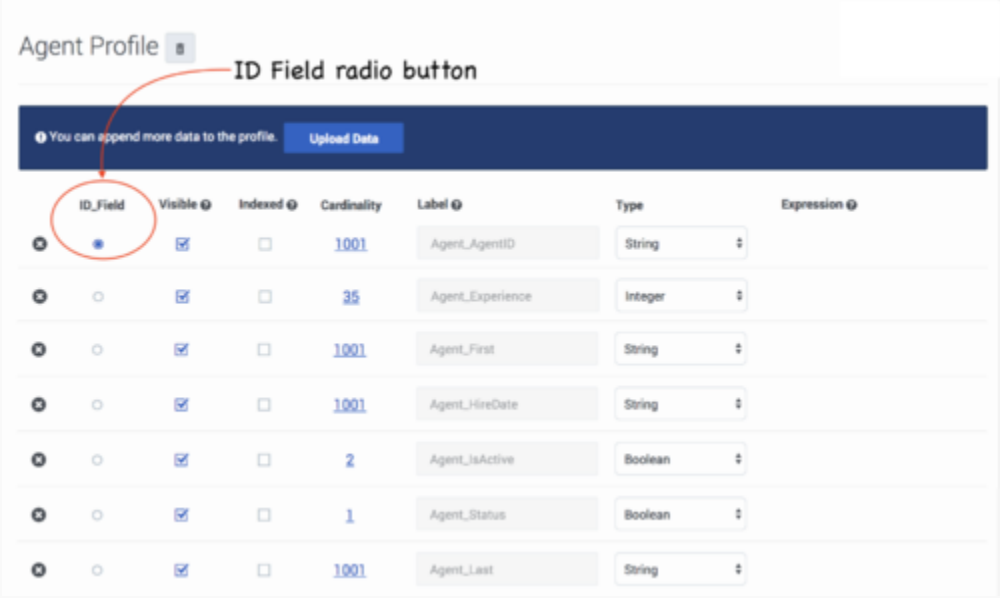
- Install Agent State Connector and connect it to Configuration Server/Configuration Server Proxy.
- Create a default agent profile consisting of two columns, employeeId and loginStatus, and several rows containing placeholder values for each column that can establish the correct data type for the column.

Steps

Click the **Agent Profile** tab, then follow the steps to create an Agent Profile schema:

1. Click **Create Schema**. The **Create Profile Schema** dialog box opens.
2. Click **Select file**. Navigate to your small default CSV file and select it.
   Your CSV file can be zipped. You do not need to unzip it for uploading.
3. Select the separator type for your CSV file. You can choose either TAB or COMMA.
4. Select the encoding type. By default, this is `utf-8`.

5. Click **Create**. The uploaded data appears on the Agent Profile window.
6. Set the **ID Field**. This field must have a unique value in each row that identifies the agent whose data appears in it.
   The data type must be `String`. If the data type is not set correctly when the data is uploaded, change the data type by clicking in the **Type** column and selecting `String` from the drop-down list.
7. Scroll to the bottom of the 'window and click **Save Schema**. A `Success. Schema updated successfully` status message appears in the upper right side of the **Agent Profile** window.
8. Click **Sync Schema**.
9. Scroll to the top of the list and click **Accept Schema**. A `Success. Schema accepted successfully` status message appears.



This procedure has:

- Established the schema structure for the required columns.
- Established the column containing the **ID Field** parameter.

Next Step: Upload the remainder of your data. You can do this in one of two ways:

- Automatically, by having ASC load data from Configuration Server/Proxy.
- Manually, by uploading a CSV file you have prepared.

Procedure: Upload your Agent Profile data, Method 1 -- Have ASC automatically populate your schema

Purpose: Upload your Agent Profile data to the established schema.

Prerequisites

- You are using an on-premises environment.
- ASC is installed and connected to Configuration Server/Configuration Server Proxy.
- You have created a schema, as described in the procedure above.

Steps

1. Set the **auto-schema-discovery** option to `true`.
2. Run ASC.
   The agent data contained in your Configuration Database is uploaded to the Agent Profile schema. When the data upload is complete, the **Agent Profile** list displays all of the fields discovered in your data, along with their data types and cardinality values.
3. Adjust any data types in the **Type** column that were interpreted incorrectly.
4. Adjust the **Visibility** toggle, if desired, to hide fields you do not need to see on the **Agent Details** tab. Visibility settings are saved automatically. You do not need to save the schema when updating visibility.
   NOTE: The **Visibility** toggle enables you to configure which *facets*, or filters, are available for selection on the **Agent Details** tab (accessed from the top navigation bar). High-cardinality facets are always hidden, but you can select which low-cardinality facets appear. (Low cardinality means that there are 20 or fewer individual values represented for that field in the schema.)
5. Adjust the **Index** toggle to have key fields indexed. Indexing makes lookups faster for that field. The field you specify as the ID_FIELD is indexed by default.

> **Important**
>
> - An Agent Profile dataset should have no more than 64 indexed fields.
> - Indexes must be created on individual skill-name fields, not a skills dictionary field (if you are using one).

1. Delete any fields you do not want included by clicking the **X** to the left of the field name.
   Because the Agent Profile is created by default from the Configuration Database, fields you delete are re-created next time ASC refreshes data.

2. Click **Save Schema.**

This procedure has:

- Completed the data upload to GPR.

Next Steps:

- (Optional) Add new fields to the Agent Profile schema.
- Synchronize and accept the schema.

Procedure: Upload your Agent Profile data, Method 2 -- From your own CSV file

Purpose: Upload your Agent Profile data to the established schema.

Prerequisites

- You have created a schema, as described in the procedure above.
- You have created a CSV file containing all your Agent Profile data in the accepted schema structure.

Steps

Click the **Agent Profile** tab, then follow the steps to upload your data:

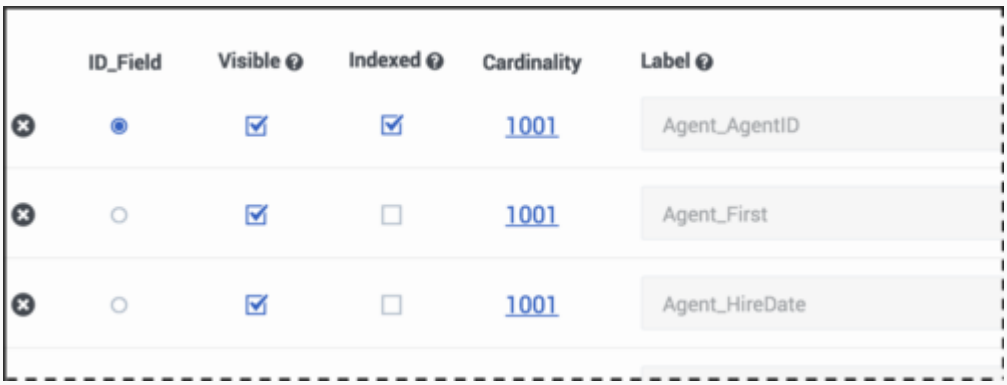
1. Click **Upload Data**. The **Create Profile Schema** dialog box opens.
2. Click **Select File**. Navigate to your complete CSV file and select it.

Your CSV file can be zipped. You do not need to unzip it for uploading.

3. Select the separator type for your CSV file. You can choose either TAB or COMMA.
4. Click **Create**. The uploaded data appears on the Agent Profile window.
5. Adjust any data types in the **Type** column that were interpreted incorrectly.
6. Adjust the **Visibility** toggle, if desired, to hide fields you do not need to see on the **Agent Details** tab. Visibility settings are saved automatically. You do not need to save the schema when updating visibility.
   NOTE: The **Visibility** toggle simply enables you to configure the display to make it easier to see the fields you are most interested in. Hidden fields continue to be processed.
7. Adjust the **Index** toggle to have key fields indexed. Indexing makes lookups faster for that field. The field you specify as the ID_FIELD is indexed by default.

> **Important**
>
> - An Agent Profile dataset should have no more than 64 indexed fields.
> - Indexes must be created on individual skill-name fields, not a skills dictionary field (if you are using one).

1. Delete any fields you do not want included by clicking the **X** to the left of the field name.
2. Scroll to the bottom of the list of fields and click **Save Schema**. A `Success. Schema updated successfully` status message appears in the upper right side of the **Schema** tab.



This procedure has:

- Completed the data upload to GPR.

Next Steps:

- (Optional) Add new fields to the Agent Profile schema.

- Synchronize and accept the schema.

Procedure: (Optional) Add new fields to the Agent Profile schema

Steps

1. Click **Add New Field**.
2. Add any number of discovered fields to the Agent Profile schema from the drop-down menu.
3. (Optional) Type a new field name and press **Enter** to add a custom field. The custom field value is an expression constructed from arithmetic operations, Python 3 built-in functions, and discovered fields.
   - To access the built-in functions, press the **SHIFT+@** shortcut.
4. Click **Save Schema.**

Procedure: Synchronize and accept the schema

Purpose: You must synchronize the schema before you can use it.

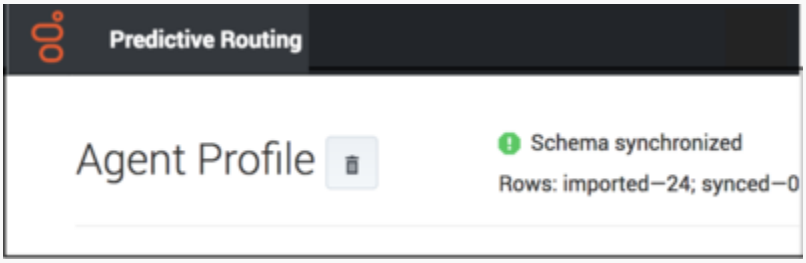
Prerequisites

You must already have created your schema, uploaded your data, and saved the schema.

Steps

1. Click **Sync Schema**.
2. Scroll to the top of the **Schema** tab and click **Accept Schema**. A `Success. Schema accepted successfully` status message appears.
   When the schema has been accepted, the `Schema out of synchronization` message changes to `Schema synchronized` and the associated icon turns green.

When data upload is completed, the **Agent Profile list** displays the fields discovered in your data, along with their data types and cardinality values.



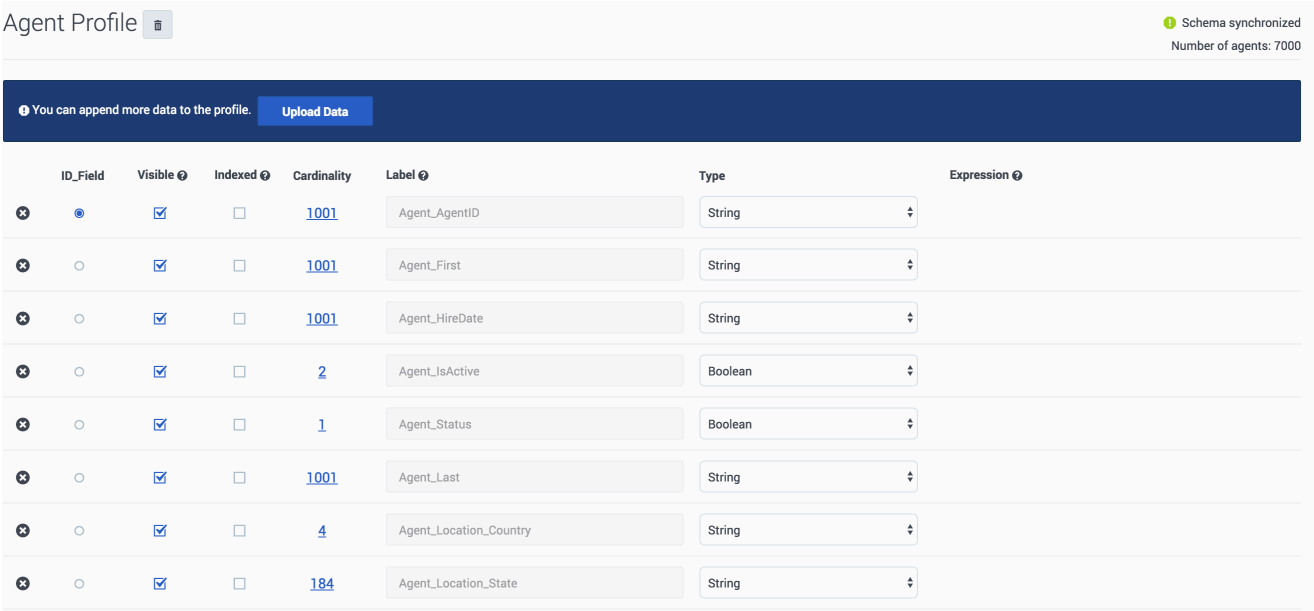
The List of Agent Profile Fields

When you navigate to the **Settings > Agent Profile** page, and you have imported an Agent Profile schema, your data is displayed in a table. Each row presents a schema column.

- The columns in the Agent Profile list are the following:
  - ID Field - The field containing the employeeID value.
  - Visible - Show which fields are visible on the **Agent Details** tab.
  - Indexed - Shows which fields are indexed, which makes lookups faster for that field. The field you specified as the ID_FIELD is indexed by default.
  - Cardinality - The number of unique values that appear in this field. If there are more than 1000, the number appears as 1001. Click this number to see the actual values that appear in this field.
  - Label - The name of the field as specified in the Agent Profile schema.
  - Type - The data type for the field.
  - Expression - If configured, an arithmetical operation to be performed on the value of this field.
- Click **Upload** to append more data to your Agent Profile schema.

> **Important**
> Your appended data must have the same schema structure as the existing data. You can add fields and values, but you cannot change the existing schema. If you need to change the structure of your schema, delete the existing schema and upload your corrected data as a new Agent Profile schema.

- To delete your Agent Profile schema, click the trash can icon next to the **Agent Profile** page title.



API Users: Special Note on Understanding Cardinality

- When you upload additional data using the API, cardinalities are automatically updated after every 1,000 new rows are uploaded.
- To view Agent Profile data you have uploaded using the API, including cardinalities, re-load your browser page.

Fields Populated Automatically By Agent State Connector

Field Name	Data Type	Source	Indexed	Comments
employeeId	string	Configuration Server: Person object, **General** tab	no	
firstName	string	Configuration Server: Person object, **General** tab	no	
lastName	string	Configuration Server: Person object, **General** tab	no	
userName	string	Configuration Server: Person object, **General**	no	

Field Name	Data Type	Source	Indexed	Comments
		tab		
tenantName	string	Configuration Server: `Person` object, **General** tab	no	
loginTimestamp	string	Stat Server: CurrentAgentState statistic	yes	
state	string	Configuration Server: Person object, **General** tab	no	Indicates whether the **State Enabled** check box is selected.
loginId	string	Stat Server: CurrentAgentState statistic	yes	
dbID	integer	Configuration Server	yes	The DBID of the Person object.
loginStatus	integer	Stat Server: CurrentAgentState statistic	yes	
tenantDbID	integer	Configuration Server	no	The DBID of the Tenant specified in the tenantName field.
groupNames	list	Configuration Server	yes	All groups are assigned to the agent and available under the groupNames parameter in the Agent Profile schema.
loginCodes	list	Configuration Server: Person object, **Agent Info** tab	yes	
attached_data	dict	Configuration Server: Person object, **Annex** tab	no	
skills	dict	Configuration Server: Person object, **Agent Info** tab	yes	Automatically adds each skill into the schema as separate field with the integer data type.
connection_ids	dict	Stat Server: CurrentAgentState statistic	no	

Supported Encodings

By default, GPR handles data using UTF-8 encoding. However, starting with release 9.0.014.00, GPR supports importing of data that uses certain legacy encodings. Appendix: Supported Encodings lists those encodings currently supported. This list is updated as new encodings are verified. If you use an encoding type that is not listed, contact your Genesys representative for assistance.

> **Important**
> All responses and returned data is provided in UTF-8 encoding.

Unsupported Characters in Agent and Customer Profiles and Datasets

The following characters are not supported for column names in Datasets or Agent and Customer Profile schemas. If GPR encounters these characters in a CSV file, it reads them as column delimiters and parses the data accordingly.

- | (the pipe character)
- \t (the TAB character)
- , (the comma)

Workaround: To use these characters in column names, add double quotation marks (" ") around the entire affected column name, except in the following situations:

- If you have a comma-delimited CSV file, add double quotations marks around commas within column names; you do *not* need quotations for the \t (TAB) character.
- If you have a TAB-delimited CSV file, add double quotations marks around TAB characters within column names; you do *not* need quotations for the , (comma) character.
- You must *always* use double quotations for the | (pipe) character.

Unsupported characters in releases prior to 9.0.014.00

In releases prior to 9.0.014.00, certain characters in column names are ignored, are unsupported, or cause an upload to fail, as explained in the following points:

- Columns with the following symbols in their column names are not added to Agent Profiles or Customer Profiles:
  `*, !, %, ^, (, ), ', &, /, â, è, ü, ó, â, ï`
- The following symbols in column names are ignored, and the column is added with the symbol dropped out as though it had not been entered:

`[Space], -, <`

- Non-ASCII characters are not supported. How they are handled differs depending on what data you are uploading:
  - In Agent Profiles and Customer Profiles, columns with non-ASCII characters in the column name are not added.
  - In Datasets, when a column name contains a mix of ASCII and non-ASCII characters, GPR removes the non-ASCII characters from the column name as though they had not been entered and correctly uploads all column values.
  - In Datasets, when a column name contains only non-ASCII characters, the column name is entirely omitted. All the column values are preserved, but you cannot modify or save the schema. In this scenario, GPR generates the following error message: `An unhandled exception has occurred: KeyError('name')`.

Logs for Unsupported Characters

The following Agent State Connector log messages record issues with unsupported characters:

- `<datetime> [47] ERROR <BOTTLE> schema_based.py:63 Invalid expression while parsing: <fieldname> = None`
- `<datetime> [47] ERROR <BOTTLE> agents.py:172 Fields set([u'<fieldname>']) were ignored because names were invalid.`

Skills in Agent Profile Data

The Genesys configuration layer allows Skills and Groups to have the same name. There should be no impact on either Agent State Connector or scoring due to the same group name/skill name.

- Groups are stored in the groupNames list in the Agent Profile.
- Skills are stored in a skills dictionary and copied to the top level in the Agent Profile.

As a result, there is no collision between the names.

For example, an Agent can be assigned to the Group "Complaints" and at the same time be assigned the Skill "Complaints" with a skill level of 2. This does not negatively affect GPR performance.

When creating/updating an Agent Profile in AICS, ASC copies the keys and values listed in the skills dictionary to the top level. This facilitates the selection of agents when AICS processes scoring requests from the routing strategy. The skill expressions used in the strategy and provided in the **action_filters** field of the scoring requests can be used as-is for agent selection.

Configuring Customer Profiles

Use the **Customer Profile** tab to import and configure customer-related data that you can then use to create Predictors. You must gather the desired data into a CSV file. Make sure the data is formatted with a consistent schema. After importing, you can append data, which enables you to make updates.

> **Important**
> When you are creating the CSV data file for the Customer Profile schema, do not include the following in the column name for the field to be used as the Customer ID: `ID`, `_id`, or any variant of these that changes only the capitalization. Using these strings in the column name results in an error when you try to upload your data.

- To open the configuration menu, click the **Settings** gear icon, located on the right side of the top menu bar:  .
- See Supported Encodings and Unsupported Characters for information on how to configure your data.

> **Important**
> To view schema updates, such as appended data, reload the page.

Procedure: Create your Customer Profile schema

Purpose: To establish a schema where all data falls into a set structure; for example, all data within a certain column must have the same data type. GPR analyzes your data, recognizes the structure, and ensures that all data you upload later complies with the established schema.

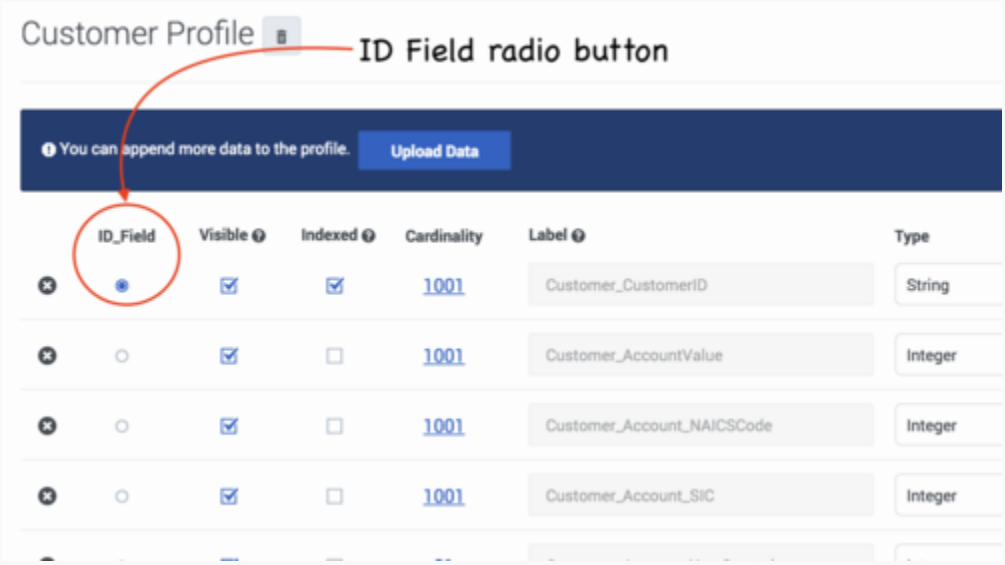
Prerequisites

- A small starter customer profile consisting of at least the customer_ID column and several rows containing placeholder values for each column that can establish the correct data type for that column.

Steps

Click the **Customer Profile** tab, then follow the steps to create a Customer Profile schema:

1. Click **Create Schema**. The **Create Profile Schema** dialog box opens.
2. Click **Select file**. Navigate to your small starter CSV file and select it.
   Your CSV file can be zipped. You do not need to unzip it for uploading.
3. Select the separator type for your CSV file. You can choose either TAB or COMMA.
4. Select the encoding type. By default, this is `utf-8`.
5. Click **Create**. The uploaded data appears on the Customer Profile window.
6. Set the **ID Field**. This field must have a unique value in each row that identifies the customer whose data appears in it.
   The data type must be `String`. If the data type is not set correctly when the data is uploaded, change the data type by clicking in the **Type** column and selecting `String` from the drop-down list.
7. Scroll to the bottom of the window and click **Save Schema**. A `Success. Schema updated successfully` status message appears in the upper right side of the **Customer Profile** window.
8. Click **Sync Schema**.
9. Scroll to the top of the list of fields and click **Accept Schema**. A `Success. Schema accepted successfully` status message appears.



This procedure has:

- Established the schema structure for the required columns.
- Established the column containing the **ID Field** parameter.

Next Step: Upload the remainder of your data.

Procedure: Upload your Customer Profile data

Purpose: Upload your Customer Profile data to the established schema.

Prerequisites

- You have created a schema, as described in the procedure above.
- You have created a CSV file containing all your Customer Profile data in the accepted schema structure.

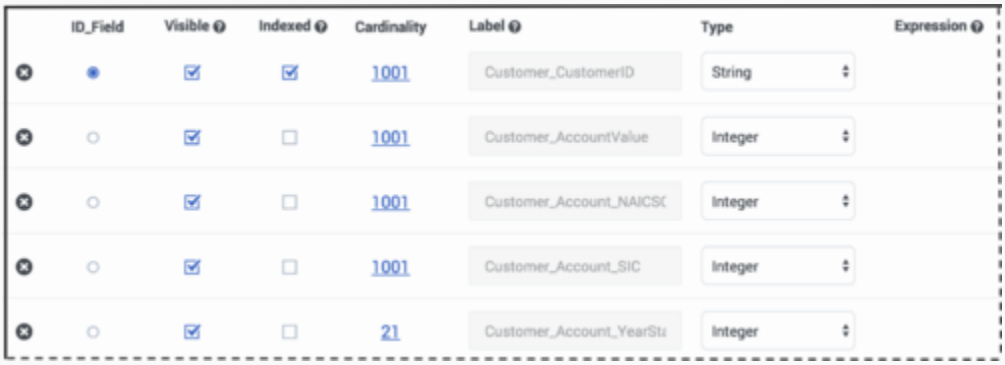
Steps

Click the **Customer Profile** tab, then follow the steps to upload your data:

1. Click **Upload Data**. The **Create Profile Schema** dialog box opens.
2. Click **Select File**. Navigate to your complete CSV file and select it.
   Your CSV file can be zipped. You do not need to unzip it for uploading.
3. Select the separator type for your CSV file. You can choose either TAB or COMMA.
4. Click **Create**. The uploaded data appears on the Customer Profile window.
5. Adjust any data types in the **Type** column that were interpreted incorrectly.
6. Adjust the **Visibility** toggle, if desired, to hide fields you do not need to see on the **Customer Details** tab.
   NOTE: The **Visibility** toggle simply enables you to configure the display to make it easier to see the fields you are most interested in. Hidden fields continue to be processed. Visibility settings are saved automatically. You do not need to save the schema when updating visibility.
7. Adjust the **Index** toggle to have key fields indexed. Indexing makes lookups faster for that field. The field you specify as the ID_FIELD is indexed by default.

   > **Important**
   > A Customer Profile dataset should have no more than 64 indexed fields.

8. Delete any fields you do not want included by clicking the **X** to the left of the field name.
9. Scroll to the bottom of the list of fields and click **Save Schema**. A `Success. Schema updated successfully` status message appears in the upper right side of the **Schema** tab.



This procedure has:

- Completed the data upload to GPR.

Next Steps:

- (Optional) Add new fields to the Customer Profile schema.
- Synchronize and accept the schema.

Procedure: (Optional) Add new fields to the Customer Profile schema

Steps

1. Click **Add New Field**.
2. Add any number of discovered fields to the Customer Profile schema from the drop-down menu.
3. (Optional) Type a new field name and press **Enter** to add a custom field. The custom field value is an expression constructed from arithmetic operations, Python 3 built-in functions, and discovered fields.
   - To access the built-in functions, press the **SHIFT+@** shortcut.
4. Click **Save Schema.**

Procedure: Synchronize and accept the schema

Purpose: You must synchronize the schema before you can use it.

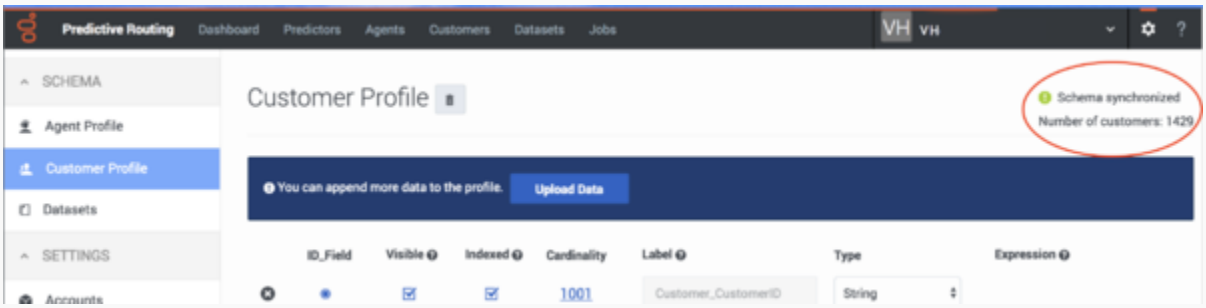
Prerequisites

You must already have created your schema, uploaded your data, and saved the schema.

Steps

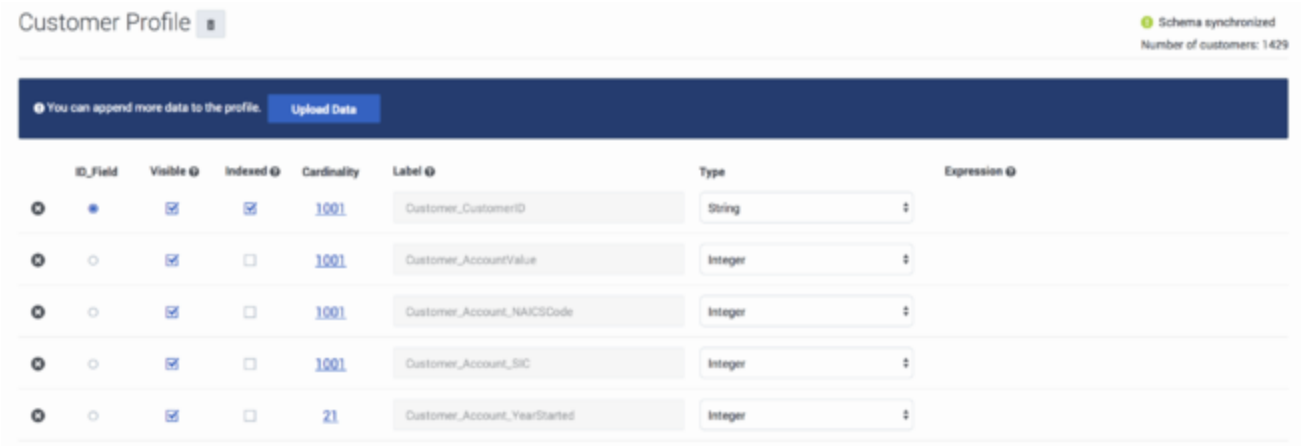
1. Click **Sync Schema**.
2. Scroll to the top of the **Schema** tab and click **Accept Schema**. A `Success. Schema accepted successfully` status message appears.
   When the schema has been accepted, the `Schema out of synchronization` message changes to `Schema synchronized` and the associated icon turns green.

   When data upload is completed, the **Customer Profile list** displays the fields discovered in your data, along with their data types and cardinality values.



The List of Customer Profile Fields

When you navigate to the **Settings > Customer Profile** page, and you have imported a Customer Profile schema, your data is displayed in a table. Each row presents a schema column.



- The columns in the Customer Profile list are the following:
  - ID Field - The field containing the employeeID value.
  - Visible - Show which fields are visible on the **Customer Details** tab.
  - Indexed - Shows which fields are indexed, which makes lookups faster for that field. The field you specified as the ID_FIELD is indexed by default.
  - Cardinality - The number of unique values that appear in this field. If there are more than 1000, the number appears as 1001. Click this number to see the actual values that appear in this field.
  - Label - The name of the field as specified in the Customer Profile schema.
  - Type - The data type for the field.
  - Expression - If configured, an arithmetical operation to be performed on the value of this field.
- Click **Upload** to append more data to your Customer Profile schema.

> **Important**
>
> Your appended data must have the same schema structure as the existing data. You can add fields and values, but you cannot change the existing schema. If you need to change the structure of your schema, delete the existing schema and upload your corrected data as a new Customer Profile schema.

- To delete your Customer Profile schema, click the trash can icon next to the **Customer Profile** page title.

API Users: Special Note on Understanding Cardinality

- When you upload additional data using the API, cardinalities are automatically updated after every 1,000 new rows are uploaded.
- To view Customer Profile data you have uploaded using the API, including cardinalities, re-load your browser page.

Supported Encodings

By default, GPR handles data using UTF-8 encoding. However, starting with release 9.0.014.00, GPR supports importing of data that uses certain legacy encodings. Appendix: Supported Encodings lists those encodings currently supported. This list is updated as new encodings are verified. If you use an encoding type that is not listed, contact your Genesys representative for assistance.

> **Important**
> All responses and returned data is provided in UTF-8 encoding.

Unsupported Characters in Agent and Customer Profiles and Datasets

The following characters are not supported for column names in Datasets or Agent and Customer Profile schemas. If GPR encounters these characters in a CSV file, it reads them as column delimiters and parses the data accordingly.

- `|` (the pipe character)
- `\t` (the TAB character)
- `,` (the comma)

Workaround: To use these characters in column names, add double quotation marks (" ") around the entire affected column name, except in the following situations:

- If you have a comma-delimited CSV file, add double quotations marks around commas within column names; you do *not* need quotations for the \t (TAB) character.
- If you have a TAB-delimited CSV file, add double quotations marks around TAB characters within column names; you do *not* need quotations for the , (comma) character.
- You must *always* use double quotations for the | (pipe) character.

Unsupported characters in releases prior to 9.0.014.00

In releases prior to 9.0.014.00, certain characters in column names are ignored, are unsupported, or cause an upload to fail, as explained in the following points:

- Columns with the following symbols in their column names are not added to Agent Profiles or Customer Profiles:
  `*, !, %, ^, (, ), ', &, /, â, è, ü, ó, â, ï`
- The following symbols in column names are ignored, and the column is added with the symbol dropped out as though it had not been entered:

`[Space], -, <`

- Non-ASCII characters are not supported. How they are handled differs depending on what data you are uploading:
  - In Agent Profiles and Customer Profiles, columns with non-ASCII characters in the column name are not added.
  - In Datasets, when a column name contains a mix of ASCII and non-ASCII characters, GPR removes the non-ASCII characters from the column name as though they had not been entered and correctly uploads all column values.
  - In Datasets, when a column name contains only non-ASCII characters, the column name is entirely omitted. All the column values are preserved, but you cannot modify or save the schema. In this scenario, GPR generates the following error message: `An unhandled exception has occurred: KeyError('name')`.

Logs for Unsupported Characters

The following Agent State Connector log messages record issues with unsupported characters:

- `<datetime> [47] ERROR <BOTTLE> schema_based.py:63 Invalid expression while parsing: <fieldname> = None`
- `<datetime> [47] ERROR <BOTTLE> agents.py:172 Fields set([u'<fieldname>']) were ignored because names were invalid.`

Importing and Managing Datasets

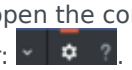
Datasets can include a broad range of data, including interaction details, outcome data, and any other data you consider relevant for predictive routing. You can upload multiple Datasets, but each Predictor is built on data from a single Dataset. Data for upload must be compiled into a CSV file with a consistent schema. Genesys Info Mart is a key source for interaction data, but you might also include data from third-party applications such as CRM system or a survey provider.

You can upload data from a CSV file using either the GPR web application, as described in this topic, or using the GPR API. The file can be zipped for uploading.

- If you plan to use the API, see the *Predictive Routing API Reference*. (Requires a password for access. Please contact your Genesys representative if you need to view this document.)

For a detailed discussion of the types of data you might use and how it is processed in Predictive Routing, see The Data Pipeline in the *Genesys Predictive Routing Deployment and Operations Guide*.

View Data on This Window

- To open the configuration menu, click the **Settings** gear icon, located on the right side of the top menu bar:  .
- The right-hand toggle navigation menu enables you to view a tree view of all Datasets associated with your Account, with the Predictors and Models configured for each. To open or close this navigation menu, click the  icon.
- You must reload the page to view updates made using the Predictive Routing API, such as appending data to a Dataset, creating, updating, or deleting a Predictor, or creating, updating, or deleting a Model.

Best Practices

- Because a large complex Dataset takes significant time to import and display, Genesys recommends that you start a new deployment by importing a small, starter Dataset, which will load quickly and enable you to troubleshoot any issues efficiently. You can then append the remaining Dataset in a single append action.
- When you are creating the CSV data file for a Dataset, do not include the following in the column name for the field to be used as the ID_FIELD: `ID`, `_id`, or any variant of these that changes only the capitalization. Using these strings in the column name results in an error when you try to upload your data.
- To speed up Dataset uploads, increase the number of CPUs allocated for Dataset processing from two (the default) to four or six CPUs. For example, with six CPUs, the time required to append a Dataset of three million rows could be less than two hours.
- Release 9.0.013.01 and higher uses the Minio container to increase Dataset upload speeds. If you are running an earlier release and experience unacceptably slow upload and append times, consider upgrading to a more recent release of the AI Core Services component.

- See Supported Encodings and Unsupported Characters for information on how to configure your data.
- If you use a Microsoft editor to create your CSV file, remove the carriage return (^M) character before uploading. Microsoft editors such as Excel, WordPad, and NotePad automatically insert this character. For tips on removing the character from Excel files, refer to How to remove carriage returns (line breaks) from cells in Excel 2016, 2013, 2010.

Procedure: Create your Dataset schema

Purpose: To establish a schema where all data falls into a set structure; for example, all data within a certain column must have the same data type. GPR analyzes your data, recognizes the structure, and ensures that all data you upload later complies with the established schema.

Prerequisites

- A small starter Dataset consisting of the desired columns and several rows containing placeholder values for each column that can establish the correct data type for that column.

Steps

Click the *Datasets* tab, then follow the steps to create a Dataset schema:

1. Click **Create Dataset**. The **Create Dataset** dialog box opens.
2. Click **Select file**. Navigate to your small starter CSV file and select it.
   Your CSV file can be zipped. You do not need to unzip it for uploading.
3. Select the separator type for your CSV file. You can choose either TAB or COMMA.
4. Select the encoding type. By default, this is `utf-8`.
5. Click **Create**. The new Dataset appears on the Dataset window.

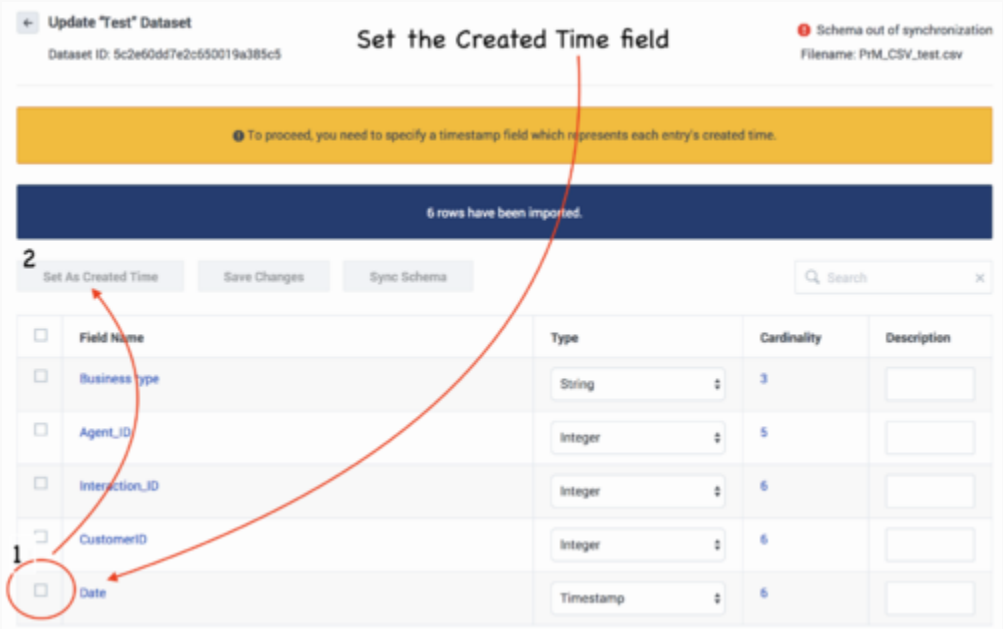
Procedure: Set the Timestamp field and synchronize the schema

Steps

1. Set the **Timestamp**. This field must identify the interaction start time.

The data type must be `Timestamp`. If the data type is not set correctly when the data is uploaded, change the data type by clicking in the **Type** column and selecting `Timestamp` from the drop-down list.

2. Scroll to the top of the list of fields and click **Set as Create Time**, and then click **Save Changes**. An `Updated schema successfully` status message appears in the upper right side of the **Datasets** window.
3. Click **Sync Schema**. A message appears once the schema has been synced. If there are issues, open the error message to troubleshoot the problem.
4. Click **Accept Schema**. A `Schema accepted successfully` status message appears.



This procedure has:

- Established the schema structure for the required columns.
- Established the column containing the **Timestamp** parameter.

Next Step: Upload the remainder of your data.

Procedure: Upload your Dataset data

Purpose: Upload your Dataset data to the established schema.

Prerequisites

- You have created a schema, as described in the procedure above.
- You have created a CSV file containing all your Dataset data in the accepted schema structure.

Steps

From the Settings > Datasets window, click the name of your Dataset in the list. The window displays a list of the fields in your Dataset.

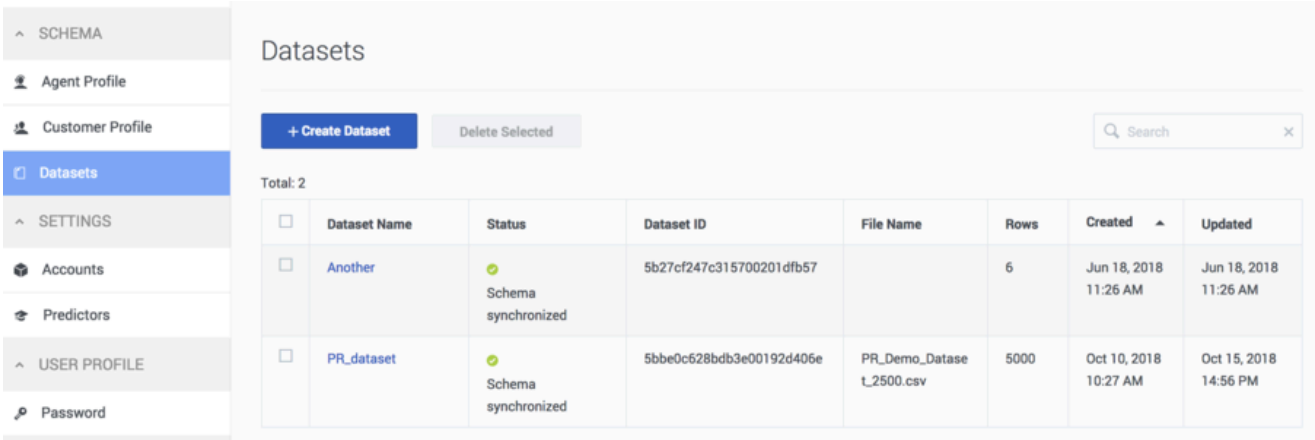
1. Click **Append Data**. The **Append Data** dialog box opens.
2. Click **Select File**. Navigate to your complete CSV file and select it.
   Your CSV file can be zipped. You do not need to unzip it for uploading.
3. Select the separator type for your CSV file. You can choose either TAB or COMMA.
4. Select the encoding type. By default, this is `utf-8`.
5. Click **Create**. The uploaded data appears on the Dataset file list window.
6. Adjust any data types in the **Type** column that were interpreted incorrectly.
7. Adjust the **Visibility** toggle, if desired, to hide fields you do not need to see on this**Dataset fields** window or the **Dataset Details** window.
   - The **Visibility** toggle simply enables you to configure the display to make it easier to see the fields you are most interested in. Hidden fields continue to be processed.
   - Click the **Show visible fields only** check box to reduce the number of fields displayed.
   - Use the **Search** box to locate a specific field.
8. Click **Save Schema**. A `Success. Schema updated successfully` status message appears.

This procedure has:

- Completed the Dataset upload to GPR.

The List of Datasets

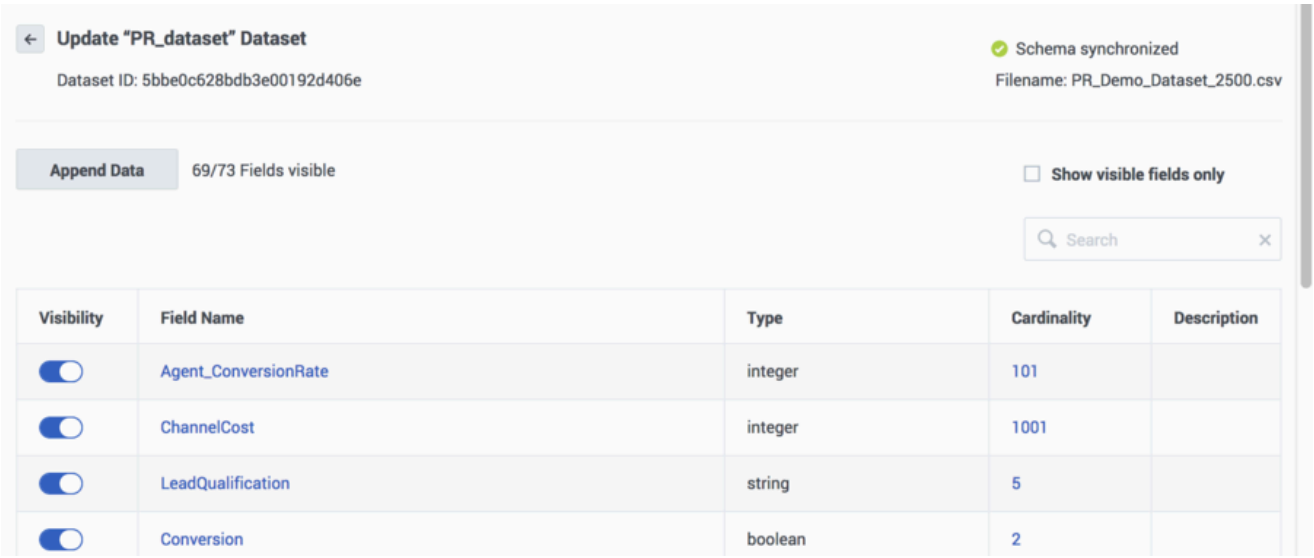
When you navigate to the **Settings > Datasets** page, all Datasets associated with your account are displayed in a table. Each row presents a Dataset.



- The columns in the Dataset list are the following:
  - Dataset Name - The name entered when creating the Dataset.
  - Status - Whether the Dataset is synchronized.
  - Dataset ID - An identifying number used to access the Dataset in API requests.
  - Filename - The name of the CSV file most recently used to create or append data to the Dataset.
  - Rows - The number of rows in the Dataset.
  - Created - The date and time the Dataset was initially created.
  - Updated - The most recent date and time the Dataset was updated.

The List of Dataset Fields

When you navigate to the **Settings > Datasets** page, and click a Dataset name, your data is displayed in a table. Each row presents a Dataset field.



- The columns in the Dataset fields list are the following:
  - Visibility - Shows which fields are set as visible in this list and in the **Datasets Details** window. This setting affects the display only. Hidden fields are included when running analysis reports, such as the Feature Analysis report, and during scoring.
  - Field Name - The name of the field.
  - Type - The data type for the field.
  - Cardinality - The number of unique values that appear in this field. If there are more than 1000, the number appears as 1001. Click this number to see the actual values that appear in this field.
  - Description - Any explanatory note you might have added about this field.
- Click **Append Data** to append more data to your Dataset.

> **Important**
>
> Your appended data must have the same schema structure as the existing data. You can add fields and values, but you cannot change the existing schema. If you need to change the structure of your schema, delete the incorrect Dataset from the table containing all the Datasets associated with your account and then upload a new Dataset.

- To locate a specific field in the list, type the field name into the **Search** field on the upper right side of the window.
- The ID for the Dataset is located at the top of the list f Dataset fields, just below the Dataset name. This ID is used to make API requests.
- To return to the list of all Datasets, click the left-pointing arrow next to the name of your Dataset at the top of the iist of fields.
- To delete a Dataset, from the table listing all Datasets, select the check box at the beginning of the row for that Dataset and then click **Delete Selected**.

Understanding Cardinality

- When you upload additional data, cardinalities are automatically updated after every 1,000 new rows are uploaded.
- To view updated Customer Profile data, including cardinalities, re-load your browser page.

Supported Encodings

By default, GPR handles data using UTF-8 encoding. However, starting with release 9.0.014.00, GPR supports importing of data that uses certain legacy encodings. Appendix: Supported Encodings lists those encodings currently supported. This list is updated as new encodings are verified. If you use an encoding type that is not listed, contact your Genesys representative for assistance.

> **Important**
> All responses and returned data is provided in UTF-8 encoding.

Unsupported Characters in Agent and Customer Profiles and Datasets

The following characters are not supported for column names in Datasets or Agent and Customer Profile schemas. If GPR encounters these characters in a CSV file, it reads them as column delimiters and parses the data accordingly.

- `|` (the pipe character)
- `\t` (the TAB character)
- `,` (the comma)

Workaround: To use these characters in column names, add double quotation marks (" ") around the entire affected column name, except in the following situations:

- If you have a comma-delimited CSV file, add double quotations marks around commas within column names; you do *not* need quotations for the \t (TAB) character.
- If you have a TAB-delimited CSV file, add double quotations marks around TAB characters within column names; you do *not* need quotations for the , (comma) character.
- You must *always* use double quotations for the | (pipe) character.

Unsupported characters in releases prior to 9.0.014.00

In releases prior to 9.0.014.00, certain characters in column names are ignored, are unsupported, or cause an upload to fail, as explained in the following points:

- Columns with the following symbols in their column names are not added to Agent Profiles or Customer Profiles:
  `*, !, %, ^, (, ), ', &, /, â, è, ü, ó, â, ï`
- The following symbols in column names are ignored, and the column is added with the symbol dropped out as though it had not been entered:
  `[Space], -, <`
- Non-ASCII characters are not supported. How they are handled differs depending on what data you are uploading:
  - In Agent Profiles and Customer Profiles, columns with non-ASCII characters in the column name are not added.
  - In Datasets, when a column name contains a mix of ASCII and non-ASCII characters, GPR removes the non-ASCII characters from the column name as though they had not been entered and correctly uploads all column values.
  - In Datasets, when a column name contains only non-ASCII characters, the column name is entirely omitted. All the column values are preserved, but you cannot modify or save the schema. In this scenario, GPR generates the following error message: `An unhandled exception has occurred:`

```
KeyError('name').
```

Logs for Unsupported Characters

The following Agent State Connector log messages record issues with unsupported characters:

- `<datetime> [47] ERROR <BOTTLE> schema_based.py:63 Invalid expression while parsing: <fieldname> = None`
- `<datetime> [47] ERROR <BOTTLE> agents.py:172 Fields set([u'<fieldname>']) were ignored because names were invalid.`

Creating and Interpreting Analysis Reports

Predictive Routing provides the following reports within the application interface:

- Feature Analysis report: Analyzes how the characteristics and performance of agents and customers affect the metric you are targeting.
- Agent Variance report: Analyzes how much difference there is among agents for the different business processes they work on. More variance means better opportunities for optimization.
- Lift Estimation report: Analyzes how much impact Genesys Predictive Routing can have on a selected target metric in the specified environment and circumstances.
- Model Quality report: Provides an analysis of how well the model is performing.
- Agent Coverage report: Indicates how many agent models were built, as a function of the total agents available.

Lift Estimation Report

The Lift Estimation report generates an estimate of what lift you might be able to achieve in the value of the target metric optimized compared with your existing routing. It functions as a sort of testing of the waters, providing a broad-stroke outline of the sort of results you might expect with a full implementation of Genesys Predictive Routing (GPR). In contrast with model evaluation metrics, such as Area Under the Curve (AUC) or Mean Absolute Error, which reflect the accuracy of a GPR Model in predicting the outcome of an interaction + agent combination, Lift Estimation attempts to estimate the improvement in the target metric you ultimately care about.

- For an in-depth discussion of how GPR handles metrics, see Understanding Score Expressions.

For example, in a First Contact Resolution maximization use case, the AUC of the Model indicates how well the Model predicts the number of resolved and unresolved outcomes. The Lift Estimation report directly estimates the amount of improvement you might expect in FCR when the predictive Model is deployed in production.

The key challenge with an estimate is that it is based on historical data. As a result, we only know the actual outcome of an handled by a specific agent. We do not know *for certain* what the outcome would have been if the exact same interaction was handled by the agent GPR selected as optimal. The underlying algorithm *estimates* the outcome for the GPR-selected agent based on historical interactions where the agent actually selected matches the one GPR would have selected.

Keep in mind the following points regarding the results of the analysis. The Lift Estimation report:

- is based on historical data from your contact center.
- assumes an agent-surplus situation.
- assumes your baseline or existing routing selects agents randomly without using any predictive model.
- includes only agents found in the Dataset; agents found only in the Agent Profile are not included.
- does not factor in handle time for the interactions
- depends on the quality of the Model you use to create it. See View Model quality and agent coverage reports for information on how to assess Model quality.

Important

- See Lift Estimation Report In-Depth for a detailed discussion of how the Lift Estimation report works.
- See Lift Estimation vs A/B Testing for an explanation of how these reports differ and the advantages of each.
- See Best Practices and Troubleshooting to ensure that you are setting up the report as effectively as possible.
- See Calculating Lift for Metrics You Want to Minimize (releases earlier than 9.0.012.01

only) for how generate estimates for metrics, such as AHT and number of escalations, where a lower value is better.

Lift Estimation End-to-End Example

James' business has been doing reasonably well, but customer satisfaction numbers have stagnated and even seem to be decreasing. James knows his business needs to pick up the pace. Genesys Predictive Routing (GPR) looks like a great idea. But can it make the difference he's looking for?

James' business has a lot of data available, about agents and customers, and about how the interactions turned out. He deploys GPR in a test environment and creates an initial Dataset, drawing especially on interaction data from Genesys Info Mart, agent data from Configuration Server, customer data from the CRM system, and results from customer satisfaction surveys (CSAT). He combines this data into a CSV file, and imports it into GPR.

For these initial trial runs of GPR, James does not create separate Agent Profile and Customer Profile schemas. He can get an adequate estimate from a single Dataset.

James know that he has CSAT results for only a small percentage of the total interactions. To make use of more of his rich data stockpile, he decides he will also run a Lift Estimation based on first-contact resolution (FCR)—all interactions where customers did not call back for the same reason within a set time. So James opens his GPR web interface and creates two Predictors, one for CSAT, one for FCR. For each, he uses the default full-feature set Model, which is created automatically when the Predictor is created. At this point, he's ready to consider all factors as possible drivers for improvement.

Now James starts running Lift Estimation reports, starting with the default numbers of samples and simulations. He starts with no Group By setting, then experiments with grouping by different parameters, such as agent groups, customer types, customer intents, agent tenure, and so on.

To get a view-at-a-glance compilation of the results of his Lift Estimation experiments, James creates a table similar to the following one.

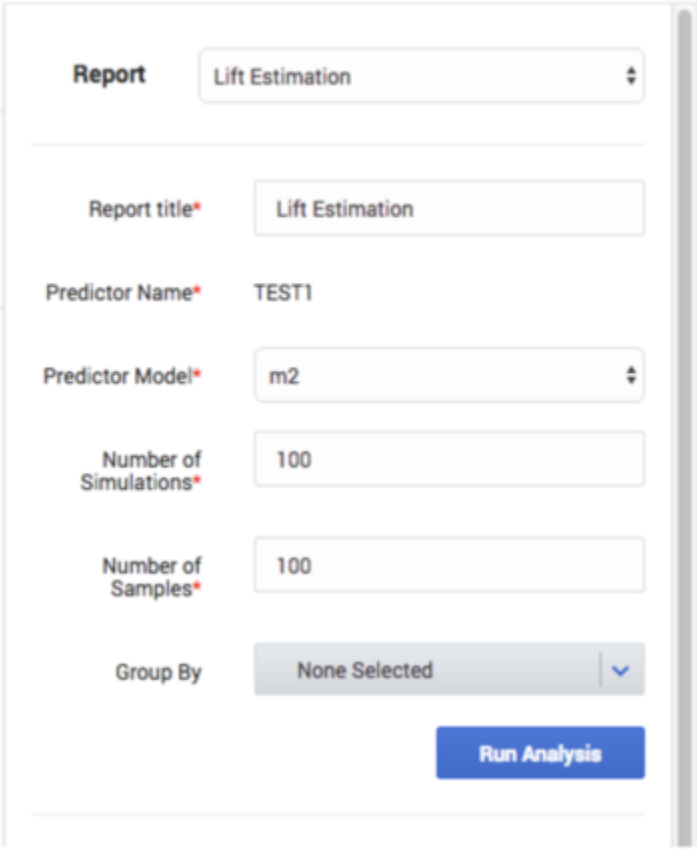
Metric	Group By	Model Name	Report Name	Model Quality	No GPR		GPR		Uplift		# Simulations	# Samples	Tuning Threshold
5%	10%	5%	10%	5%	10%								
FCR	VAG-1	FCR_Uplift_Global	Lift_FCR_8-10-18	AUC: 0.98	0.92	0.92	0.96	0.97	50%	62.5%	100	10,000	50
CSAT	VAG-1	CSAT_Global	Lift_CSAT_8-10-18	R2S: 0.05	0.80	0.80	0.86	0.86	7.5%	7.5%	100	10,000	50

As James views the results from these reports, he starts to breath more easily. He's seeing potential lift. Of course, the more agent availability, the better GPR looks. That's only natural; the more agents available, the more likely GPR can pick the absolutely ideal matchup. But even a real-life availability levels, ones he's used to from his years of experience, GPR can get interactions to agents who are

better at specific kinds of issues. He can improve his company's customer service, even without a single change to training or other factors.

And with the Feature Analysis report, he can target factors that will most effectively drive improvement, enabling his company to allocate resources where it really matters. And by integrating out of the box with Genesys Reporting, he can run that A/B testing report and see a head to head matchup between his current routing and Predictive Routing. He's not going to bet against Genesys on that one.

How to Generate a Lift Estimation Report



To create a **Lift Estimation** analysis report, start on the **Predictors** window. The report uses the metric and parameters set in the Predictor you select on the **Trend** tab or **Details** tab of the **Predictors** window.

Important

- The Lift Estimation report does not support composite Predictors.

- To configure this report correctly, see the Lift Estimation Best Practice Recommendations, below.
- Predictive Routing supports report generation that includes up to 250 features (columns).
- For all reports, mandatory fields are marked with an asterisk.

To configure the report, complete the following fields:

1. Click **Analysis**, located on the right side of the top navigation bar.
2. Select **Lift Estimation** from the **Report** drop-down menu.
3. Select a Model from the drop-down list. This Model can be active or inactive, but it must have been trained.
4. In the **Number of Simulations** field, enter a figure for how many times to select subsets of agents; each subset of agents is used in one simulation and GPR calculates an average across the specified number of simulations to account for the randomness in subset selection. The size of these subsets is determined by the agent availability figure calculated. Predictive Routing calculates lift for all agent availability percentages, from 0.01, when only 1% of total agents are available, to 1, when 100% of agents are available. For example, 50% availability uses random selections of half the total agents; 25% availability uses simulations that each pick a random 25% of the total number of agents.
   By default, the number of simulations is set to `100`, meaning 100 subsets of agents are selected by random sampling. The field accepts any value larger than `0` and less than or equal to `500`.
5. In the **Number of Samples** field, enter a value for how many samples to use from the test set. By default, this is set to `100`. This value should be approximately 30 times the number of agents (that is, an average of 30 samples per agent). Note that the number of samples cannot exceed the number of records in the test section of the Dataset. If you enter a larger number, the Lift Estimate report runs only the available number of samples in the test portion.
6. In the **Group By** field, enter a parameter to use to group interactions for estimation. Only agents who handled interactions of the type specified in the group-by value are used in the estimation for that group.
   When you specify a high-cardinality feature as a grouping parameter, the top 20 values of that feature, as determined by interaction volume, are extracted and a report is generated for each one of those groups.
7. If you want to use values other than the default top 20 group values for high-cardinality features, select the **Advanced** check box, and then choose up to 20 group values against which you want to run the List Estimation report. By default, the 20 feature values with the highest interaction volume are available for selection in the **Group Values** field when **Advanced** mode is on.
   If there are no interactions in the test part of the Dataset for a selected Group By feature, that feature does not appear in the generated report.
8. Click **Run Analysis**.
   The result appears on the **Reports** tab.

Lift Estimation Best Practices and Troubleshooting

> **Important**
>
> If you are troubleshooting and encounter problems not covered here, contact Genesys Customer Care for additional support.

Number of Simulations

- This value should be higher for larger numbers of agents. `100` is an appropriate value for most environments. Increase this value to the maximum, `500`, if you are scoring for large number of agents (more than 5000).

The Group By Parameter

- If you are using the **Group By** functionality, the Lift Estimation dataset is constructed with latest **Number of Samples** rows for each unique value in the **Group By** feature selected. The rows are drawn from the Predictor Dataset, using rows that fit the criteria. If there are insufficient records for a certain **Group By** value, that set is underrepresented.

  For example, if **Group By** is set to `Queue`, which has two values, VQ1 and VQ2, and **Number of Samples** is set to `1000`, GPR constructs two Lift Estimate Datasets (VQ1_Dataset, VQ2_Dataset). Each Dataset should be analyzed based on the most recent 1,000 samples from the corresponding queue. However, if there are only 200 rows in the Predictor Dataset where `Queue=VQ2`, the VQ2_Dataset would be short of 800 records compared with the Dataset for VQ_1. As a result, the results for VQ_2 are probably less accurate than those for VQ_1, and do not provide equally strong results.

- To group a Lift Estimation report by queue, you must include the desired queue as a Predictor (context) feature.

Remove Erroneously-Collected Target Variables

Data collection errors can distort predictions, especially with respect to the value of a target variable. Before uploading your data to GPR, remove any target variables that contain clearly erroneous values and that do not represent the actual outcome of the interaction.

Examples of values that should be removed:

- A handling time of `0` seconds. GPR processes zeros like any other number. However, a handling time of `0` is not a viable real-world value, which means that this value is generated by some data collection issue.
- A handling time of `10+` hours for an immediate-response interaction type, such as voice. No real-world customer phone call lasts for ten hours, indicating some upstream error that resulted in the erroneous value.
- A customer satisfaction score of 99 when the normal range is `1-10`. Some statisticians encode missing values with an arbitrary number, such as 99. Any scores falling outside the valid range should be removed.

These examples are not exhaustive. Part of the process of creating an effective Dataset is to remove values at your discretion when you see that they do not represent a realistic outcome for an interaction.

Lift Estimation Report Not Available for Selection

- Check that you are on the **Predictors Trend** tab or **Details** tab.
- Set the date range to a period that has data.

The Lift Estimation Reports is Empty

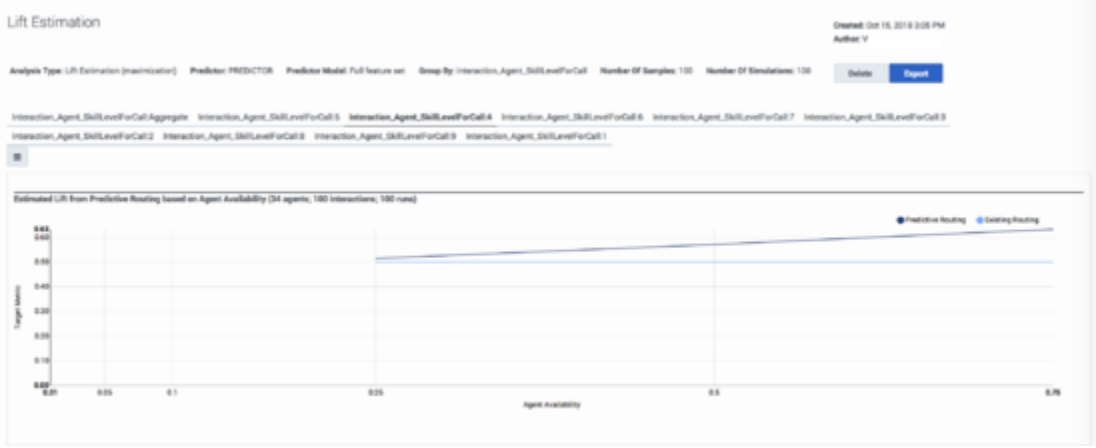
- Verify that you have data for the selected period and that you have created and trained your Predictor.

A 'No data available for your chosen parameters for analysis type lift_estimation" Error Appears

- The selected Group By filter might not yield enough data.
- The trained Model is old and the Predictor has been updated since it was created and trained.
  To resolve this issue, regenerate the Predictor, add all of the Agent and Customer features, and retrain/reactivate a new Model.

Reading a Lift Estimation Report

The Lift Estimation graph shows two lines. The blue line represents your baseline routing. The black line represents the results of using Predictive Routing. The distance between the two lines represents the expected lift. The diagram shows the estimated outcome for various levels of agent availability.



To produce the estimate, the Lift Estimation analysis takes the specified number of interactions, identifies target agent pools from the data based on the day of interaction and group-by value, if any, and then runs multiple simulations for differing levels of availability. The restriction of target agents to those in agent groups active on the day of the interaction is to ensure that GPR has the exact same choices as what the existing routing had, and thus to have a level-playing field.

- The y-axis shows the target metric used in the Predictor. If you want to maximize your target metric, as for FCR, for example, the higher up the y-axis, the better the routing performance. If you want to minimize your target metric, such as Handle Time, the lower on the y-axis, the better the result.
- The x-axis represents the agent availability factor, which is part of the simulation. The agent availability could range from 0.01, when only 1% of total agents are available, to 1, when 100% of agents are available. The range on the x-axis can vary depending on the total number of agents under consideration.

You can identify the potential lift in your environment by checking the difference between the blue and black lines at the point on the x-axis that corresponds to your average agent availability.

> **Important**
>
> If the target metric you are evaluating is a Boolean, the Boolean values are converted to the equivalent numeric values, with false = 0 and true = 1. Values between 0 and 1 can be interpreted as the percent chance of the metric being true.

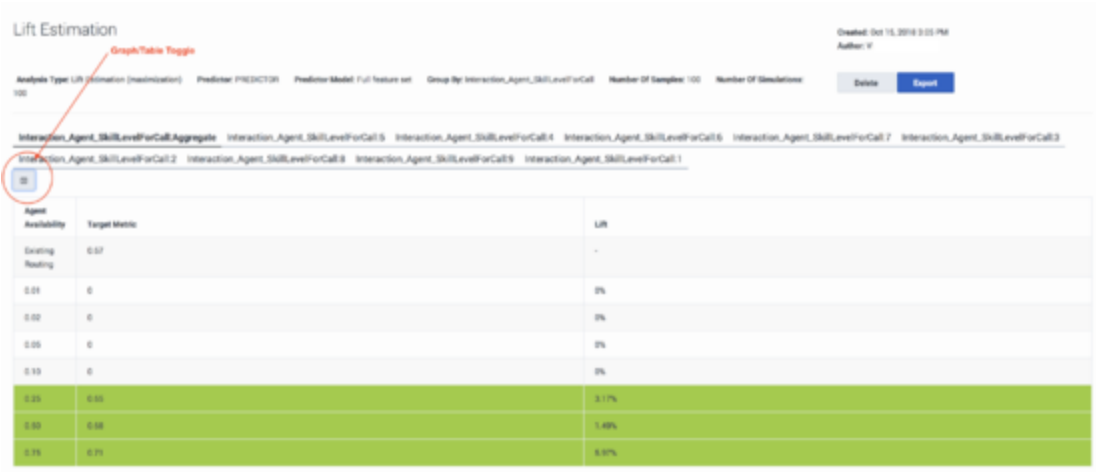
If you select a **Group By** value when defining the report parameters, target candidate agents for scoring and lift estimation are defined within the specified group, and the tabs above the chart show Lift Estimation reports for each group. The **Aggregate** tab displays the weighted average for each availability based on the number of interactions for each group. The shape of the lift estimation curve depends on the following two factors:

- The variation in scores across agents for each interaction. If many agents have similar scores that are close to the maximum, an increase in agent availability does not significantly impact the lift, and the line extending across the range of availability percentages does not increase or decrease as the availability changes.
- The accuracy of the Model. The position of the data points on the curve relative to the base line is determined by the reliability of the predicted scores against the true outcome.

> **Important**
>
> In some cases, overfitting of the underlying Models might produce negative lift in scenarios with high agent availability. While this may look counterintuitive, it is a result of negative correlation between the predicted and the actual scores. To reduce overfitting, ensure that individual agent Models (created for DISJOINT and HYBRID Model configurations) are trained with enough samples and/or reduce the number of features included in the Model.

Customizing the Display

- You can toggle between the default graph view and a tabular view of the same data points. The rows highlighted in green show positive lift.
- To save your report outcome in CSV format, click the **Export** button. The report downloads immediately.



Lift Estimation Report In-Depth

The Lift Estimation report does a *hindsight analysis* to estimate the lift in a specified KPI if the interactions in the test dataset had been routed using the selected predictive Model instead of the baseline or existing routing.

To recreate the original routing scenarios as closely as possible, GPR limits the choice of agents to those who handled calls on a given day as found in the test data collected through the existing baseline routing and further assumes the agent-specific features are stable for the given day.

Agent Availability

Agent availability is defined as the fraction of the total number of agents who handled calls on the day of the interaction within the group selected in the **Group By** parameter (if used).

- To simulate 100% agent availability, for each interaction, GPR scores all agents who are part of the agent pool, which includes all agents working on the relevant day and belonging to the group selected in the group-by value. GPR picks the agent from that pool with the maximum score.
- To simulate 50% agent availability GPR randomly selects half the agents from the daily agent pool, scoring them, and picking the maximum-scored agent from that half.

To ensure that the lift produced by routing with GPR in a reduced agent-availability scenario does not happen by chance, GPR repeats the Lift Estimation analysis on a random selection of agents many times (100 runs, for example), and averages the estimate across the runs.

> **Important**
>
> 100% agent availability is unrealistic in any real-world setting. To focus on meaningful results, disregard the section of the generated report showing agent availabilities

higher than 50%, or higher than you would normally expect to see.

Adjusting the availability of agents shows how different operating constraints can yield different outcomes. On average, agents should have approximately 30 samples for good-quality analysis results.

Lift Estimation vs A/B Testing

The Lift Estimation report is a useful, efficient way to get a reasonably quick assessment of how well a Model performs and the expected lift in a specified KPI over baseline routing. However, it does not replace A/B testing. The following table highlights key differences between the two types of reports.

Important

The A/B Testing report is generated from data written to the Genesys Info Mart database.

- For an explanation of how to create and view the A/B Testing report, see Predictive Routing A/B Testing Report in the *Genesys Customer Experience Insights User's Guide*.
- For instructions on how to set up Genesys Reporting to store GPR data, see Integrate with Genesys Reporting in the *Predictive Routing Deployment and Operations Guide*.

Lift Estimation	A/B Testing
Offline hindsight analysis using historical interaction data	Online testing in the live production environment; considered as the ultimate test
Estimates the scope for KPI improvement under various assumptions	Determines the real improvement in KPI with minimal or no assumptions
Being offline analysis, no real-time processing resources involved, which might slow down performance	A poor Model or incorrect routing strategy could potentially have detrimental effects
Assumes that the baseline routing selects agents randomly	No assumption on baseline agent selection
Lift is estimated only for agent-surplus scenarios	Can measure performance for both caller-surplus and agent-surplus scenarios
Likely agent availability to be calculated from past data prior to determining the applicable estimate	Lift is calculated based on real agent availability during the period of assessment, hence more accurate
Like any other statistical estimate, it is associated with error which could be higher when assumptions are violated	When ensured Control and Target routing methods operate in similar conditions, the calculated lift is likely to be unbiased and reliable.

Calculating Lift for Metrics You Want to Minimize (releases earlier than 9.0.012.01 only)

For releases earlier than 9.0.012.01, creating a Lift Estimation report for a metric where a lower value is preferable requires additional configuration. The following procedure uses AHT and EscalationFlag as the example metrics. AHT is a straightforward example of a metric where a lower outcome value is better. EscalationFlag is a Boolean metric, where 0 = no escalation, which is the preferred result.

To generate values for the Lift Estimation report, use the following procedure:

1. Create a new outcome column in your dataset that stores the *negative* of the original outcome.
   For example, use the following expression types to transform your metrics:
   - AHT: `New_AHT = -1* AHT`
   - EscalationFlag (where 1 is escalated and `0` is not): `New_EscalationFlag = 1- EscalationFlag`
2. Run a Feature Analysis report on the *original* outcome.
3. Build a Predictor using the key features identified in the Feature Analysis report and built on the new (modified) metric. For example, instead of selecting `AHT` as your metric, select `New_AHT`.
4. Follow the standard process of training your Predictor and building a Model using the new Predictor.
5. Run a Lift Estimation report from the **Predictors** tab with the desired Predictor selected.

The Lift Estimation report now correctly displays the expected improvement in the metric value.

> ### Important
> For all purposes *other than* running a Lift Estimation report--that is, Feature Analysis, Agent Variance, Predictors and Models--use the *original* metric. The Feature Analysis report, Predictor, and Model created using the new modified metric should be used *only* in the process of creating a Lift Estimation report.

Feature Analysis Report

The Feature Analysis report provides a starting point for the process of creating Predictors and Models. It enables you to determine which factors—agent and customer characteristics and behavior—have the most impact on a target metric you select.

You can run a Feature Analysis for your dataset (from the **Datasets** tab) or for a specific Predictor (from the **Predictors** tab). The Feature Analysis for the Dataset considers all features in the Dataset. The Feature Analysis for the Predictor only considers those features included in the Predictor.

The Feature Analysis report returns only those *features* (also referred as *attributes*) that most influence the target metric. The features are ranked, from the one with the strongest impact on the target metric to the one with the least. Each subsequent feature is ranked in relation to the most powerful one. Therefore, a feature with a numeric ranking of 0.5 is half as powerful as the highest-ranked feature.

By default, the report displays only the attributes with the strongest impact on the target metric. Use this aspect of the functionality to identify, and then omit from the Models you create, attributes with an insignificant impact on the value of the target metric. This way, you can focus your Model on the most powerful attributes.

Although not all features are shown by default, the report does contain data for all features. If a feature has minimal impact, it does not affect the outcome of the report.

> **Important**
>
> - Predictive Routing supports report generation that includes up to 250 features (columns).
> - For all reports, mandatory fields are marked with an asterisk.
> - When a Dataset has many fields, you can hide some to view the most relevant fields more easily. Hiding fields only removes them from your view. Hidden fields are still used in Feature Analysis reports for Predictors and Datasets.

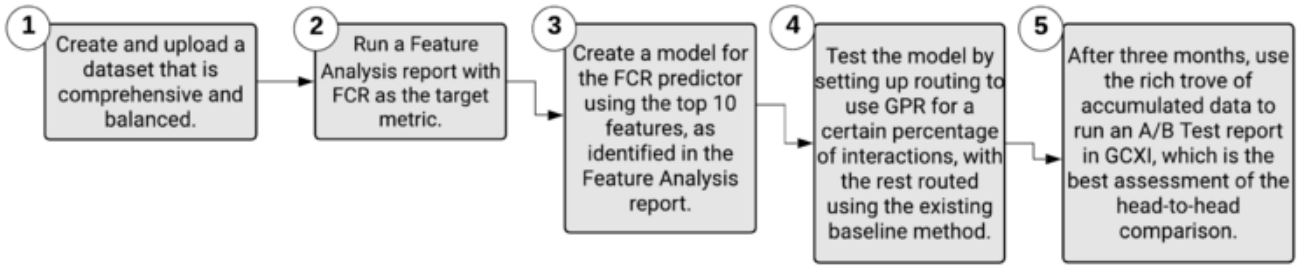
Feature Analysis End-to-End Example

Alissa's business is plagued with escalations and frustrated customers who have to contact their agents multiple times to resolve issues. She needs to improve first contact resolution, but a scan of the data leaves her confused. Each case seems so different. How can she tell what aspects of the environment to target for quick, lasting results?

Alissa starts by compiling and importing a high-quality Dataset. She makes sure of the following points about her Dataset:

- It contains at least three months' worth of contact center data.
- It includes data from all the queues she needs to evaluate.
- If an agent is included in the Dataset, all that agent's interactions for the covered period are included.

With the data in place, Alissa runs a Feature Analysis report using FCR as the target metric.



The outcome lists the Dataset fields having the strongest effect on FCR. The feature, or aspect of the environment, having the greatest impact on FCR is listed first and given a weight of 1. All other features are compared with the highest-ranked feature and given a ranking that expresses how strongly they affect the target metric relative to the top feature. If a feature has a value of 0.75, that means it has 3/4 as much impact as the top feature.

Now that Alissa know which are the most critical features in her environment, she can use this information to construct a better Models for the predictor in her environment Predictor that uses FCR as the target metric. Although the Predictor includes all features, when Alissa creates Models based on the Predictor, she configures them with only those features that the Feature Analysis report identified as most important.

Alissa takes the top ten features as a starting point for her first Model. She knows that if she selects only some of the high-ranked features—the features ranked, for example, at 1, 3, 4, and 6—she will be second-guessing the algorithm. The Feature Analysis accounts for the fact that the features can be interrelated and affect each other. If Alissa arbitrarily selects only a few of the top features, her Model will be weaker and less accurate than it should be.

So, by using the results of the Feature Analysis report, Alissa removes features that are minimally relevant from her Model, enabling her to focus on the key factors. She can create and run Models efficiently, with less load on her system. She can also target her company's efforts to allocate resources and provide training toward those areas that will drive the greatest improvements to the target metric.

Once the Model is in place, Alissa can run a Lift Estimation report, which provides a preliminary assessment of the projected improvement she might expect for the selected target metric, based on the features included in the Model.

After configuring her company's routing strategies to use baseline routing for some interactions and using GPR for the rest, Alissa can perform a real-world A/B test of how well GPR performs over time when compared against the baseline routing without GPR. With at least three months' worth of data, she can see the real-world results that the Lift Estimation report simply estimated. She runs a Predictive Routing A/B Testing Report in Genesys CX Insights, using Genesys Historical Reporting.

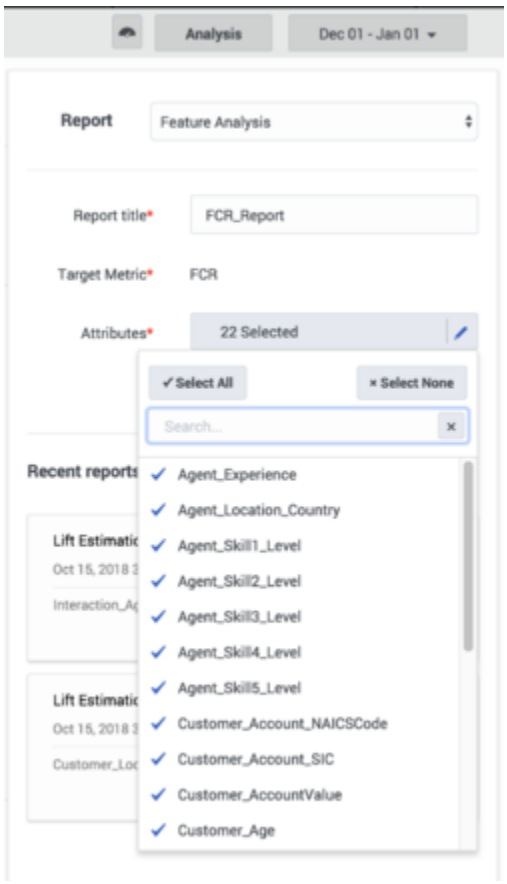
However, she's careful to monitor whether there are changes to the Dataset that affect the environment in ways that make it necessary to create a train a new Model. For example, changes in the environment that might cause features to gain or lose importance in how much they affect the

target metric. After new data is appended to the Dataset, and obsolete data purged, Alissa can repeat the steps to regenerate Predictor data, run a new Feature Analysis report, and then create and train new Models.

For example, Alissa's company has created a new IVR flow that directs certain types of challenging interactions to a new agent group that is specially trained to handle such issues. By rerunning the Feature Analysis report based on the new conditions in the environment, Alissa can quickly gather better insight on how to set up new Models to replace the now-outdated ones.

How to Generate a Feature Analysis Report

Run **Feature Analysis** reports from the **Predictors** tab and the **Datasets** tab. Use the following procedure to create a Feature Analysis report:



1. Click the **Predictors** tab or **Dataset** tab on the top navigation bar. To analyze a model, click **Predictors**.
2. Click **Analysis**. This button is located on the right side of the top navigation bar.
3. Select **Feature Analysis** from the drop-down **Report** menu.
4. Choose the parameters you want to include using the selectors on the left side of the window.

5. Click **Run Analysis**.

The result appears on the **Reports** tab for the object you are analyzing. That is, if you are running an analysis of a dataset, the result appears on the **Reports** tab on the **Datasets** tab window.

Tips for Creating an Effective Feature Analysis Report

When you create a Feature Analysis report for a predictor, Predictive Routing extracts input data from the predictor, such as the target metric. When you run the report for a dataset, you must manually select the target metric. However, when you click **Run Analysis**, the algorithm used is identical.

The Feature Analysis report uses two types of analysis depending on the target metric type:

- **Numeric** (continuous): The Feature Analysis report uses regression analysis, which predicts the output value using training data.
- **Boolean**: The Feature Analysis report uses classification analysis, which groups the output values into two classes, `true` and `false`.

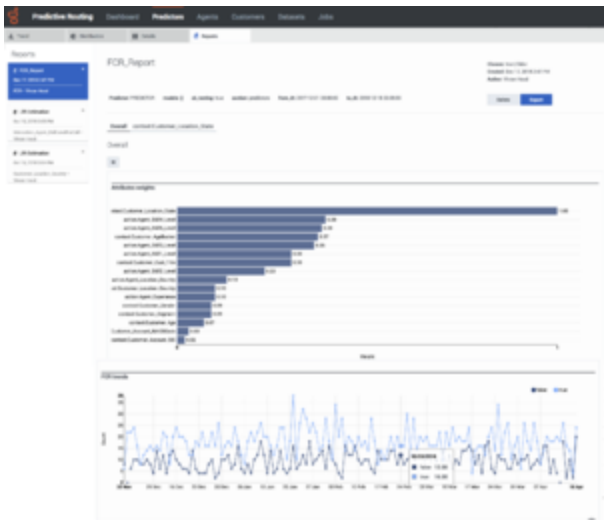
Target Metrics <*metric_name*> Range: Appears only if your target metric is numeric. The Target Metric Ranges slider converts a numeric—regression—metric into a classification metric. For example, if you have a numeric metric with a range from 0-10, you can adjust the slider to divide the outcome results into two or three classes or *buckets*. You might move the buttons to create one bucket from 0-3, one from 4-6, and one for 6 and higher. To create two buckets, leave one button at the far end of the slider and use the other to divide the bar.

- Creating these buckets sets the Features Analysis report to use classification analysis on the target metric, rather than regression analysis. So the same numeric target metric could produce different results depending on which underlying analysis type you specify.
- To have the Feature Analysis report use regression analysis, leave both buttons at the far ends of the bar, to create a single bucket.
- If the report for a numeric metric is taking an unacceptably long time to run, you can speed processing by dividing the possible values into buckets. To do this, you need to have some understanding of how dividing the data into buckets affects the outcome. This scenario requires input from your data science team and might require experimentation to determine the best trade-off between the need for fine-grained detail, which is coarsened by bucketing, and the need to improve processing speed.

Attributes: When you are setting the report parameters, all features/attributes are available for selection. Selected attributes have a check mark next to the name. Click the attribute to toggle the check mark on or off. To add all or remove all, click **Select All** or **Select None**.

- You can select up to 250 attributes. For help understanding how GPR analyzes and displays attributes, refer to the section below.

View a Feature Analysis Report



Feature Analysis Report Window

To view a report:

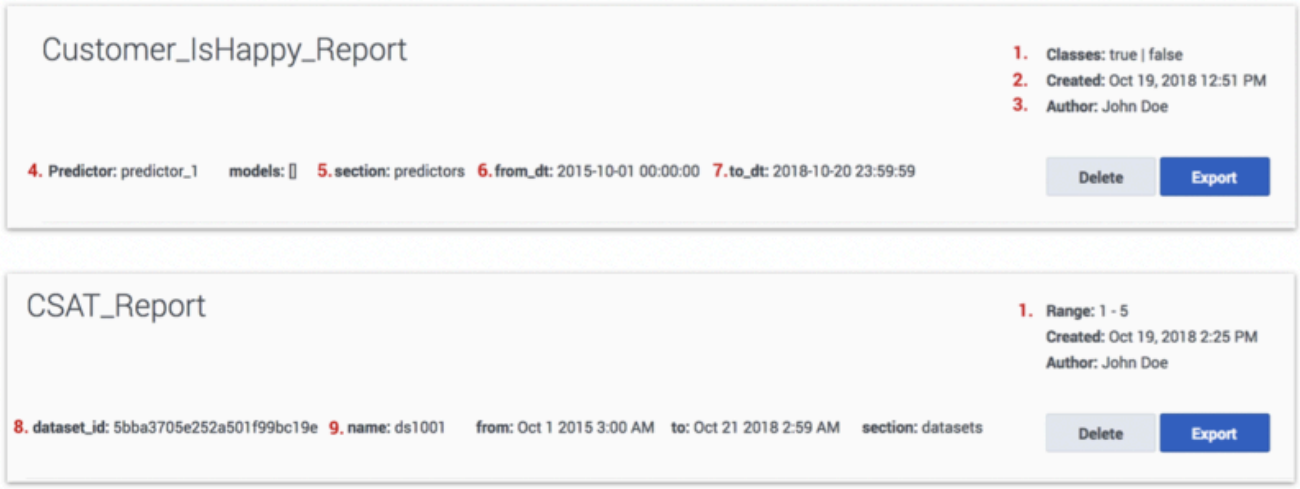
- Click a report to view it from the list in the **Run Analysis** window; or
- Click the **Reports** tab and select it from the list on the left side of the tab.

The report window is large and contains a number of sections and options for how to view the analysis results. The thumbnail on the right shows the entire window, for your reference (click to enlarge it). The sections that follow explain the report display, section by section.

Report Header and Tabs

By default, the report opens showing an Overall view of the data. All attributes (features) you selected for the report and which have a relative weight greater than one-half percent (0.5%) are listed on tabs under the report name, so you can view analyses of the data for each feature.

- The numbers on the following graphic correspond to the field descriptions (below the graphic).



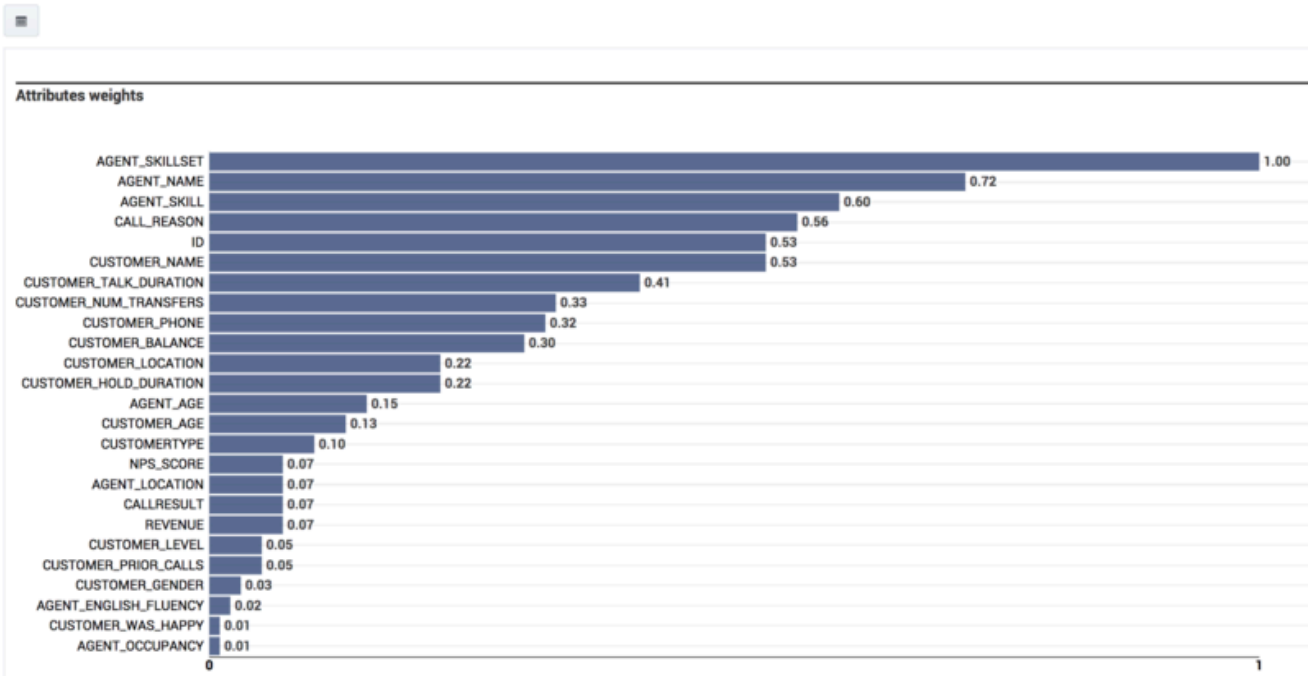
1. **Classes/Range**:
   - **Classes** - The target metric for the report is Boolean, or a numeric target metric was bucketed using the Target Metrics Range setting. The Classification algorithm was used to create the report, the label reads **Classes**, and lists all identified classes.
   - **Range** - The target metric is numeric. The Regression algorithm was used to create the report, the label reads **Range**, and displays the minimum and maximum values for the metric.
2. **Created**: Date the report was generated.
3. **Author**: Name of the user who generated the report.
4. **Predictor**: Name of the Predictor used to generate the report (applicable only for reports run on a Predictor).
5. **Section**: Object on which the report is built, either `predictors` or `datasets`.
6. **From_dt**: Dataset start date.
7. **To_dt**: Dataset end date.
8. **Dataset_id**: ID of the Dataset used for analysis (applicable only for reports run on a Dataset).
9. **Name**: Name of the Dataset used for analysis (applicable only for reports run on a Dataset).

The header also contains the following objects:

- **Delete button**: Entirely removes the report from your reports list.
- **Export button**: Creates a CSV file containing the report data for the currently-selected tab.
- **Tabs**: Features that are analyzed to have the strongest impact on the target metric appear as tabs above the report graph or table. All features with a weight of at least 0.5 relative to the most powerful feature appear as tabs.

Report Graph or Table

The button at the top left of the graph enables you to toggle between the chart view (shown here) and a tabular view.



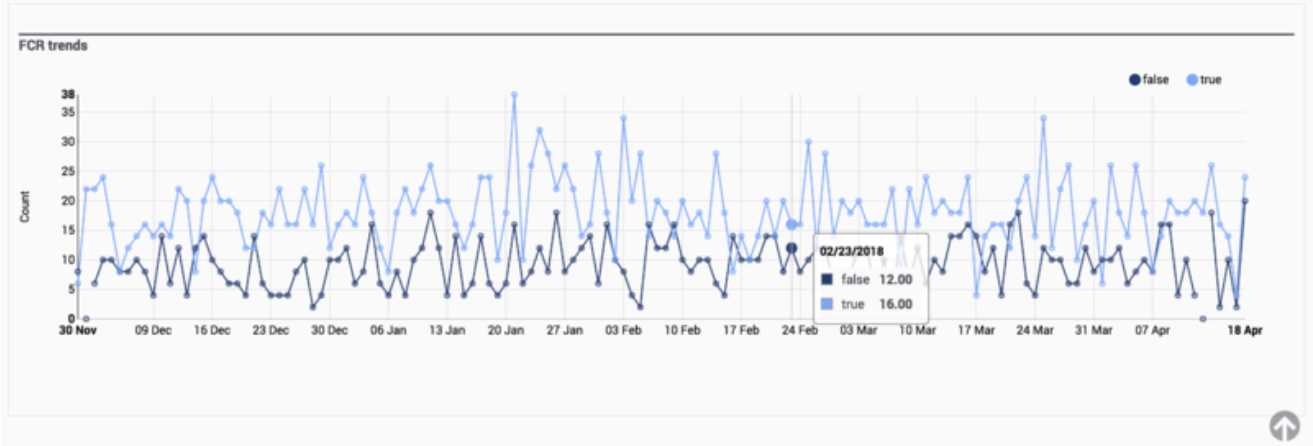
- The Overall view contains a graph listing the features ranked according to how strongly they affect the target metric. The feature that affects the metric most strongly is assigned a value of 1.0 and the remainder are assigned numbers that indicate how influential they are relative to the strongest feature. All features with a weight of 0.5% or higher are displayed.

    - For example, you might have three features, ranked as follows: FeatureA = 1.0, FeatureB = 0.86, and FeatureC = 0.54. These numbers indicate that FeatureB has only 86% as much weight in affecting the target metric as FeatureA, and FeatureC 54% of the impact on the target metric. These values are relative to the most impactful feature, not an absolute measure of their impact on the target metric.

> **Important**
>
> If the Dataset you are using to run the report has more than 100,000 samples for a feature, GPR samples the rows for that feature randomly. As a result, in such cases, the Feature Analysis report might produce slightly different results when running the report on the same Dataset with the same parameters selected.

- Click a tab for a specific feature on the top section of the report to view a chart displaying data for that feature only.
- Click the bar on the graph for a feature with a weight less than 0.5 (that is, for which a tab is not generated by default) to have a new tab open showing a chart of that feature. Note that this tab is displayed only until you navigate away from it.

Report Trends Graph



In the Overall view, the second chart shows the target metric values over time.

- Hover over any chart to view a tooltip containing information about that exact data point.
- To toggle between a table view and a chart view of the report, click the icon at the top left corner of the top-most chart or table.
- To drill down to more granular data about a specific feature, click its name from the list above the graphical display. By default, tabs for feature sub-reports are visible only for features with a weight greater than 0.5. To access sub-reports for features weighted less than 0.5, click the corresponding bar in the bar chart.
  - The charts change to show data relevant to how that feature affects the target metric.
  - When you are viewing charts for a specific feature, the score for that attribute is provided in a gray oval next to the feature name.
- To export the results of a Feature Analysis report, click **Export**. The export contains all of the features and the weights determined for them. You can save the file in Excel format.

Agent Variance Report

Success using Genesys Predictive Routing (GPR) depends on the presence of variance in agent performance for a target metric. The more variance between agents, the greater the impact of choosing better agents.

The Agent Variance report actually produces two different graph types, depending on your choices as you configure the report:

- **Inter-agent Variance** - Shows how well individual agents perform, which enables you to see which are your highest-performing and weakest agents.
- **Agent Variance** - Shows the range of agent performance for each category as specified in the **Group By** field. For example, if you group your report by location, you can see how your agents are performing in each location.

Important

- Predictive Routing supports report generation that includes up to 250 features (columns).
- For all reports, mandatory fields are marked with an asterisk.

Procedure: Generate an Agent Variance report

Steps

To create an **Agent Variance** report:

1. Click **Datasets** on the top navigation bar.
2. Click **Analysis**. This button is located on the right side of the top navigation bar.
3. Choose the **Per Agent Variance** report type from the drop-down list.
4. Select the settings you want to include in the report.
    - **Target Metric:**Choose the target metric from the drop-down list of metrics included in the selected dataset. The target metric must be of a numeric or Boolean type.
    - **Agent ID:** The Agent ID should be an identifier that uniquely and precisely distinguishes each agent included in the dataset.

- **Group By:** Your selection here determines which type of graph output is generated.
  - The agent variance tool enables you to show variance between agents grouped by a categorical or a numeric variable, such as agent location, virtual queue, or seniority. To create such a report, select the appropriate parameter in the **Group By** field.
  - Alternatively, you can create an inter-agent performance analysis. In this case, you are analyzing how a specific agent performs in various contexts. To create this type of report, the **Group By** value should be the same as the **Agent ID** value.
- **Min Interactions Per Agent:** Set this parameter to filter out agents that have too few interactions in the dataset records to give a meaningful picture of their performance. Genesys recommends that the minimum number of interactions per agent should be at least 10.
- **Number of Agents:** Specify the number of agents for which you want to run this report. The default is 50 agents. GPR determines which agents to include by first filtering the pool of agents using the parameters you set when configuring the report, then by ranking the agents in descending order according to the number of interactions they have handled. The number of agents you specify here are then selected from the top of the resulting list.

5. Click **Run Analysis**.

The result appears on the **Reports** tab. Information above the graph shows the parameters used to generate it. You can view it on the **Reports** tab or use the buttons to the upper right of the graph to export or delete the results.

- See About the Agent Variance Report Graphs (below) for an explanation of the resulting report.

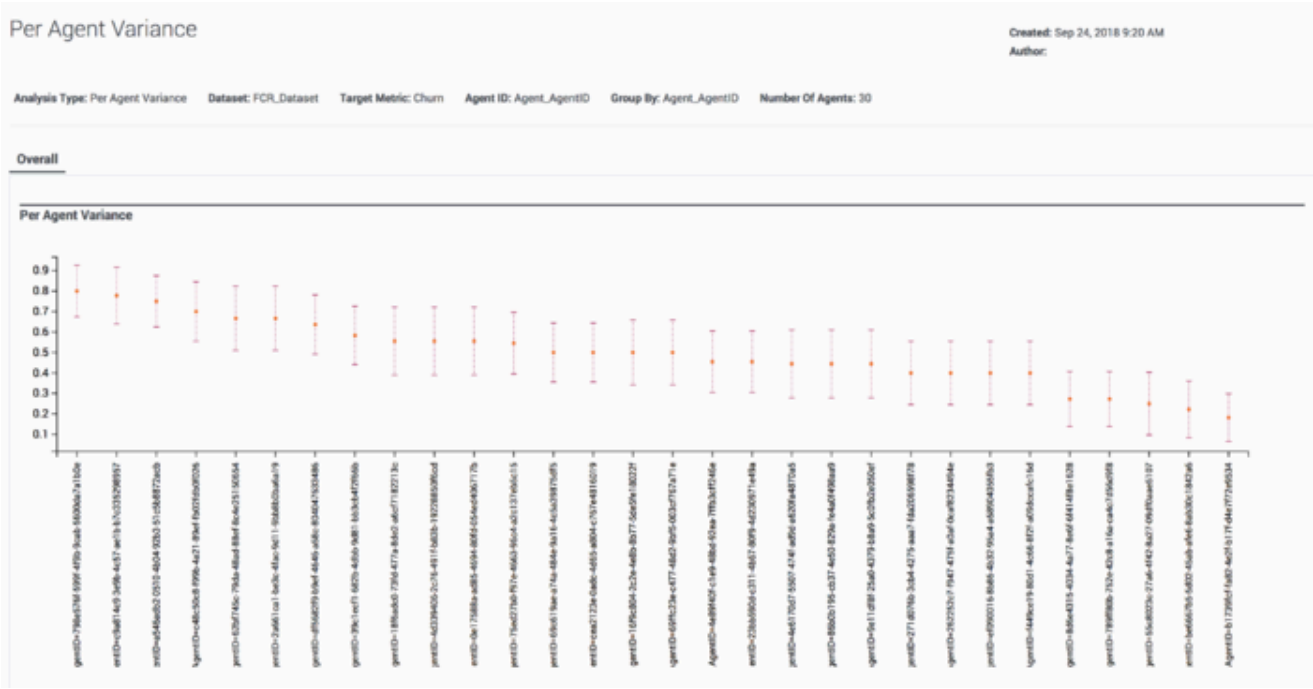
About the Agent Variance Report Graphs

This report produces two different chart types, depending on what you select as the value of the **Group By** parameter., intra-agent variance and agent variance across categories.

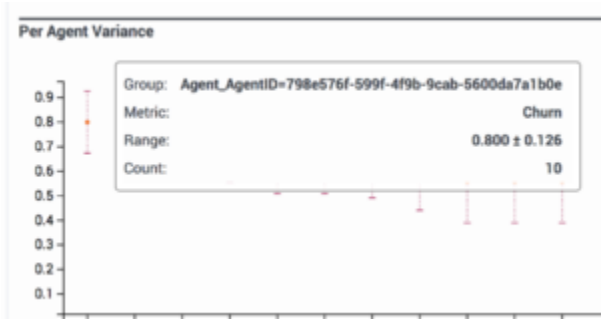
Inter-Agent Variance

When specify Agent_ID as the value for the **Group By** setting, the graph shows inter-agent variance with each agent functioning as its own "group". In this scenario, the highest potential for optimization occurs when you have tight vertical bounds, showing consistency in agent skills, and large horizontal variations, indicating that the mean values for these agents are very different.

In the Inter-agent variance graph, each red bar represents one agent.



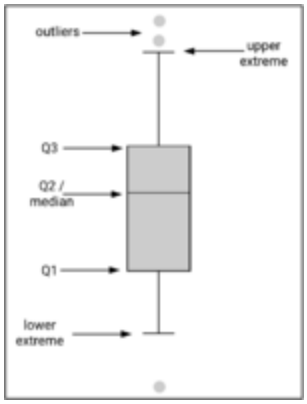
Hover over the center red dot on any bar to view details about that item.



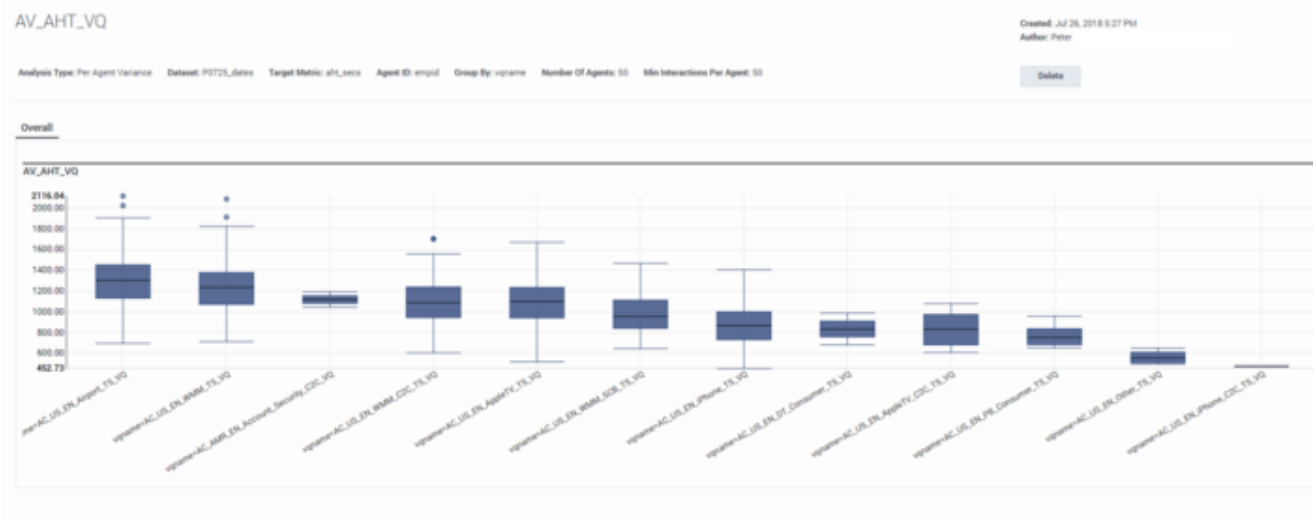
- The **Range** indicates the numeric value of the mean (central dot), followed by the the standard error of the mean for the agent who is represented by the selected bar, showing agent performance for the specified Metric. The standard error of the mean is "a measure of the dispersion of sample means around the population mean" (Wikipedia, Standard Error).
- The **Count** is the number of interactions (or rows in the Dataset) and agent has that relate to the specified Metric.

Agent Variance Across Categories

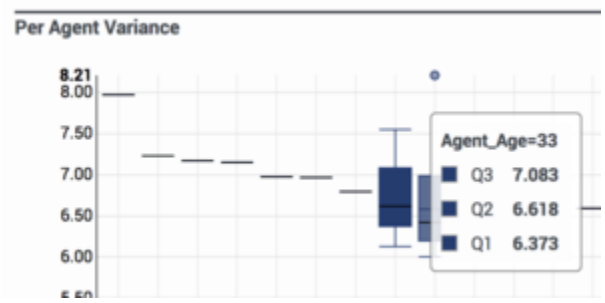
If you select any Group By value other than the agent ID, the result is shown in a box plot.



- A large variation in the mean or median values along the *horizontal* axis means that the agent performs very differently depending on the selected interaction or customer category (whatever you entered as the **Group By** value).
- A large variation on the *vertical* axis means that agent performance varies a great deal within the category.



If you hover over any box on the graph, a popup window shows the numeric values that are shown graphically in the box plot. Gray dots scattered above or below the box plot and its *whiskers* indicate outlier values.



Q in this window stands for *quartile*. The numbers on the popup indicate the numeric value at which the respective quartile starts.

Creating and Testing Predictors and Models

Predictors and models are key objects to create and optimize predictive routing.

- *Predictors* enable you to analyze various factors that might affect a specific metric. For example, you might check how the matching between customer and agent languages, ages, genders, and locations affect the NPS score.
- *Models* are built on a predictor and include the same target metric. Each model has a subset of the agent and customer features present in the dataset. The Feature Analysis report helps you to identify the features with the strongest impact on the target metric. You can create multiple models for the same predictor, each with a different set of features selected.

Before proceeding to create predictors, make sure you have created/uploaded the following data:

- One or more Datasets
- Agent Profile schema
- Customer Profile schema

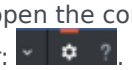
To start the process,

1. Run the Feature Analysis report.
2. Build a predictor focusing on the features that emerged as key in the Feature Analysis report.
3. Create train, and test models based on the predictor.

Create and Update Predictors

Predictors enable you to analyze various factors that might affect a specific metric. For example, you might check how the matching between customer and agent languages, ages, locations, customer's reason for making contact, and agent skills affect the NPS score. In addition to *simple Predictors*, you can also combine them to create *composite Predictors* that analyze multiple metrics.

Viewing Data on This Window

- To open the configuration menu, click the **Settings** gear icon, located on the right side of the top menu bar:  .
- A right-hand toggle navigation menu opens a tree view of all Datasets associated with your Account, with the Predictors and Models configured for each. To open or close this navigation menu, click the  icon. Note that composite predictors do not appear in this tree view.
- You must reload the page to view updates made using the Predictive Routing API, such as appending data to a Dataset, creating, updating, or deleting a Predictor, or creating, updating, or deleting a Model.

Important

- The Tooltips, which appear when you hover over any **?** icon, contain helpful explanatory information about the associated fields.

Creating a Predictor

The following series of procedures takes you through the steps required to create and configure a new Predictor.

Procedure: Begin to create a new Predictor

Purpose: To create a Predictor, which specifies a metric you plan to optimize and the agent and customer features you have found to have the strongest effect on that metric.

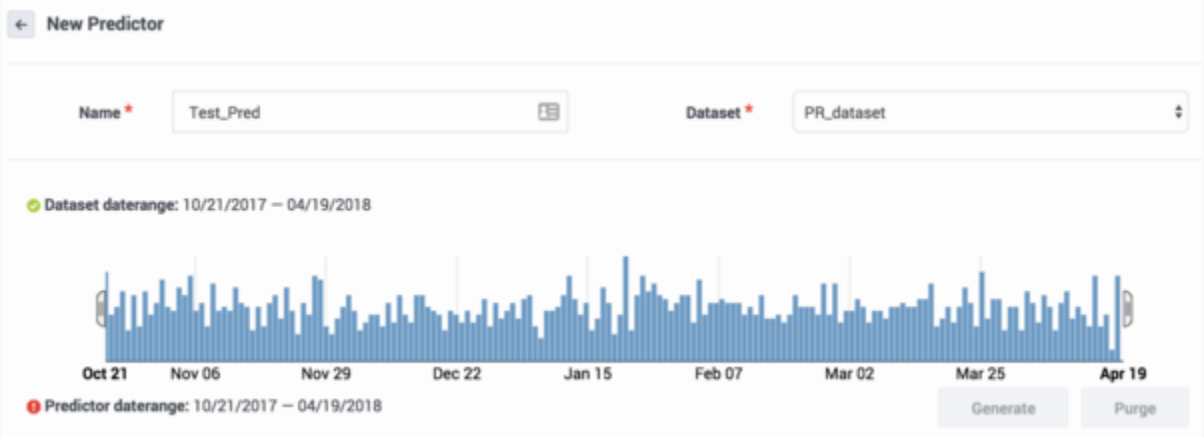
Prerequisites

- You might want to run a Feature Analysis report before creating a Predictor. The Feature Analysis report can analyze which features in your dataset have the strongest impact on the value of a specific metric.

Steps

To start creating a Predictor:

1. Select **Predictor** from the left-hand navigation bar and then click **Add Predictor.**
2. Name your Predictor and select a Dataset from the drop-down menu. When you select a Dataset, the Dataset date range appears.
   Note: Predictor names can consist only of alphanumeric characters, and must start with a letter or underscore.
3. Move the slider bars at either end of the date range to select the part of the Dataset you want the Predictor to evaluate.

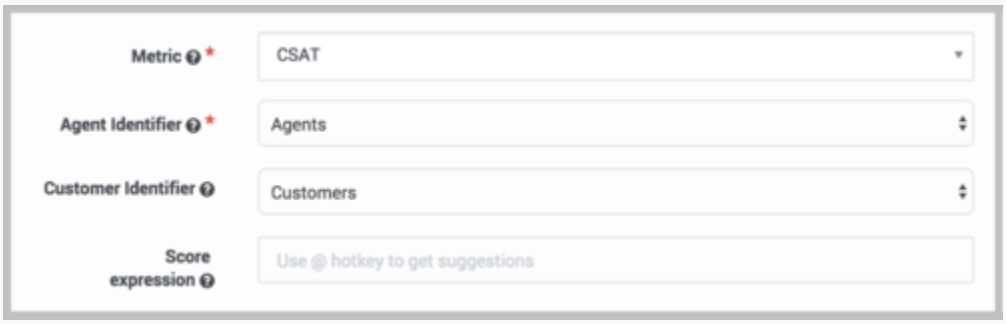


Procedure: Select a metric and the Agent and Customer Identifiers

Steps

To continue Predictor configuration, perform the following steps:

1. Select the metric for this Predictor. A Predictor can be associated with only one metric.
2. Select the **Agent identifier**, which can be either `Dataset generated` or `Agents`.
   - **Dataset generated:** Agent profile data is derived from the most up-to-date data captured in the Dataset used to create the current Predictor. Note that this Dataset must be synchronized for the latest data to be available for the Predictor.
   - **Agents:** Agent profile data is taken from the Agent Profile schema. This is the typical production configuration.
3. Select the **Customer identifier**, which can be either `Customers` or `None`.
   - **None:** Customer and interaction data is gathered from attached data.
   - **Customers:** Customer data is taken from both the Customer Profile schema and attached data. If both sources include data for a specific field, the value in the attached data is used. This is the typical production configuration.
4. **KPI Type:** This field is reserved for future use. All users should accept the default type, which is `Service`.
5. Optional. Enter an expression to be used for computing the final score returned by the scoring engine. You can construct the expression using arithmetic operations, Python 3 built-in functions, and discovered fields. To access the built-in functions, press the **SHIFT+@** shortcut.
   Examples of ways to use this field:
   - If URS has different scales for scoring, you can use this field to scale the returned score appropriately.
   - You might need to translate the result returned from URS to correct the sort order. For instance, if **customer_talk_duration** is a target metric, agents with lower scores are actually better. So you might enter the score expression `1 / p_score`, which produces an outcome such that higher predicted values are lower actual scores.
   - For an in-depth discussion of how GPR handles metrics, see Understanding Score Expressions.



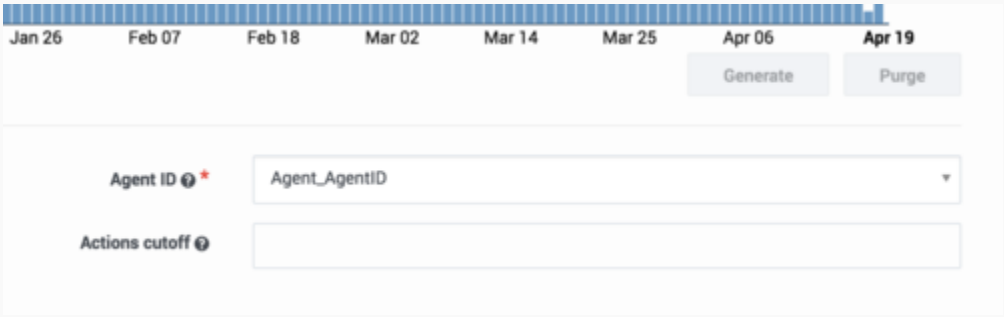
Procedure: Select the Agent ID and Actions Cutoff

Steps

To continue Predictor configuration, perform the following steps:

1. Select the Agent ID from the drop-down menu. This is a unique employee identifier that is relevant for the type of metric you are evaluating.
   If **Agents** (the Agent Profile schema) has been selected as Agent Identifier, the Agent ID you select must be the same field as the ID_FIELD in the Agent Profile.
2. Select the maximum number of best scores that will be returned when you make a scoring request to the API.

> **Important**
>
> The maximum number of best scores is only relevant to the API, not to scoring requests sent using the Predictive Routing application.

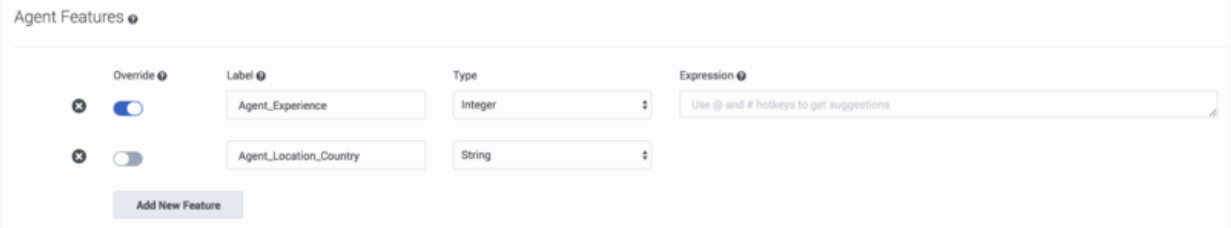


Procedure: Choose Agent Features

Steps

Agent Features are items in the Dataset that refer to the agent. All agent-related fields in your selected Dataset appear in the drop-down list under **Agent Features**.

1. Select an Agent Feature from the drop-down list. The type associated with it in the Dataset appears.
2. Continue until you have selected the Agent Features you want to include in your Predictor.
3. Optionally, you can create a new feature. A new feature must be based on existing features. When you create a new feature, you can add an expression, which enables you to perform some action on existing features and then use the result in your Predictor.
    1. Click **Add New Feature**.
    2. Type a name for your new feature and then select the type of value this feature returns: Boolean (the returned value is an either/or value, such as `true/false`), list (a list of the possible returned values), string, and so on.
    3. If you need to use a value from a different source than that initially added to the schema, toggle the **Override** control to on (toggle turns from gray to blue) for those features that should be updated at the time of scoring and then add an expression that tells GPR what value to use. For example, if you configured your Agent Profile schema with the CSAT captured in the AVG_CSAT column, but at runtime you want the value to be computed from other columns in the schema, turn on the **Override** control and enter the desired expression in the **Expression** field.
        To construct your expression, you can use arithmetical operators, Python 3 built-in functions, and fields accessed by the following shortcuts:
        - `SHIFT+@` - for Dataset fields
        - `SHIFT+#` - for Profile fields



Procedure: Choose Customer Features

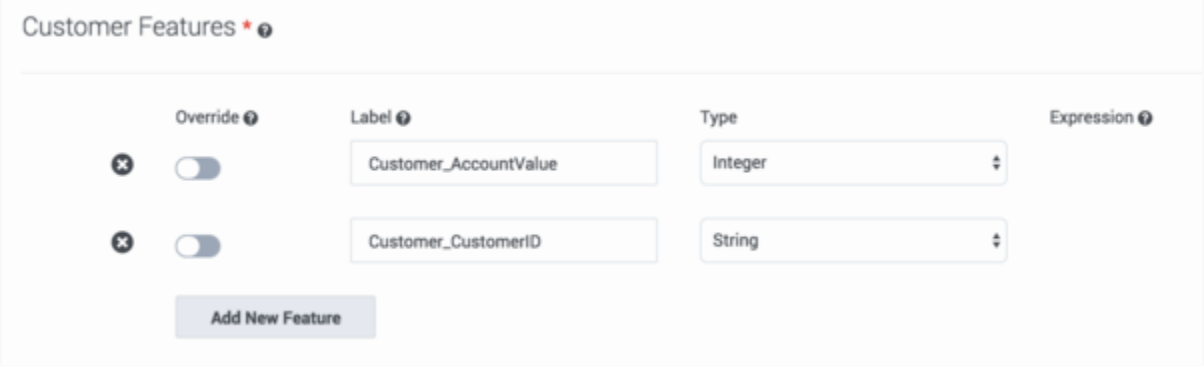
Steps

Customer Features are items that refer to the customer or that are available in interaction user data. They refer to aspects of the environment, broadly speaking, in which the interaction occurs. All customer- and userdata-related fields in your selected Dataset appear in the drop-

down list under **Customer Features**.

1. Select a Customer Feature from the drop-down list. The type associated with it in the Dataset appears.
2. Continue until you have selected the customer features you want to include in your Predictor.
3. Optionally, you can create a new feature. A new feature must be based on existing features. When you create a new feature, you can add an expression, which enables you to perform some action on existing features and then use the result in your Predictor.
    1. Click **Add New Feature**.
    2. Type a name for your new feature and then select the type of value this feature returns: Boolean (the returned value is an either/or value, such as `true/false`), list (a list of the possible returned values), string, and so on.
    3. If you need to use a value from a different source than that initially added to the schema, toggle the **Override** control to on (toggle turns from gray to blue) for those features that should be updated at the time of scoring and then add an expression that tells GPR what value to use. For example, if you configured your Customer Profile schema with the customer value status captured in the CUST_VALUE column, but at runtime you want the value to be computed from other columns in the schema, turn on the **Override** control and enter the desired expression in the **Expression** field.
        To construct your expression, you can use arithmetical operators, Python 3 built-in functions, and fields accessed by the following shortcuts:

        - `SHIFT+@` - for Dataset fields
        - `SHIFT+#` - for Profile fields



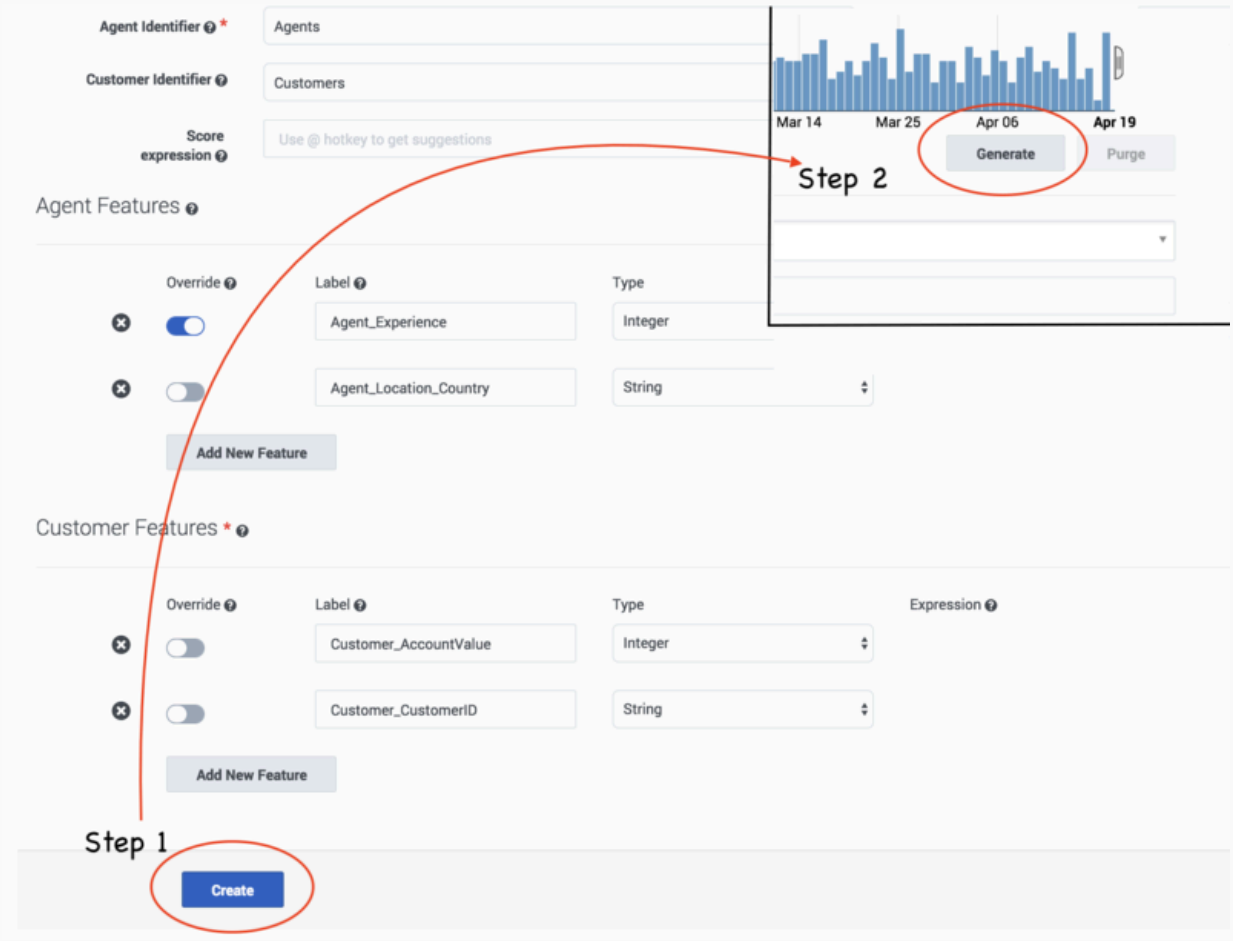
Procedure: Create and generate your new Predictor

Steps

To finalize your Predictor configuration, save and generate it:

1. Click **Create** to save your Predictor settings. You should receive a success pop-up window indicating that the Predictor has been created.
2. Before you can train and activate Models, you must generate your Predictor. Scroll up to the daterange display on your Predictor configuration window, and then click **Generate**.
   Pop-up windows indicate the progress of the generate job.

Your new Predictor now appears in the list of Predictors, along with information about its status, such as the number of associated Models, when it was last run, and its quality.



Viewing and Updating Predictors

After you have created Predictors, use the following procedures to view and maintain them. It is important to ensure that your Predictors and Models stay up-to-date, so that they continue to address your most compelling business needs.

Procedure: View your Predictors

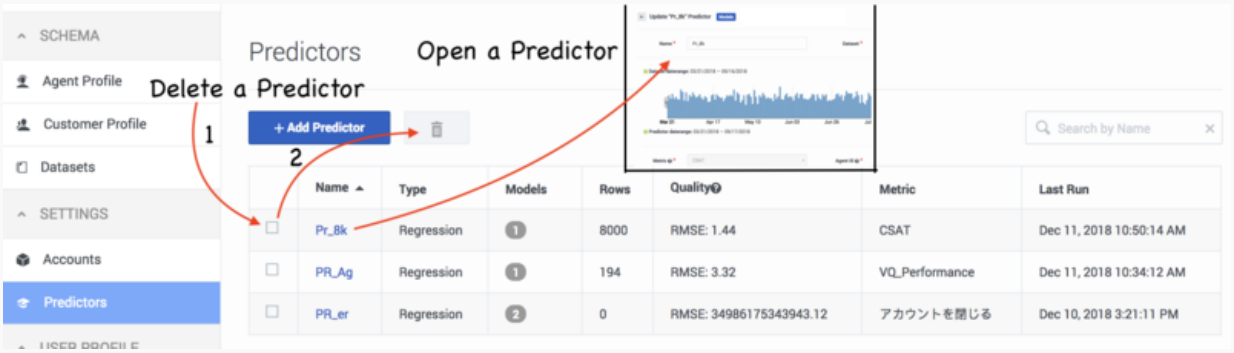
Steps

When you navigate to **Settings** > **Predictors**, the window shows a table listing all your existing Predictors. For each, the table shows what the following information:

- Name - The name given to the Predictor when it was created.
- Type - Whether the metric requires classification (binary) or regression analysis.
- Models - The number of Models created for the Predictor.
- Rows - The number of rows in the Dataset used to create the Predictor.
- Quality - The quality value displayed for the Predictor (AUC for classification metrics and RMSE for regression metrics) is the average of the results for each trained Model associated with that Predictor. Both active and inactive Models are included in the average, as long as they are trained.
- Metric - The metric that the Predictor is built to optimize.
- Last Run - The last time the Predictor was trained.

From this list you can do the following:

- Edit your Predictor, if you have not yet created and activated any Models created for it. See Update a Predictor (below) for details.
- Create or edit Models for the predictor. Click the name of a Predictor to open it, and then click **Models** to access the Model functionality.
- Delete a Predictor. Select the check box next to a Predictor name, and then click the trash can icon.

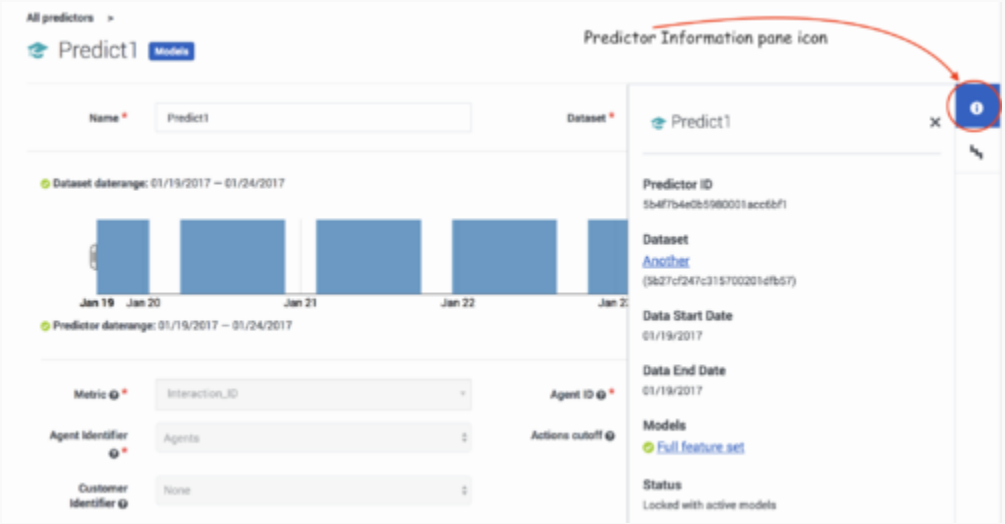


Procedure: View the Predictor Information Pane

Steps

When you view the configuration data for a Predictor, the right-hand toggle Information pane icon becomes active. Click this button to view the following information:

- The Predictor ID, which you can use to make API requests affecting the Predictor.
- The Dataset upon which the Predictor is based.
- The start and end dates for the data on which the Predictor is based.
- The Model or Models created for this Predictor.
- The Predictor status.



Procedure: Update a Predictor

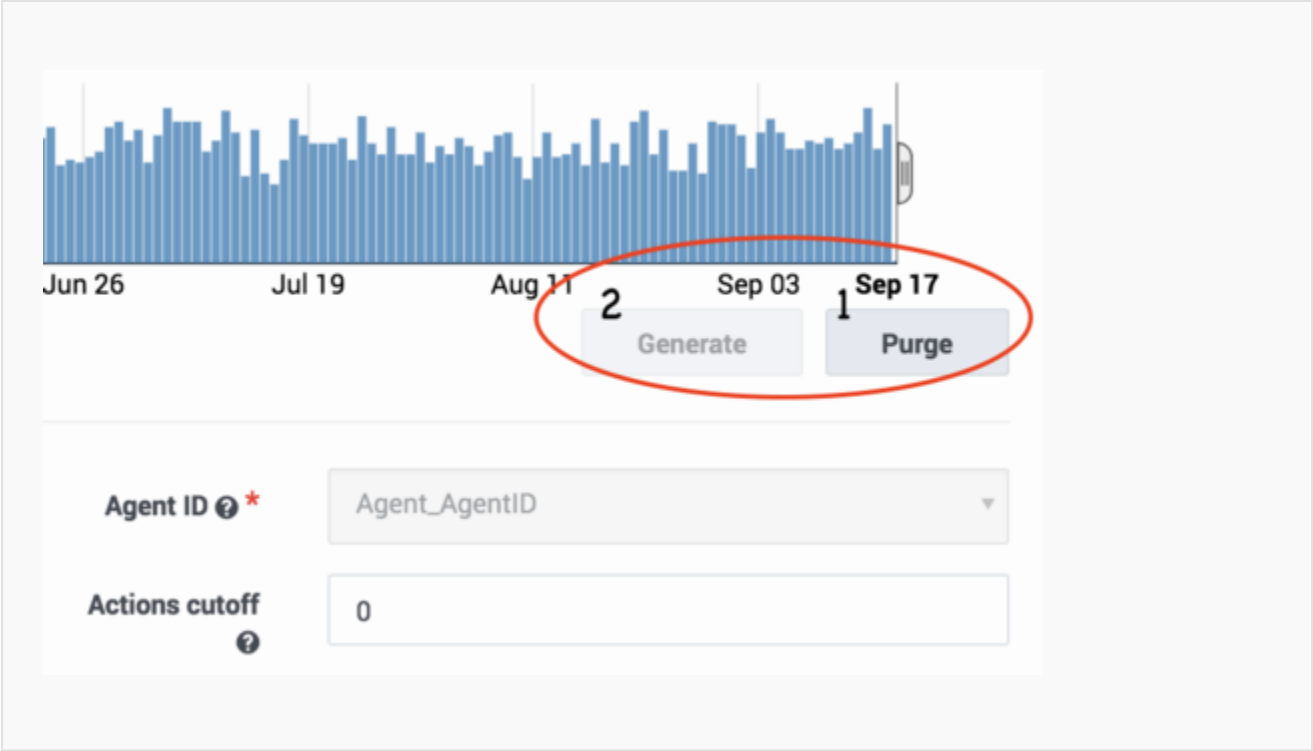
Steps

You can edit your Predictor *unless* you have created and activated one or more Models based on it. In that case, Genesys recommends that you create a new Predictor with the desired parameters.

You can change the Predictor date range, purge generated data, and re-generate your Predictor with a different date range at any time. However, already trained and activated Models continue to use data from the old daterange.

1. Click **Purge** to change the date range in your Dataset used to generate new Models. Activated existing Models continue to use the same date range.
2. Select the new date range, and then click **Generate**.

Pop-up windows indicate the progress of the purge and generate jobs.



Gather Updated Scoring Data Using Profile Look Ups

When you are using a Model to score agents, you can configure Predictive Routing to incorporate up-to-date data from the Agent Profile schema and/or the Customer Profile schema rather than the corresponding data from your Dataset.

For example, your Dataset might be three months old. As a result, various metrics might no longer reflect the actual conditions in your environment. For example, a metric such as agent tenure is now three months out of date. Agent performance scores for each virtual queue might have changed, because of factors such as changes in virtual queue assignments or training that might have improved an agent's performance.

To make use of the most recent available data, you *override* the use of the older data and enable Predictive Routing to look up the new values for key features.

Important

When configuring profile lookups, keep in mind that a large number of lookups can significantly impact the scoring response time. You should test for impact on scoring performance in your environment before configuring overrides for a large number of features.

Settings Required to Use Profile Lookups

To have Predictive Routing look up fresh values for specified fields, you must have the following:

- Agent Profile and Customer Profile schemas loaded and accepted.
- The **Agent Identifier** and **Customer Identifier** fields set to `Agents` and `Customers`, respectively.

> **Important**
>
> These instructions are given for both Agent and Customer Profile lookups. If you do not need Customer Profile lookups—that is, the customer data is fairly stable and does not need to be updated constantly, you can omit the **Customer Identifier** and **Customer Features** settings.

How Profile Lookups Work

The image below shows a record in the Agent Profile schema that shows how to encode agent performance across different queues. The **a_performance** column contains a dictionary, consisting of two entries with the values `Tech Support:10.00` and `Sales:1.00`, respectively.

a_id	a_performance
a_1000	{'Tech Support':10.00,'Sales':1.00}

> **Important**
>
> - In the Predictor schema, the action feature—in this case, **a_performance**—must be defined in such a way as to allow it to be an expression, since its actual value is based on an Agent Profile lookup.
> - Currently only one-dimensional dictionaries are supported, with up to 200 key-value pairs where the key is a string and the value is int, float, or Boolean.

Note that information from the Agent Profile schema is used only for scoring, not for Model training. When you are training a Model based on your Predictor Dataset, it uses the original profile data, but stores it in a flat (non-dictionary) format. This works well for training a Model, where what is needed is a complete and consistent set of data, which permits meaningful learning from these attributes while training a Global Model.

The following image shows a Dataset record encoding the same information as shown above, only in a flattened format:

a_id	VQ	Feedback
a_1000	Sales	1
a_1000	Tech Support	10

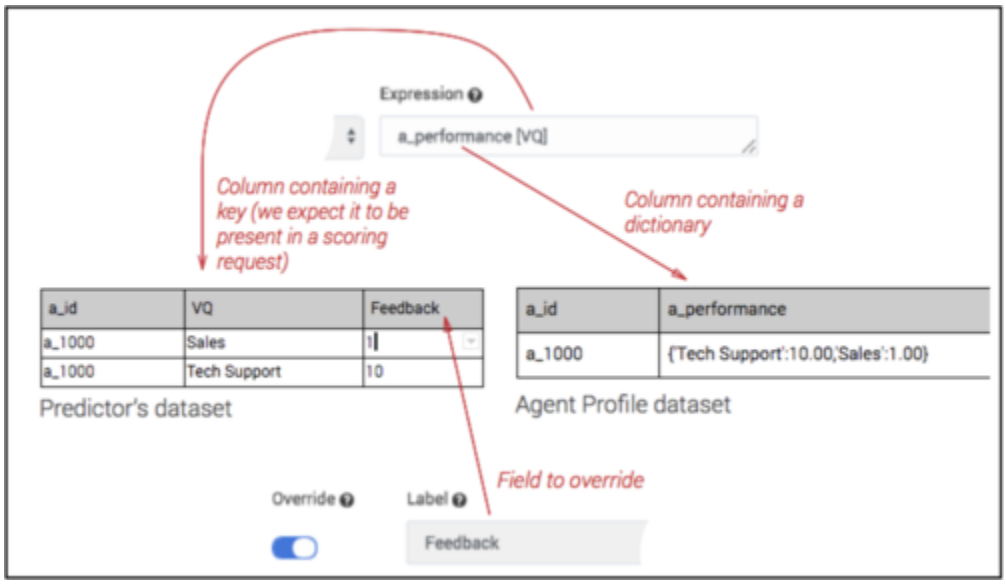
Here the **VQ** columns contain the names of the virtual queues and the **Feedback** column contains the agent performance value for the associated virtual queue.

In the example we have been using, the **Feedback** column (*feature*) holds the historical data on the agent's performance. To get the most recent value at run time, *override* this field so that it gets its value from the Agent Profile dataset rather than from the Predictor (training) Dataset. To do so, enable the **Override** toggle control next to the corresponding field and provide a lookup expression:

The **Override** toggle appears only beside fields that have a direct corresponding field in the Dataset. Once **Override** is toggled on, the expression field appears and you can enter an expression for looking up the associated value from the profile Dataset. Use the following shortcuts to open a suggestion list in the expression field:

- `SHIFT+@` - for dataset fields
- `SHIFT+#` - for profile fields

The following graphic illustrates how the lookup expression maps to the different Datasets:



Now you can issue a scoring request and it looks up the associated value in the Profile Dataset. In this example, Predictive Routing looks up the value in the Agent Profile **a_performance** column using the VQ Key: **Sales**.

Composite Predictors

You can create *composite Predictors* by combining two or more *simple Predictors*—that is, standard Predictors such as those described in this topic so far. The composite is defined using an arithmetical function that works on the set of target metrics used in the selected simple Predictors. This enables you to score agents based on multiple metrics rather than just one.

The composite Predictor takes the scoring outcomes for each of the included Predictors and then applies the arithmetical expression you specify to those results. This composite result is then sent back to the routing strategy to be used when determining the best match between waiting interactions and available agents.

Example

Assume you have three agents with the following individual scores:

Agent	Predicted NPS Score	Predicted CSAT Score
Agent 1	8	7
Agent 2	8	8
Agent 3	6	5

If you just use NPS to select the best agent, Agent 1 and Agent 2 appear equally likely to handle the interaction well. But if you want to maximize your CSAT as well, the additional parameter acts as a differentiator. The aggregated score for Agent 2 (16) is higher than that for Agent 1 (15).

Important

- If a Predictor you include has multiple active Models associated with it, the Model used is determined in the same way as it normally is when you have multiple Models.
- The Lift Estimation report, which evaluates potential lift based on a specific Model, does not support composite Predictors. If you need to create a complex metric for use in the

Lift Estimation report, see Creating Complex Metrics in Genesys Predictive Routing for guidance.

The advantage of starting with separate Predictors over pre-computing the final metric in a common Dataset is to maximize data usage. For example, you probably have much more data for talk duration than for NPS, which requires customers to take a survey. It is also easier to create the desired calculation when you combine individual, already-created metrics.

- **Example 1:**
  You might create a composite Predictor out of three simple ones by combining them. Target metrics contain only numeric or Boolean values, so that you can combine the outcome using basic arithmetic operations. Assuming that the target metrics for the respective Predictors are the following:
  - Predictor1 - NPS
  - Predictor2 - CSAT
  - Predictor3 - TALK_DURATION

  You can write an expression such as the following:

  ```
  (Predictor1 + Predictor2) / Predictor3
  ```

  In this example, the agent score is (predicted NPS + predicted CSAT) / predicted talk duration. That means agents with higher NPS and CSAT get higher scores if call duration is lower. Agents with high NPS and CSAT scores that also have high talk durations are scored lower. As a result, you can take into account several aspects of agent performance when scoring.
- **Example 2:**
  You might use different simple Predictors depending on a context variable passed in a scoring request. You can create a composite Predictor that would use one simple Predictor for customers in a high-value category (value >= 50) and a different simple Predictor for lower-value customers (value <= 50). The idea is to offload this logic from the strategy into a Predictor to reduce the need to modify your strategy. To create such a Predictor, define the following expression for your composite Predictor:
  - `int(value > 50) * Predictor1 + int(value <= 50) * Predictor2`

  The logic here is the following: the `int(value > 50)` function converts the Boolean value from `true/false` to `1/0`. Whichever Predictor is multiplied by 0 is ignored and the remaining Predictor is used for routing.

Important

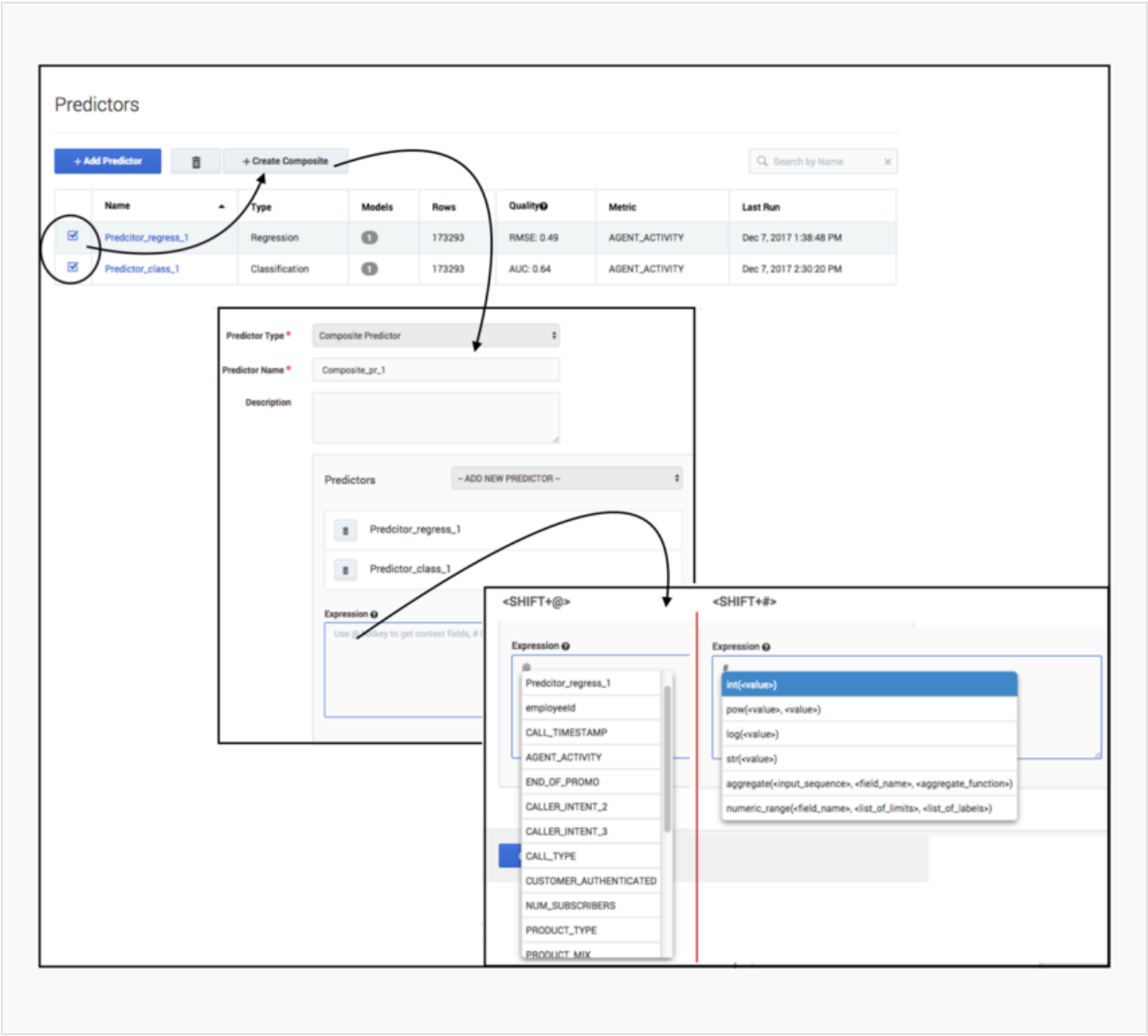
When creating a scoring request for use with a composite Predictor, the request must contain at least one Customer Feature that is common for all the simple Predictors included in the composite Predictor.

Procedure: Create a composite Predictor

Steps

1. Navigate to the **Predictors** list page in **Settings**.
2. Select the check boxes next to at least two simple predictors. The **Create Composite** button appears. You must keep in mind the following constraints when selecting simple Predictors:
   - All of the simple Predictors that are going to be used in a composite Predictor should have the **Agent Identifier** field set to `Agents`.
   - The **Agent ID** field should be identical in all of the simple Predictors, and should be the same as that in the Agent Profile schema. For example, if in the Agent Profile schema the Agent ID is the `Agent_Id` field, the Agent ID in each Predictor must also be set to the `Agent_Id` field.
3. Click **Create Composite**, which opens the **Composite Predictor** page, pre-populated with the Predictors you selected.
4. Fill out the **Expression** field. This field is *mandatory* for composite Predictors.
   You can use a **Suggestion** menu triggered by the following keyboard shortcuts to configure your expression: [Shift + @] (to open context fields) or [Shift + #] (to open a list of functions). The menu lists only the applicable fields for a given composite Predictor, thus reducing the chance of error when composing an expression.

Your new composite Predictor now appears in the list of predictors. Note that information about Predictor status, such as the number of associated Models, when it was last run, and its quality, are available only for simple Predictors.


Predictors
+ Add Predictor
+ Create Composite
Search by Name
Name
Type
Models
Rows
Quality
Metric
Last Run
Predcitor_regress_1
Regression
173293
RMSE: 0.49
AGENT_ACTIVITY
Dec 7, 2017 1:38:48 PM
Predictor_class_1
Classification
173293
AUC: 0.64
AGENT_ACTIVITY
Dec 7, 2017 2:30:20 PM
Predictor Type *
Composite Predictor
Predictor Name *
Composite_pr_1
Description
Predictors
-- ADD NEW PREDICTOR --
Predcitor_regress_1
Predictor_class_1
Expression
<SHIFT+@>
<SHIFT+#>
Expression
Predcitor_regress_1
employeeId
CALL_TIMESTAMP
AGENT_ACTIVITY
END_OF_PROMO
CALLER_INTENT_2
CALLER_INTENT_3
CALL_TYPE
CUSTOMER_AUTHENTICATED
NUM_SUBSCRIBERS
PRODUCT_TYPE
PRODUCT_MIX
Expression
int(<value>)
pow(<value>, <value>)
log(<value>)
str(<value>)
aggregate(<input_sequence>, <field_name>, <aggregate_function>)
numeric_range(<field_name>, <list_of_limits>, <list_of_labels>)

Understanding Score Expressions

Using Genesys Predictive Routing (GPR) is all about improving key performance indicators (KPIs) in your environment. These KPIs are represented as the *target metric* in your predictors and in analysis reports, such as the Lift Estimation report. When you configure a predictor, you have the option of entering a *score expression*, which you can use to transform the raw scores for your metric that are returned from the GPR scoring engine into more usable values.

> **Important**
>
> GPR uses the term *p_score* to indicate the raw predictor score returned from the GPR scoring engine. This is an internally derived value and is not related to *p*-value or any other standard statistical terminology.

Using Expressions to Improve Scoring Results

Both predictors and the Lift Estimation report support the use of score expressions. This topic explains how metrics for which a higher score is better (metrics you want to maximize) differ from metrics for which a lower score is better (metrics you want to minimize). The discussion also accounts for whether the metric is of a classification type (results fall into categories or classes) or regression type (results can occur along a continuum of values, usually with specified minimum and maximum values).

How URS Interprets Score Values

URS has certain constraints on how it expects score values to be provided. Keep in mind the following:

- URS expects scores to be >=0.
- URS assumes that higher scores are better.
- Use the **max-score** configuration option to specify the highest score value URS can expect to encounter from GPR.
- URS truncates scores to integers by dropping any decimals produced by the scoring engine. As a result, if GPR generates scores of 99.01, 99.50 and 99.99, URS truncates all three scores to 99.

Increasing and Decreasing Functions

An *increasing scoring expression* or *increasing function* is one where the value of the expression

increases if you increase the p_score. The following are examples of increasing scoring expressions:

- p_score
- 1+ p_score
- p_score -10
- 5*p_score
- (2*p_score - 5)

To see how this works, take the last example. If you evaluate (2*p_score -5) for two values, 1 and 2, you get the following results:

- 2*1-5 = -3
- 2*2 -5 = -1

As you increased the p_score from 1 to 2, the scoring expression value increased as well, from -3 to -1. This is the defining characteristic of an increasing function, which can be used for metrics where a higher value is better. And as stated before, if you do not configure a scoring expression, the metric is treated as one you want to maximize.

A *decreasing scoring expression* or *decreasing function* is one where the value of the expression decreases if you increase the p_score. The following are examples of decreasing scoring expressions:

- 1-p_score
- 10-p_score
- 1/p_score

To see how this works, take the last example. If you evaluate 1/p_score for two values, 1 and 10, you get the following results:

- 1/1 = 1
- 1/10 = 0.1

As you increase the p_score from 1 to 10, the scoring expression value decreases from 1 to 0.1. This shows that you have a decreasing scoring expression, which you can use for a metric where a lower score is better.

Scoring Expressions for Classification Analysis

A metric with binary classification results—one where the outcome is either of two values—can be either optimal when higher or optimal when lower, depending which of the two values is preferred. For example, you might have a metric indicating whether a sale was successful, with 1 meaning a sale was made and 0 meaning no sale. In this case, the desired outcome is the higher value, so GPR can handle this as a metric to be maximized. This is GPR default behavior, so entering a scoring expression is optional.

However, you might have a target metric such as deactivation, where if an SMS message is sent

it—metric result is 1—this indicates that the customer deactivated their account. If the customer stays active, they do not send an SMS, and the result is 0, the desired outcome. In this case, to optimize the result, you should configure your predictor with a score expression of `1-p_score`. This flips the zeros to ones and the ones to zeros, and GPR correctly handles the metric as a case where you want to minimize the metric value.

Scoring Expressions for Regression Analysis

For regression metrics, you can use a number of different types of scoring functions. The examples given above for the increase and decrease functions are regression-type scoring functions. The following recommendations can guide you in creating effective scoring expressions.

Example 1—Known Range of Values

The target variable ranges from 1 to 10. If you want to minimize the metric value, you might use the scoring expression 10-(p_score -1). This scoring expression neatly preserves the original range of the target metric. If you evaluate the scoring expression with p_score values of 10 and 1, you get output values of 1 and 10, respectively. This is an ideal result.

This can be stated more generally as max-(p_score-min), where *max* is the maximum metric value and *min* is the minimum metric value.

Example 2—Unknown Range of Values

What if the maximum and minimum values of the target metric are unknown, as when working with AHT? In that case, use this scoring expression: `1/p_score`.

Note that there are important considerations when working with division in scoring expressions:

- The denominator must *never* evaluate to 0. In the case of AHT, because AHT is never negative, you can change the denominator to 1+p_score.
- Write the numerator as 1.0 instead of 1, which tells Python (the underlying processing language) to interpret the numerator as a *float* value instead of an *int* value.
  If the operation is performed on int values, the result must be an integer; that is, it cannot be a decimal or fraction. As a result, the output might be different than you anticipate. For example:
  - 1/2 (1 is an int) = 0
  - 1.0/2 (1.0 is a float) = 0.5.

Keeping these two rules in mind, the final scoring expression for our example of AHT becomes 1.0/(1+p_score).

This is, in fact, a good scoring expression for AHT, but adding another term to the generalized expression ensures that you do not end up dividing by zero in other cases: 1.0/(1+p_score-min), where *min* is the minimum metric value. If your metric has no set minimum—as AHT does not—use the minimum possible value.

Example 3—All Possible Values are Positive

As in the case of AHT, there is no set minimum, but the value cannot be a negative number.

Therefore, use 0 as the minimum.

Example 4—The Minimum Value Can Be a Negative Number

If the target metric is in the range -5 to +5, then 1/(1+p_score) results in 0 as the denominator for p_score=-1. To avoid that, use 1/(1 + p_score - (-5)). Now, the denominator can never be 0.

Metrics and Score Expressions in Predictors

GPR supports both metrics where a higher value is better, such as FCR, CSAT, and so on, and metrics where a lower score is better, such as AHT, deactivation, and so on. When handling scoring requests, by default GPR assumes metrics should be maximized. If necessary, use the scoring expression field in your predictor configuration to manipulate the raw metric values.

For example, if you are creating a predictor for a metric you want to minimize, the simple expression 1/p_score transforms your metric so that lower (improved) scores generate a higher result. See Example 2—Unknown Range of Values under "Scoring Expressions for Regression Analysis" (above) for a full discussion of the best expression to use for metrics you want to minimize.

For a complete discussion of how to create and use predictors, see Creating and Updating Predictors.

Metrics and Score Expressions in the Lift Estimation Report

From release 9.0.012.00, the Lift Estimation (LE) report supports both metrics you want to maximize (FCR, CSAT, and so on) and those you want to minimize (AHT, deactivation, and so on).

In previous releases, the LE report worked only for metrics you wanted to maximize because it used only raw scores instead of the output of any scoring expression configured in the predictor. As a result, although predictors and models worked correctly with metrics where a higher value is optimal, the LE report did not. For a workaround that explains how to create an LE report for a metric you want to minimize in releases prior to 9.0.012.00, see Calculating Lift for Metrics You Want to Minimize.

With 9.0.012.00, if you set a scoring expression in your predictor, the LE report handles it correctly.

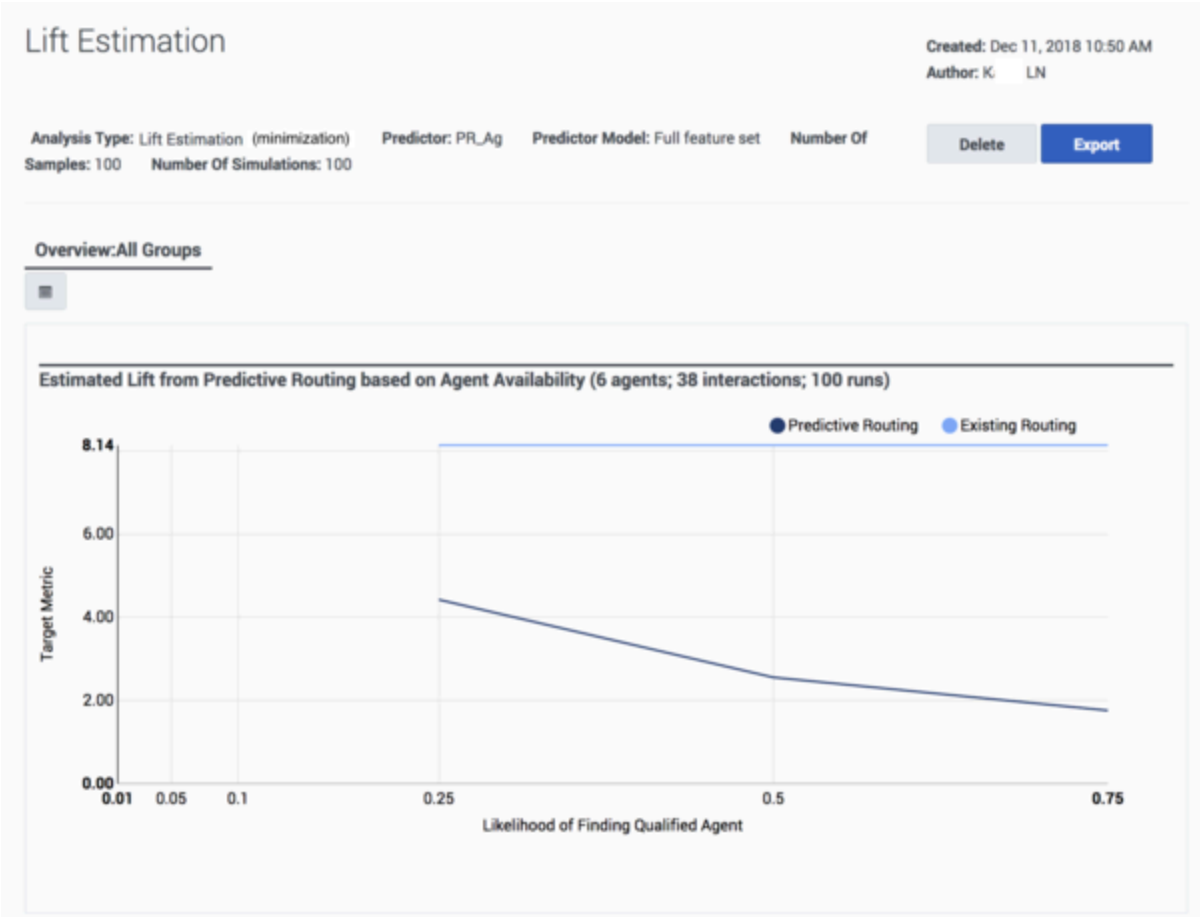
- If the scoring expression is an *increasing function*, the LE report treats it as a metric you want to maximize.
- If the scoring expression is a *decreasing function*, the LE report treats it as a metric you want to minimize.
- If no scoring expression is set, the LE report handles it as a metric to be maximized.

For a complete discussion of how to create and interpret the Lift Estimation report, see Lift Estimation Report.

Interpreting a Lift Estimate Report Graph

For a metric to be maximized, assuming positive lift, the line showing an estimate of routing results using GPR *rises* with increased agent availability.

For a metric to be minimized, assuming positive lift, the line showing an estimate of routing results using GPR *falls* with increased agent availability. That is, for metrics for which a lower value is optimal, the lower the line the better.



The report display shows whether GPR recognized the metric as one to be maximized or a minimized, based on the scoring expression you configured in the predictor.

Configuring, Training, and Testing Models

A *Model* is built on a Predictor and includes the same target metric. Each Model has a subset of the agent and customer features present in the Dataset. The Feature Analysis report helps you to identify the features with the strongest impact on the target metric. You can create multiple Models for the same Predictor, each with a different set of features selected.

- You can compare how well Models work to create the most effective ones.
- You can configure Models that are best-suited to specific circumstances and control which Model is used by activating and deactivating them. This enables you to respond promptly to changes such as weekday vs weekend volume or the anticipated increase in certain types of interactions after a big marketing push.

When you create a Predictor, a full feature set Model is created automatically, including all the agent and customer features populated from the Predictor. A Predictor can have a number of Models associated with it.

- The right-hand toggle navigation menu enables you to view a tree view of all Datasets associated with your Account, with the Predictors and Models configured for each. To open or close this navigation menu, click the  icon.
- You must reload the page to view updates made using the Predictive Routing API, such as appending data to a Dataset, creating, updating, or deleting a Predictor, or creating, updating, or deleting a Model.

Important

The *full feature set Model* comprises as complete a set of Local Models as possible based on the amount of data available for each agent (one Local Model per agent). If it's not possible to train a Local Model for a specific agent, GPR generates the following log message, indicating that the Local Model has been skipped for a specific agent, and omits that agent from the full feature set Model: `WARNING <BOTTLE> models.py:420 RETRAIN: Skipping training for individual model <agent_id> since no data is available for classes.`

For example, you might have a Boolean metric, such as FCR. If, for a specific agent, all entries from the training set had only examples of one Boolean class (that is, either all were resolved, or none were resolved), GPR cannot create a Local Model for that agent.

- You can configure a routing strategy to use a specific Predictor, then edit the Models and change which are active. In this way, routing can be adjusted and optimized on the fly, without requiring you to edit the strategy. For instructions on this specific functionality, see Activating multiple Models at once, below.
- The list of Models includes the **Quality** column, which provides analysis reports on Model Quality and Agent Coverage.

Creating and Configuring a New Model

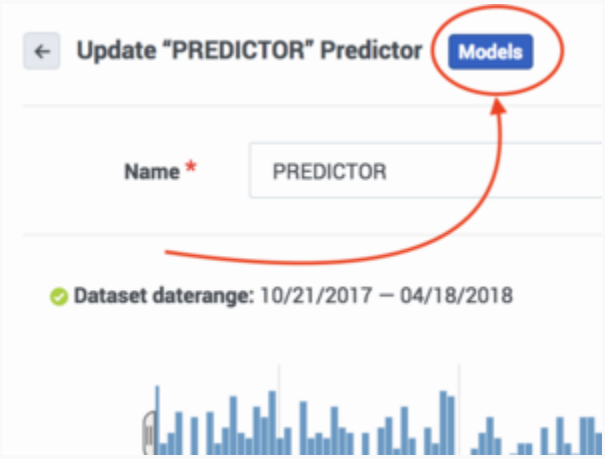
To open the configuration menu, click the **Settings** gear icon, located on the right side of the top menu bar:  .

Procedure: Open the Models interface

Steps

To access your Models:

1. Select **Predictor** from the left-hand navigation bar and then click the name of a Predictor in your list.
   The Predictor configuration window opens.
2. Click **Models**.



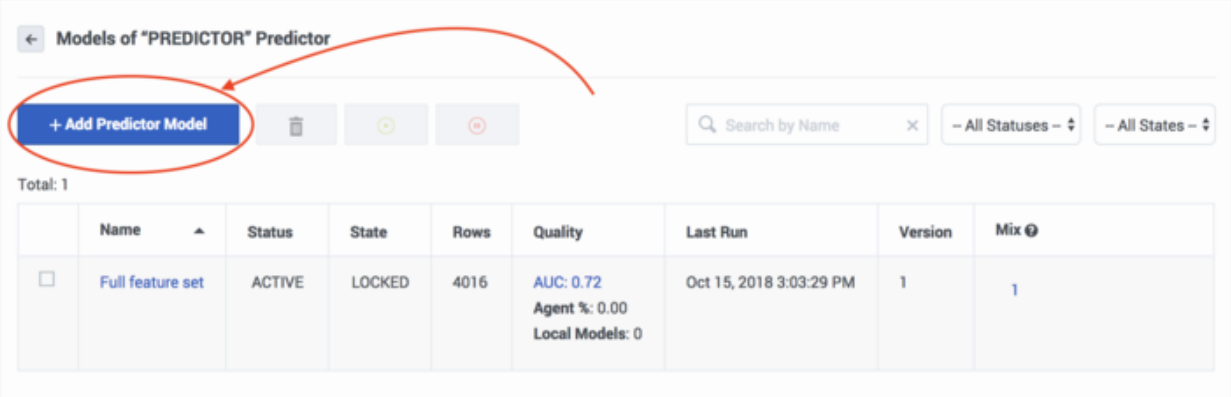
Add a New Model

Procedure:

Steps

When you create a Predictor, GPR automatically adds the full feature set Model, as shown in this graphic. The full feature set Model is a Global model, created by default, that includes every Agent and Customer feature you selected when you created the Predictor.

- To create a new Model, click **Add Predictor Model**.



Configure a Model

Procedure:

Steps

Edit the fields as explained below.

1. To choose Agent Features and Customer Features, click in the appropriate text box and select the desired features from the drop-down list.
    - Agent Features are items that refer to the agent. All agent-related fields in your selected Dataset appear in the Agent Features field.

- Customer Features are items that refer to the customer or that are available in interaction user data. They refer to aspects of the environment, broadly speaking, in which the interaction occurs.

> **Important**
>
> You can only select from the Agent Features and Customer Features that are included in the Predictor.

2. To remove a feature, click the X in the box containing the feature name.
3. Choose one of the Model types, GLOBAL, DISJOINT, or HYBRID.

Global Model

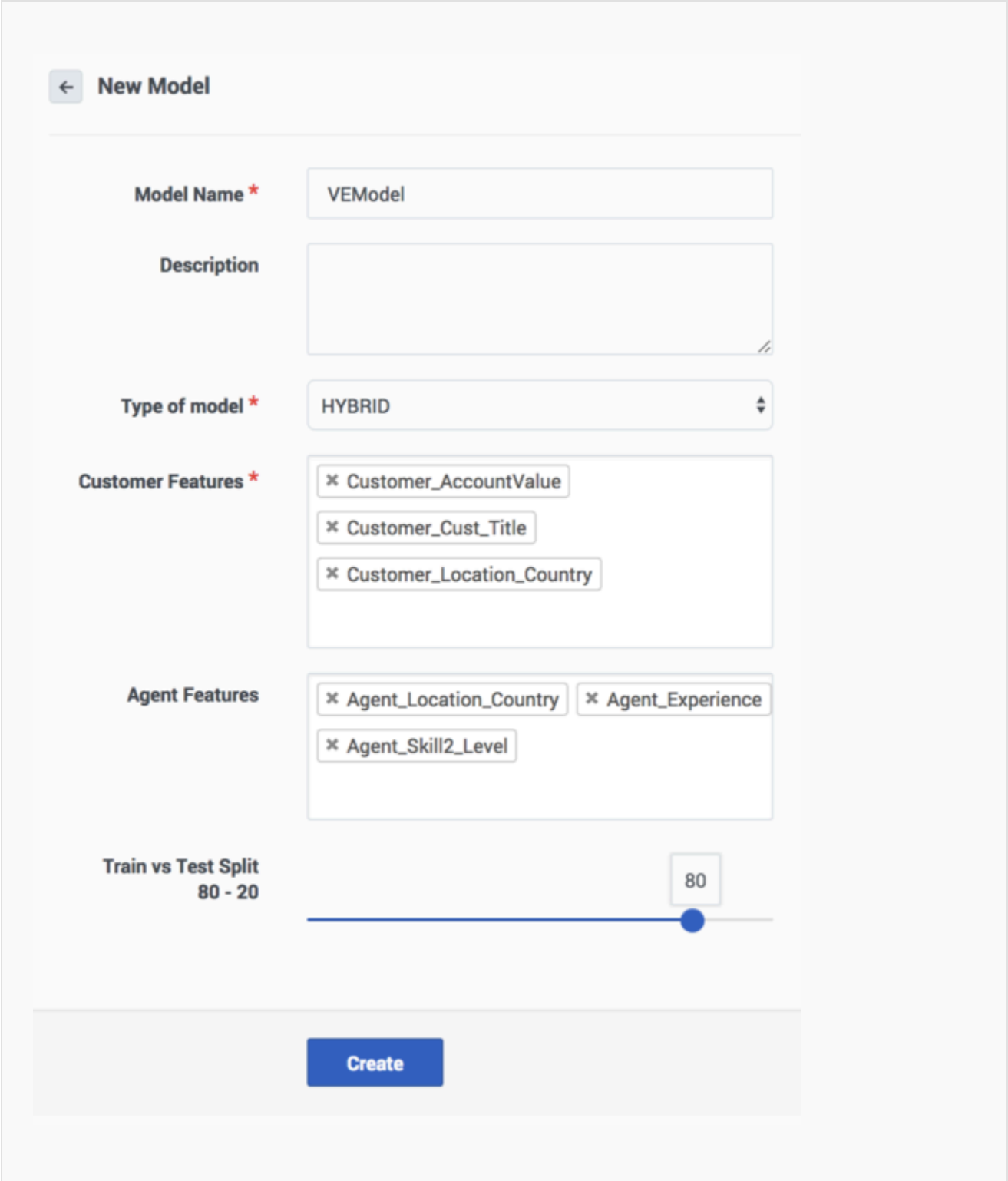
- A single Model is built to predict agent scores.
- Provides generalizations that are probably true across the whole pool of agents. For example, agents that are part of this group might have a lower transfer rate; agents with longer tenure generally have higher resolution performance; and so on.
- Select this Model type only if there are action features that correlate with the target metric.
- In the absence of Agent Features, the Global Model type produces the same score for every agent, which makes it useless for ranking.

Disjoint Model

- A Model, also called a *Local Model*, is built for each agent.
- Captures agent-specific idiosyncrasies with respect to performance.
- With this option, a Global Model is also built to produce scores for agents for whom individual Models cannot be created. For example, some agents might not have enough data to create an individual Model.

Hybrid Model

- Combination of Global and Disjoint Models, which uses an average of their scores.
- Can both provide generalization and capture agent-specific nuances in performance.
- Select this Model only if there are Agent Features that correlate with the target metric; that is, the metric (first-contact resolution, net promoter score, average handle time, and so on) for which the associated Predictor is built.


New Model
Model Name *
VEModel
Description
Type of model *
HYBRID
Customer Features *
Customer_AccountValue
Customer_Cust_Title
Customer_Location_Country
Agent Features
Agent_Location_Country
Agent_Experience
Agent_Skill2_Level
Train vs Test Split
80 - 20
80
Create

Set the Training and Testing Percentages

Procedure:

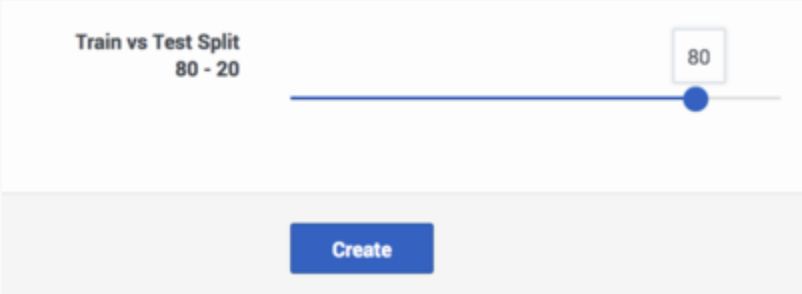
Steps

You can configure how much of your Dataset is used to train your Model and how much is used to test how well it works. This split is time-based. The most recent interactions are allocated to the test section of the Dataset. For example, if you use 80% of the data to train your Model and 20% to test it, the most recent 20% of the Dataset records are used for testing.

> **Important**
>
> Data used for training is not used to score agents. Agent scoring is based on the data in the Agent and Customer Profiles or, if you are using the GPR API, on data passed in the API score request as part of the **context** parameter. If both are present, data from the API request takes priority over data from the Agent and Customer Profiles.

To set this value:

1. Use your mouse to slide the indicator to the desired point on the **Train/Test** bar.



Train Your New Model or Retrain an Existing One

Procedure:

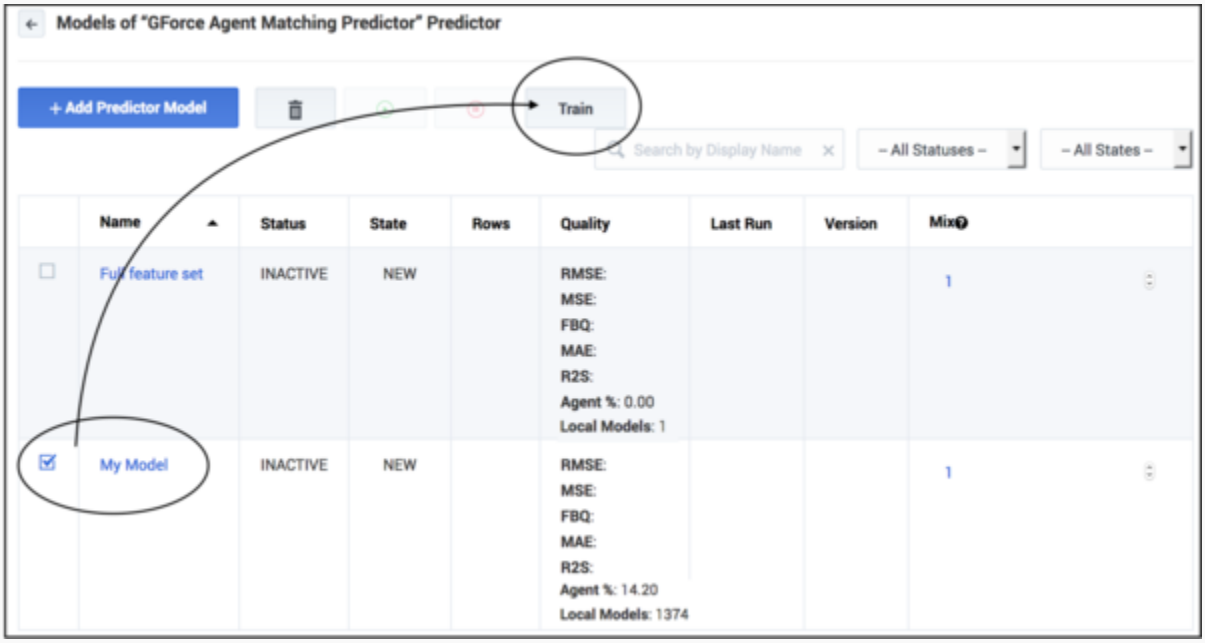
Steps

After you create your Model, you must train it on your data.

- When a trained Model has not been yet activated, you can modify it. For example, you might add new Agent or Customer Feature, change the train/test split, and so on. After those modifications, you must retrain your Model.
- When you train or retrain a Model, the integer in the **Version** column of the list of Models is incremented.
- If you change the date range for the Predictor data, then purge and regenerate your dataset, an already-trained Model does not need to be retrained. It uses the previously configured date range. But all Models created after the data purge and regeneration use the new date range.

1. Select the check box in the table row for your Model.
2. Click **Train**.

The Training job can take a fairly long time, depending on the size of your Dataset. Click the **Jobs** tab to monitor job progress.



Viewing Agent Coverage and Model Quality Reports

After you train your Model, the **Quality** column shows values for various methods of evaluating how well the Model works. The evaluation methods are selected automatically depending on the type of Model.

Procedure: View Model Quality and Agent Coverage reports

Steps

GPR provides the following analysis types:

- *Classification* analysis buckets observations into predetermined binary categories, based on data already used for training. In this case, you already know that the data can be divided into meaningful categories, into which your new data can be placed. For example, you might record

interaction results showing whether a customer's issue was resolved or not; whether the desired AHT was met or not; whether the final NPS was above a certain value or not; and so on.

- *Regression* analysis attempts to determine the strength of the relationship between one dependent variable (usually denoted by Y) and a series of other changing variables (known as independent variables). For example, you might be evaluating how agents' language skill levels (independent, changing) affect their ability to achieve first contact resolution (the dependent variable).

How different Model types are evaluated for quality:

- For binary classification Models, which are evaluated using the area under the curve (AUC) method, you can analyze their effectiveness using a Receiver Operating Characteristic (ROC) Curve.
- Regression Models, such as those shown in the graphic, are evaluated by the following methods:
  - RMSE (Root-mean-square deviation)
  - MSE (Mean squared error)
  - FBQ (Fraction below quantile. Calculated as `mean(y_i < y_pred_i)`, where `y` and `y_pred` are sequences of actual and predicted values, respectively.)
  - MAE (Mean absolute error)
  - R2s (R squared) indicates how closely the predictions fit with the historical observations. The values range from `1.0`, the highest possible value, down. Use the following guidelines to interpret the level of success your predictions are achieving:
    - Score = `1.0`: The best possible Model. This is an unlikely score in real-world situations.
    - Score between `0` and `1`: The higher the score, the better your predictions. This is the range you can expect to encounter if your Models are correctly configured.
    - Score = `0.0`: Indicates a blind Model; that is, a constant Model that always predicts the same expected value, disregarding the input features.
    - Score < `0`: Off track. The score can be negative, without a fixed lower limit. If your results fall into this range, examine your Model for misconfiguration of some sort.
- **Agent %** - This *agent coverage* metric indicates how many Local Models were built for agents, as a function of the total agents available. It evaluates how much coverage a Model has. The agent coverage metric is available for Hybrid and Disjoint Model types.

  It is possible to have 0% coverage. This indicates that none of the agents included in the Agent Profile also have records in the Dataset that was used to train the Model. {A low **Agent %** value might indicate that you should upload more data.

  If the Predictor is configured with **Dataset Generated** and there is no Agent Profile configured, then the **Agent %** = `-1.00`. (Note that the Dataset Generated setting is not intended for use in production environments.)

  Whatever type of metric you are using--numeric or Boolean--GPR creates a Local Model for each agent for whom there is enough data. The description of Local Models immediately below explains what data is required to build a Local Model for an agent.

- **Local Models** - Displays the number of Local Models generated for agents in the Dataset on which the Predictor is built. Local Models are built only for Models that have the Hybrid or Disjoint type. For Global Models this metric is always `0`. If a Model is new (that is, inactive and untrained) the metric value is `-1.00` until the Model is trained. Once trained, the metric shows the actual number of Local Models.
  Keep in mind the following requirements:
  - For a *numeric* target metric, GPR creates a Local Model for each agent having at least one Dataset record (that is, who has handled at least one interaction that is included in the Dataset).
    - If the Predictor is configured with **Dataset Generated** and there is no Agent Profile configured, then the value for **Local Models** corresponds to the number of agents with interactions in the Dataset (for models of the Hybrid and Disjoint types) and **Local Models** = `0` (for Models of the Global type). (Note that the Dataset Generated setting is not intended for use in production environments.)
    - If you have configured an Agent Profile schema and there is an intersection between the agents who appear in the Agent Profile and the Dataset, the **Agent %** value is the number of agents in the Agent Profile who also have Local Models divided by the number of agents in the Agent Profile.
      For example, if there are a total of 10 agents in the Agent Profile but only one appears in the Dataset as well, the **Agent %** value = `10%`, indicating that 10% of the agents in the Agent Profile have Local Models.
  - For a *Boolean* target metric, you must have at least one record per class (that is, one `true/1` and one `false/0`) to build a Local Model. For example, take a Predictor using a Boolean target metric and based on a Dataset with 100 interactions and four agents. Agent1 handles one interaction only, so no Local Model is created. Agent2 handles two interactions but both has the value `false` for the target metric, so no Local Model is created. Agent3 and Agent4 handle two interactions each, with at least one metric value `true` and another `false` so Local Model are created for both.

ROC Model Quality Analysis

Procedure:

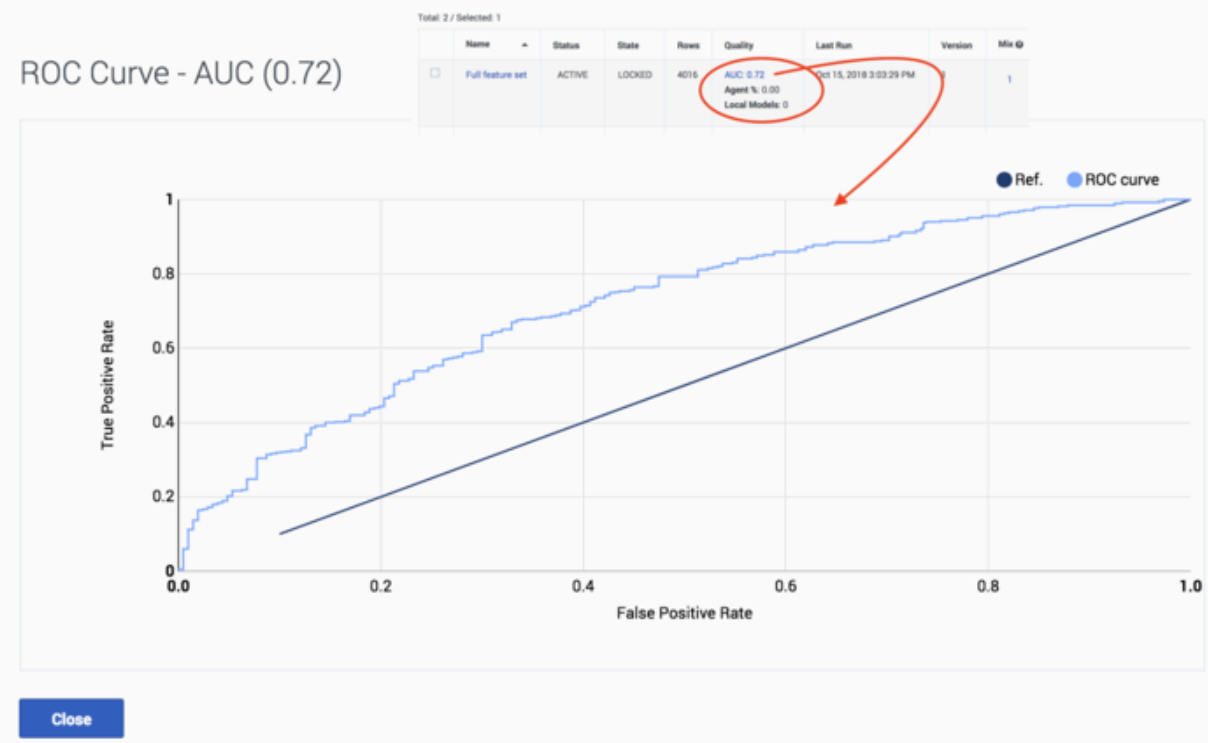
Steps

You can analyze the effectiveness of classification Models, which are evaluated by the area-under-curve (AUC) method, with a Receiver Operating Characteristic (ROC) Curve. This type of report is accessible only for classifier Predictors (Predictors that use a Boolean metric). Every trained Model for such a Predictor has an active AUC link in its row in the **Predictors** list.

- To open the Model Quality graph, click the **AUC** link in the **Quality** column.
  As you can see, the resulting diagram shows the ROC curve balancing the True Positive Rate and False Positive Rate. These terms, and some useful associated ones, are defined below:
  - True Positive (TP) - The number items that met the specified condition, and were predicted to meet the condition. In this case, a TP would be an interaction that met the designated CSAT level (value =`true`) and was predicted correctly to do so.
  - False Positive (FP) - The number of items that did not meet a condition, but were predicted to meet the condition. In this case, it would be interactions that were predicted to result in the specified CSAT level but did not.
  - False Negative (FN) - The number of items that did meet a condition, but were predicted not to meet the condition. In this case, it would be interactions that were predicted to result in an unsatisfactory CSAT level but did not.
  - Positive Population (PP) - The total number of interactions with a satisfactory CSAT (value = `true`).
  - Negative Population (NP) - The total number of interactions with an unsatisfactory CSAT (value = `false`).

    The diagram shows a curve outlining the items that were true positives—correct, positive predictions-—that occurred at a rate better than guesswork (the black line). The analysis looks at Model sensitivity versus specificity.
  - Sensitivity = TP/(TP + FN) = TP/PP - The ability of the test to detect the desired result.
  - Specificity = TN/(TN + FP) = TN / NP - The ability of the test to correctly rule out the condition where it doesn't occur.

The ROC curve is a way to see the tradeoff between sensitivity and (1 - specificity) for different thresholds of probability for classification. This is the preferred way to view Model Quality for classifiers.



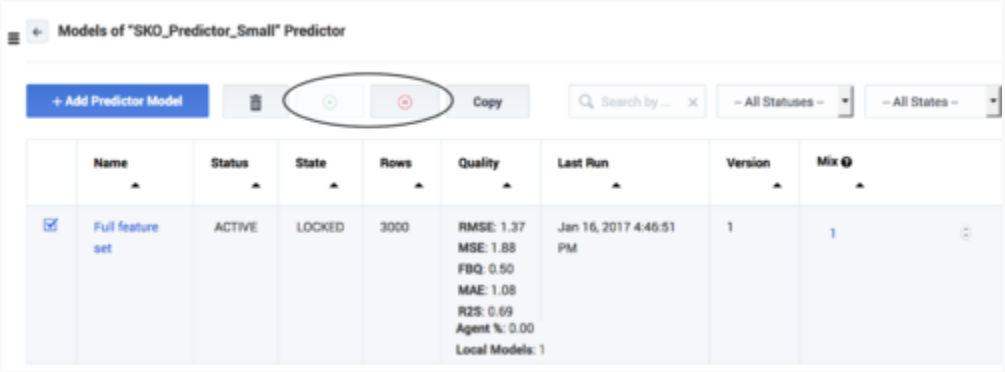
Activating a Model

Procedure: Activate your Model

Steps

After your Model is trained, activate it to use it for routing.

1. Select the check box in the table row for your Model.
2. Click the **Play** button.
3. To deactivate a Model, click the **Pause** button.



Procedure: Activating multiple Models at once

Steps

You can test Model performance against other Models by activating multiple Models at once. You can then choose how much traffic is scored using each Model. Models are selected at random to score interactions, with the number scored by each Model dependent on how you *weight* the Model using the **Mix** parameter.

- In the **Mix** column, enter the desired numbers for each Model or set them using the up and down arrows located next to the number in the table cell.
  The numbers indicate the relative numbers of interactions that are scored using each Model. If you have a 1 in each column, the interactions are equally divided among the active Models. If you set 1 for Model A and 2 for Model B, Model B is used to route two interactions for every one using Model A.
  - For example, you might have three Models to which you have assigned the weights of `1`, `8`, and 4 in the **Mix** field. Think of these weights as creating three buckets of different sizes, with a total value equal to the three weight values added together:
    ```
    0 |_|_____|___| 13
    ```
    On each incoming interaction, GPR chooses an entirely random number between `0` and the sum of all the weights (here this is 13). Depending on which bucket or range the chosen number falls in, the interaction is scored using the associated Model. In this example, Models are selected as follows:
    - If the number is between 0 - 1 (the first bucket), the interaction is scored using the first Model
    - If the number is between 2 - 9 (the second bucket), the interaction is scored using the

second Model

- If the number is between 10 - 13 (the third bucket), the interaction is scored using the third Model

Given that the numbers are selected randomly, the number of interactions scored using each Model end up proportional over time to the weights you selected in the **Mix** field.

Editing Models

Procedure: Editing Models

Steps

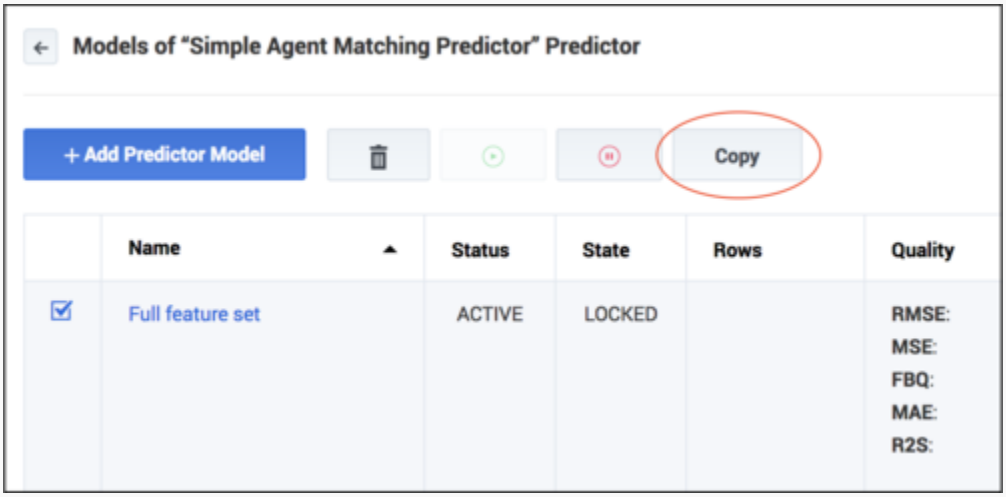
You can only edit a Model that has not yet been activated.

- If a Model has been trained and edited after training, the Model needs to be retrained.

Once a Model has been activated, it can not be changed or edited again. Even if you stop (deactivate) it, the Model remains locked.

To edit an activated Model, copy it. Only an active, trained Model can be copied. When you make a copy, you are creating a new Model that has the same name as the original Model with the added suffix <copy><version number appended>.

1. Select the check box for the Model to be copied in the list of Models.
   The **Copy** button appears.
2. Click **Copy**.
   The copy appears in the list of Models.
3. Click the name of the copy and then follow the steps given above to edit, train, and activate the copy.



A/B Model Performance Testing

Predictive Routing enables you to use A/B testing to assess how well your Predictive Routing models perform when compared with other models or with your standard routing.

- Learn more about models.

When you run an A/B test, you compare the outcome of routing using one model with the outcome from one or more other models that differ from the first in specific, targeted ways. After a set amount of time, an analysis of the outcomes can show you the strengths and weaknesses of each model.

A/B Testing

A/B testing is a variety of testing that involves single element changes across multiple variations. Predictive Routing enables you to test various models against each other with respect to a specific metric. For example, you might be able to evaluate which model best achieves an improvement in first contact resolution, compared to each other and to routing without Predictive Routing.

Use A/B Test Results for Contact Center Wide Decisions

You can use A/B testing to evaluate the impact of changes both models and as well as for the impact of other routing decisions. Such tests help you see what elements are important for your agents and customers in a controlled environment. Once you have seen the results of a test you can apply the new knowledge to your interaction routing design or training plans.

Advantages of A/B Testing

- You can see results quickly.
- You can use it to test outcomes from advanced analytics, such as the effect on handle time, speed of answer, transfers, and so on.
- Uncovers features you can manipulate to make significant improvements to Key Performance Indicators (KPIs).
- Helps to prove that predictive routing improves targeted KPIs compared with skill-based routing.
- Requires a relatively small number of interactions.

How Many Interactions Do You Need for A/B Testing?

A common question is how many interactions you need when running a test. This depends of course on a number of factors. You might be able to make useful decisions based on only 100-200 interactions, especially when you have some scenarios where some aspect of your environment is significantly underperforming. In general, you should allocate at least 1,000 total interactions to your test stream and run the test for at least a week to account for any daily variances.

How Time-Sliced A/B Testing Works

Predictive Routing provides *time-sliced* A/B testing, with which you can enable and then disable Predictive Routing for specific periods of time. You can compare results from a Predictive Routing model and routing without Predictive Routing. These time periods should be long enough to allow for a large enough sample size for each time period. Genesys recommends periods of at least 3 times your maximum speed of answer to give enough samples in each period.

> **Important**
> To use time-sliced A/B testing, all interactions must come from queues using Predictive Routing.

To be useful, these time periods also need to be comparable in expected volume of interactions, and number and quality of agents.

To configure A/B testing:

- Set the value of the **prr-mode** configuration option to `ab-test-time-sliced`.
- Configure the length in seconds of the time-slices that go into each sub-stream in the **ab-test-time-slice** configuration option.

Getting Started with A/B Testing

The features or steps in your current targeting strategy, such as the skill expression used, agent skill sets, training plans, shifts worked, and so on, have consequences. Those consequences are benefits that have been designed to suit your business and operational model. When you consider how to use A/B testing to improve your results, keep in mind the following principles:

- Focus on a specific KPI or metric that you can pin-point for testing.
- Make sure you are aiming to improve a metric that matters.
- Study the data to identify as clearly as possible which features affect that KPI. The testing itself then enables you refine your judgment.
- Clearly identify which features are necessarily static given your environment and which you can change.
- Change one feature at a time when fine-tuning your models, so you can clearly identify which have real impact.

Building a Strategy, Predictor, and Models

To start testing, create a main strategy. Insert the ActivatePredictiveRouting subroutine into the appropriate place in the strategy flow, then use the Predictive Routing interface to create a predictor for the strategy. For each predictor, you can create multiple models. By activating and deactivating

one or more models from the Predictive Routing interface, you can control your testing without having to edit your strategy each time.

Predictive Routing will work if you are targeting all agents in your contact center, agent groups, or personalized direct-to-agent targeting.

Building Predictors

Each predictor can be built to operate on only one metric, such as first contact resolution, NPS, handle time, revenue, and so on. You might want to test predictors against each other, to see which metric gets the most lift from Predictive Routing, but for the most part, you will be testing models against models, not predictors against predictors.

Building Models

A model is a variant of a predictor, which you configure to use a specific set of agent and customer features. By changing one feature at a time in various models, you can focus in on the features with the greatest impact on results. Start with the default model created by Predictive Routing, which includes all customer and agent data, then analyze and adjust from there.

> **Important**
>
> For instructions on how to create and activate models, see Configuring, Training, and Testing Models, which you can access from this link or directly from the interface by clicking the **?** icon.

Test Mode

Predictive Routing has various modes, which can be set using the **prr-mode** configuration option. You can also configure a Switch block in your routing strategy, which can direct interactions along paths configured with the various modes:

- Dry-run—Predictive Routing scores agents for your interactions, but does not use the scores for routing.
- A/B time-sliced
- Production—Predictive Routing scores are used to route all interactions.

Test mode is especially useful when you are doing early-stage model analysis to identify the most promising models for additional A/B testing.

Pitfalls to Avoid

- You are testing a hypothesis that is not based on your data.
- Your data does not contain the information you need to test the metric you have selected.
- You are using different agent pools, agent groups, or target skills for A/B testing, which means you have

multiple variables operating at once.

- Your models are running in dissimilar strategies.
- You are using time-slicing testing but your time period is too short for significant results.

Analyzing Predictors

The **Predictors** tab enables you view predictor Trends, Distribution, and Details. You can drill-down and adjust the features shown in the graph to analyze the impacts of each factor on the data as a whole.

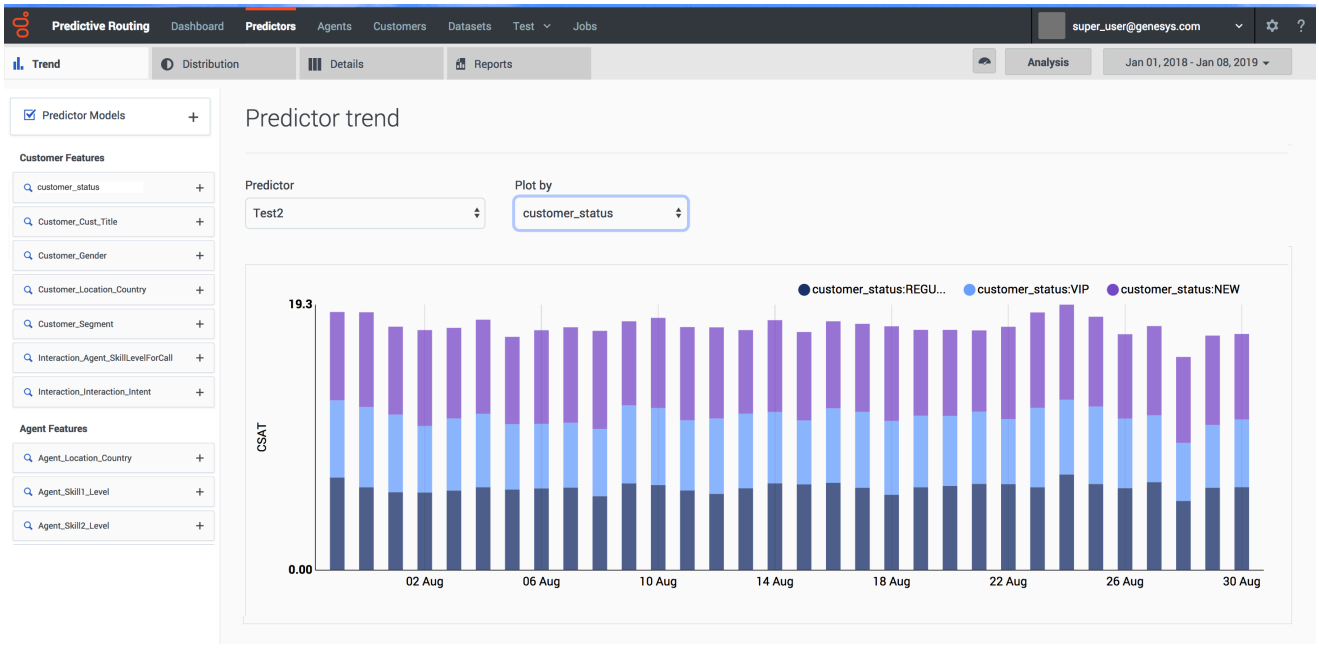
You can also run an analysis to create a Feature Analysis report, an Agent Variance report, or a Lift Estimation report. These reports shows a series of charts and graphs, enabling even more nuanced ways of parsing and understanding your data. You can break down the view to show subsets of the data. After running an analysis, you can view a report of the results and compare reports with different input selected.

- To open the **Predictors** tab, click **Predictors** on the top navigation bar.

You can create reports showing model performance versus actual data to see which factors have an impact on performance. For example, you could determine how important it is that an agent be a native-level speaker of the customer's language, and then route interactions accordingly.

- For instructions on how to run an analysis of model quality, see ROC model quality analysis.

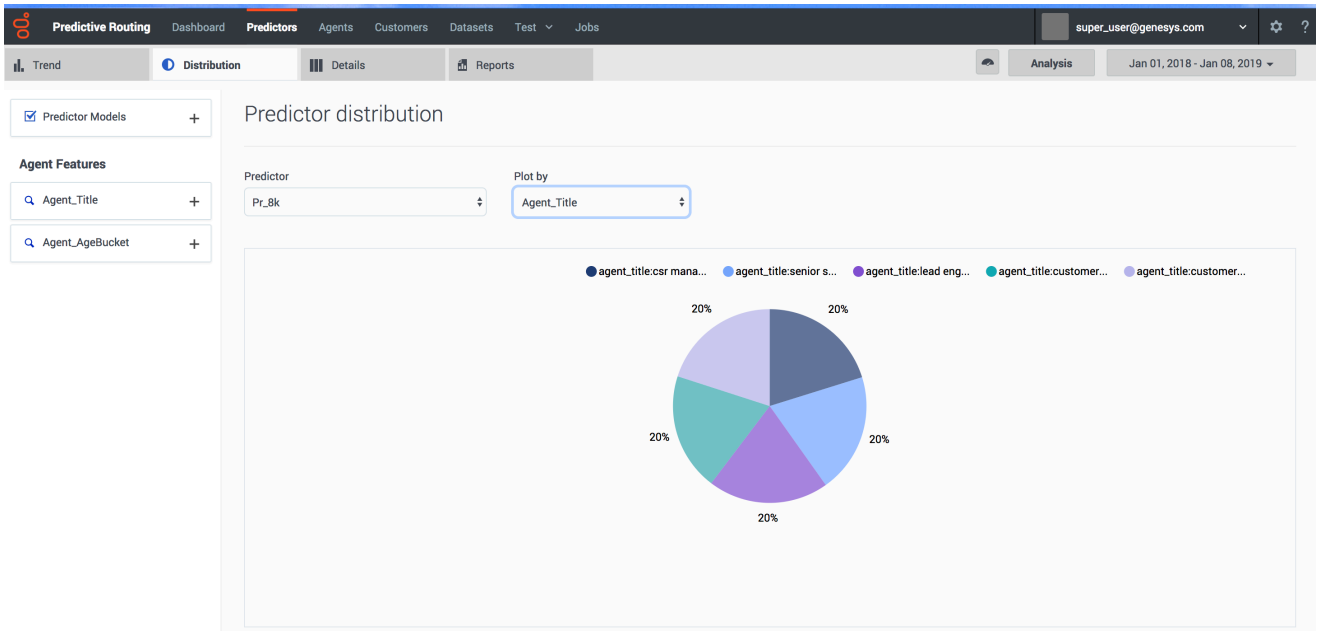
View predictor trends



To view predictor trends:

1. Select **Predictors** from the top navigation.
2. Click the **Trends** tab.
3. From the left-hand navigation, select the parameters you want to include. To choose specific facets:
    1. Click the **+** sign by the facet you want to drill down into.
    2. Click in the text box that appears.
    3. Select the parameters from the drop-down list.
4. To change which predictor you are viewing, select the desired predictor from the **Predictor** drop-down list.
5. To change the graph axis, select the desired facet from the **Plot by** drop down list.

View predictor distribution

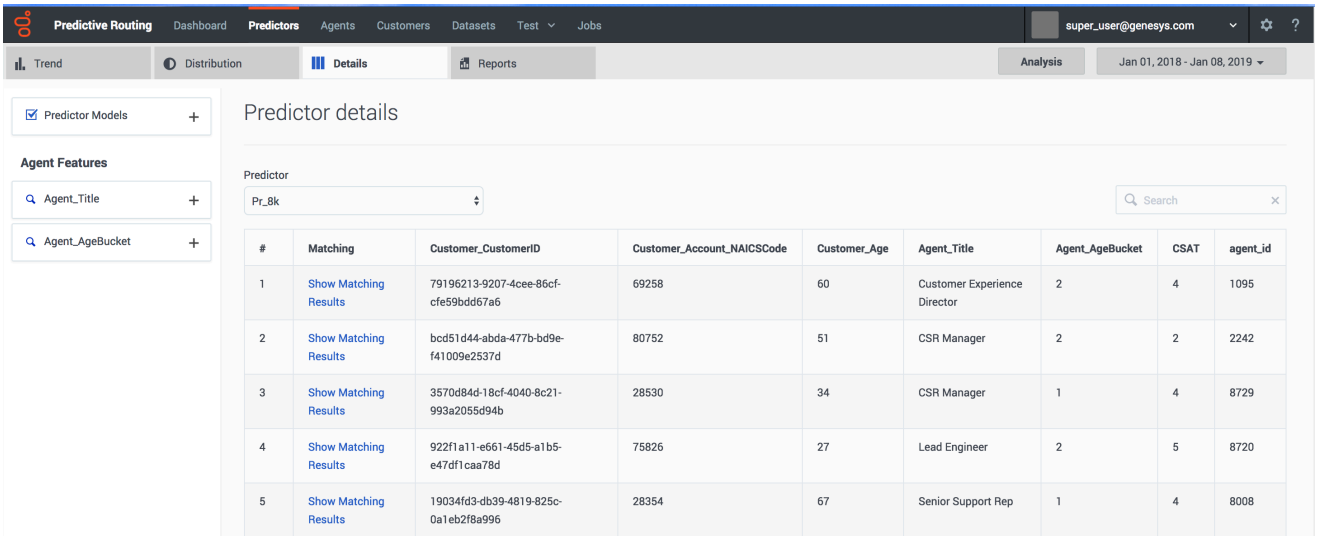


To view the way that specific types of data occur in your predictor:

1. Click the **Distribution** tab.
2. From the left-hand navigation, select the parameters you want to include. To choose specific facets:
    1. Click the **+** sign by the facet you want to drill down into.
    2. Click in the text box that appears.
    3. Select the parameters from the drop-down list.
3. To change which predictor you are viewing, select the desired predictor from the **Predictor** drop-down list.

4. To change the graph axis, select the desired facet from the **Plot by** drop down list.

View predictor details



The predictor **Details** tab enables you to drill down into your predictor to view the granular specifics of your data.

1. Select **Predictors** from the top navigation.
2. Click the **Details** tab.
3. From the left-hand navigation, select the parameters you want to include. To choose specific facets:
    1. Click the **+** sign by the facet you want to drill down into.
    2. Click in the text box that appears.
    3. Select the parameters from the drop-down list.
4. To change which predictor you are viewing, select the desired predictor from the **Predictor** drop-down list.

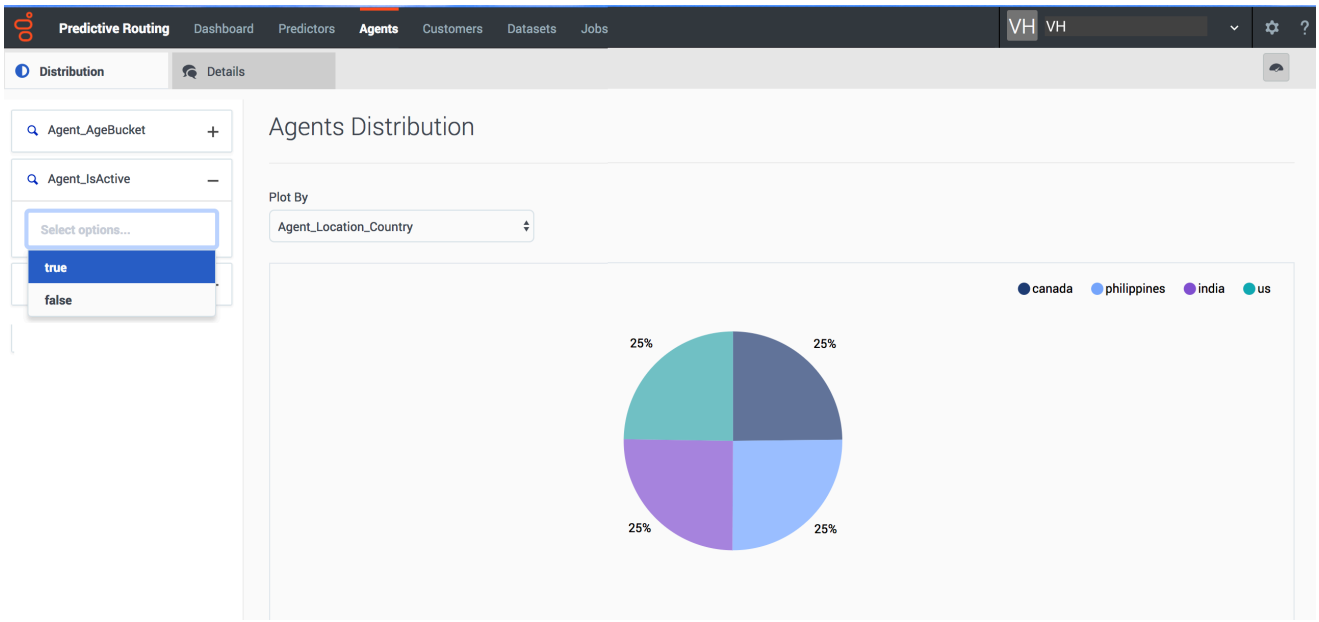
Analyzing Agent Details

To view information about the agents who appear in your environment, use the **Agents** page.

- To open it, click **Agents** on the top navigation bar.

> **Important**
>
> - If you have many columns in your Agent Profile schema, some might not be visible in the interface. To view all columns for a row, click that row to open a window containing the complete record. It appears as a two-column table. The first column contains the names of all properties and the second column contains the corresponding values.
> - Fields with the visibility turned off in the Agent Profile schema are not visible on the **Agent Details** tab.

View agent distribution

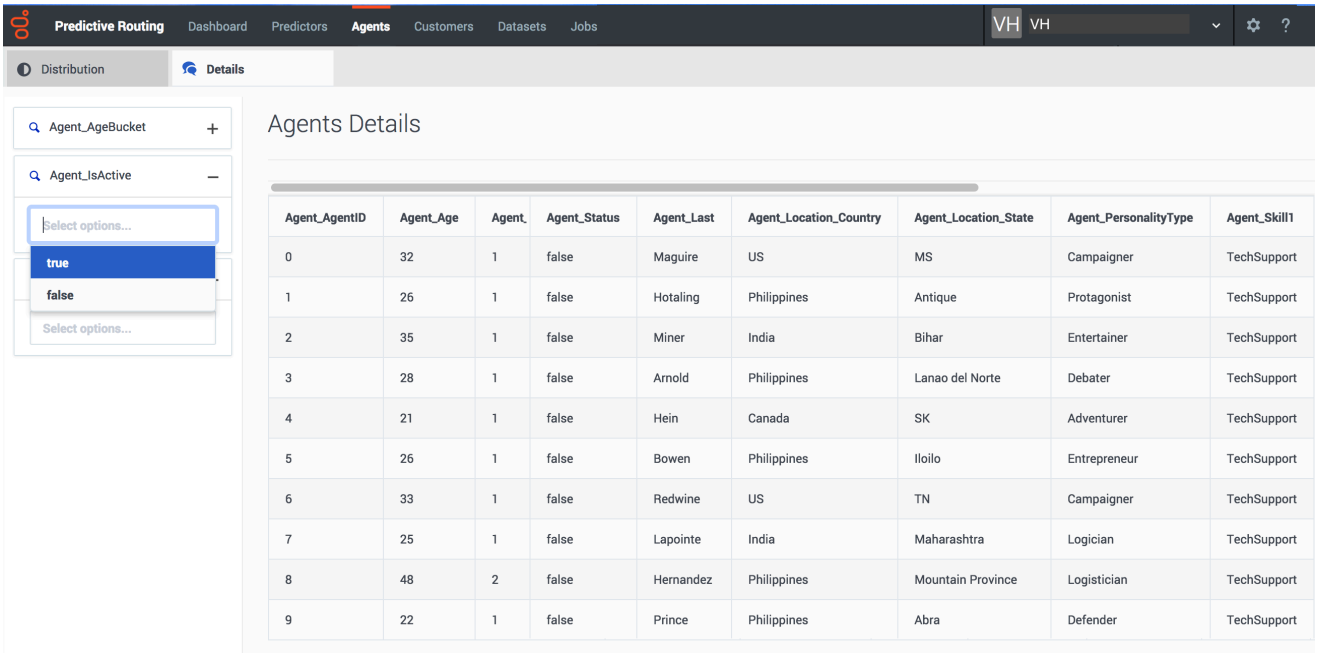


The **Distribution** tab enables you to parse your agent-related data, which is shown in the form of a pie graph. To change the parameters taken into account:

1. Use the **Plot by** drop-down menu.

2. Choose from the various filters on the left side of the page. To make selections, click the + sign by a factor, then click in the text box that appears, which opens a drop-down menu of options.
3. To change the date, use the date selector at the right side of the blue top navigation bar.

View agent details



The **Details** tab enables you to parse your agent-related data, which is shown in the form of a table. To change the parameters taken into account:

1. Use the **Plot by** drop-down menu.
2. Choose from the various filters on the left side of the page. To make selections, click the + sign by a factor, then click in the text box that appears, which opens a drop-down menu of options.
3. To change the date, use the date selector at the right side of the blue top navigation bar.

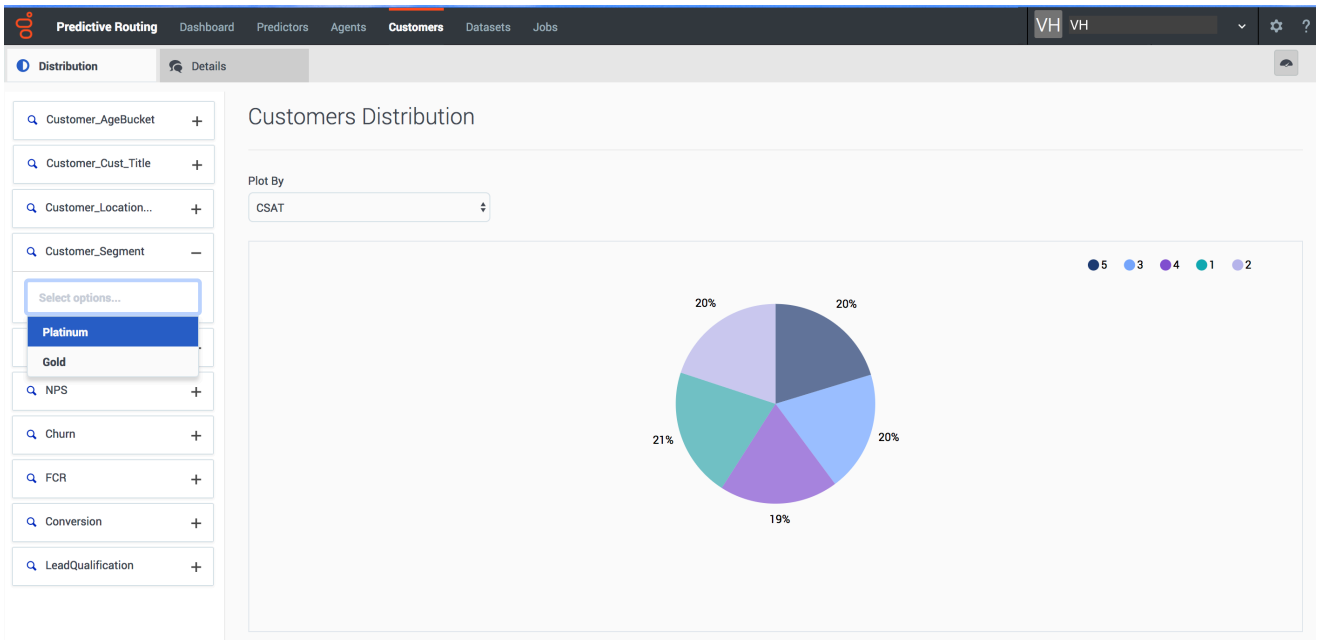
Analyzing Customer Details

To view information about the customers who appear in your environment, use the **Customers** page.

- To open it, click **Customers** on the top navigation bar.

> **Important**
>
> - If you have many columns in your Customer Profile schema, some might not be visible in the interface. To view all columns for a row, click that row to open a window containing the complete record. It appears as a two-column table. The first column contains the names of all properties and the second column contains the corresponding values.
> - Fields with the visibility turned off in the Customer Profile schema are not visible on the **Customer Details** tab.

View customer distribution

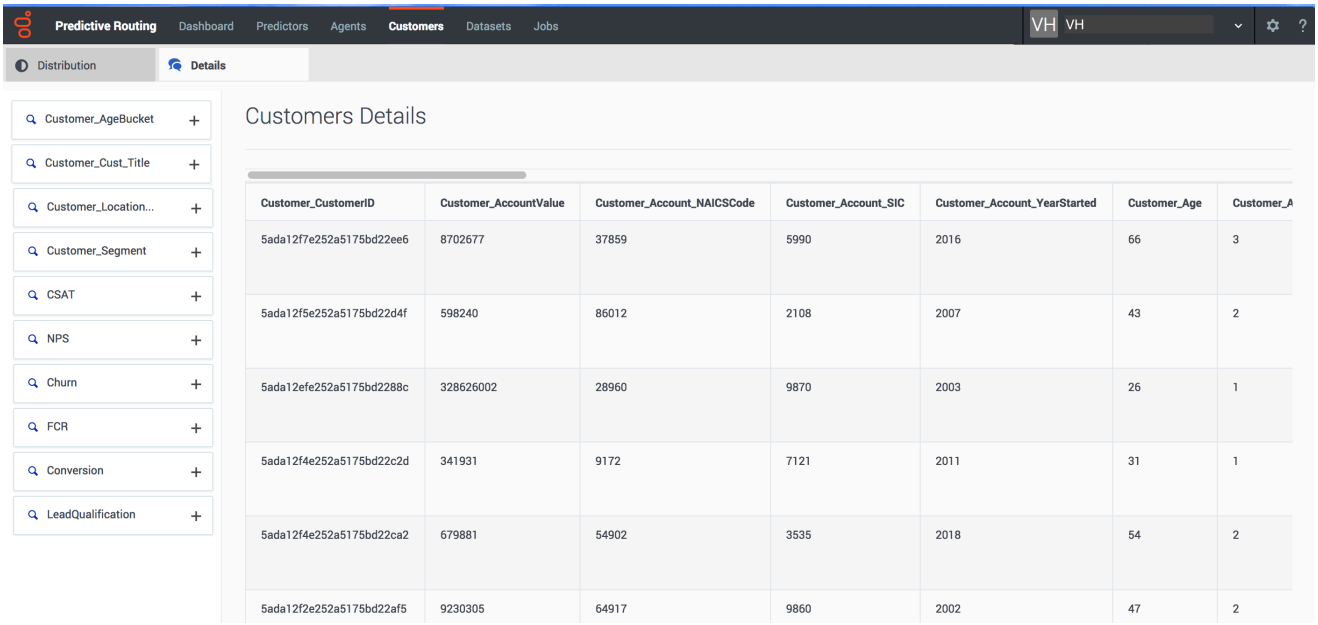


The **Distribution** tab enables you to parse your customer-related data, which is shown in the form of a pie graph. To change the parameters taken into account:

1. Use the **Plot by** drop-down menu.

2. Choose from the various filters on the left side of the page. To make selections, click the + sign by a factor, then click in the text box that appears, which opens a drop-down menu of options.
3. To change the date, use the date selector at the right side of the blue top navigation bar.

View customer details



The **Details** tab enables you to parse your customer-related data, which is shown in the form of a table. To change the parameters taken into account:

1. Use the **Plot by** drop-down menu.
2. Choose from the various filters on the left side of the page. To make selections, click the + sign by a factor, then click in the text box that appears, which opens a drop-down menu of options.
3. To change the date, use the date selector at the right side of the blue top navigation bar.

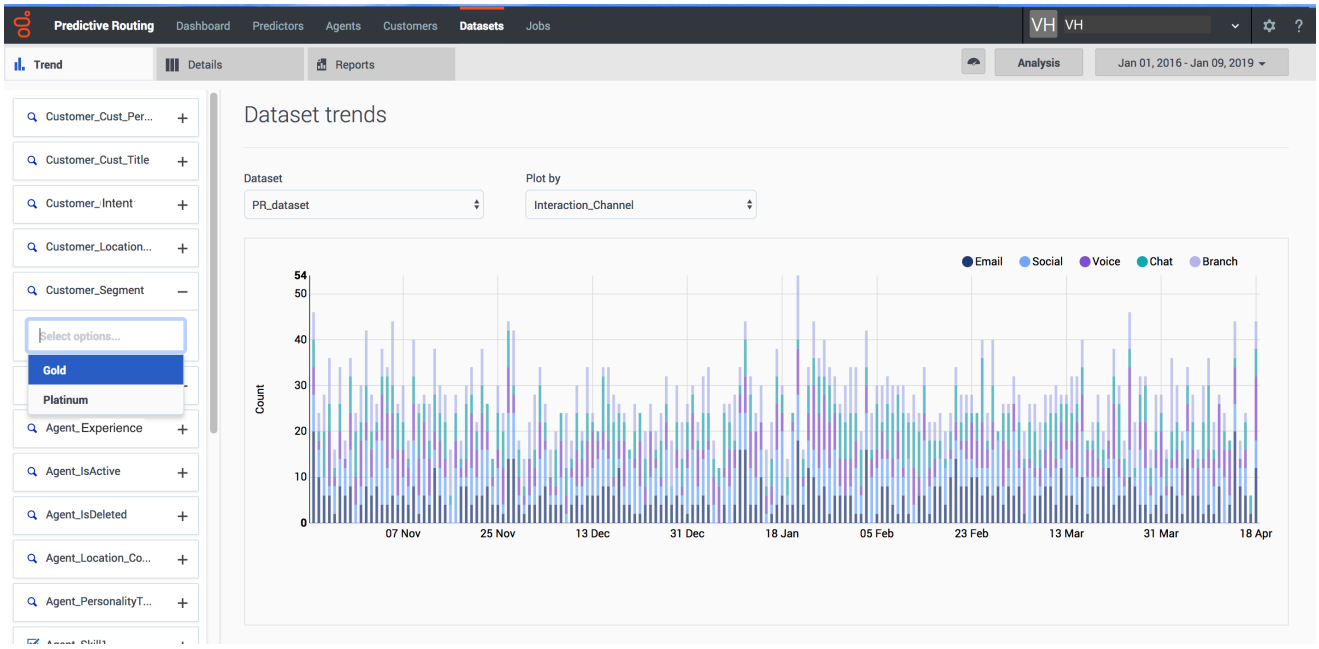
Analyzing Dataset Trends and Details

The **Dataset** page enables you to explore your datasets and perform analyses on them.

You can also run an analysis to create a Feature Analysis report, an Agent Variance report, or a Lift Estimation report. These reports show a series of charts and graphs, enabling even more nuanced ways of parsing and understanding your data. You can break down the view to show subsets of the data. After running an analysis, you can view a report of the results and compare reports with different input selected.

> **Tip**
>
> The **Datasets** tab might load and respond slowly if you are viewing a dataset with a large number of visible columns. To improve performance, go to the **Schema > Datasets** tab in the **Settings** window and configure the **Visibility** radio button to leave no more than about 20 fields visible.

View dataset trends

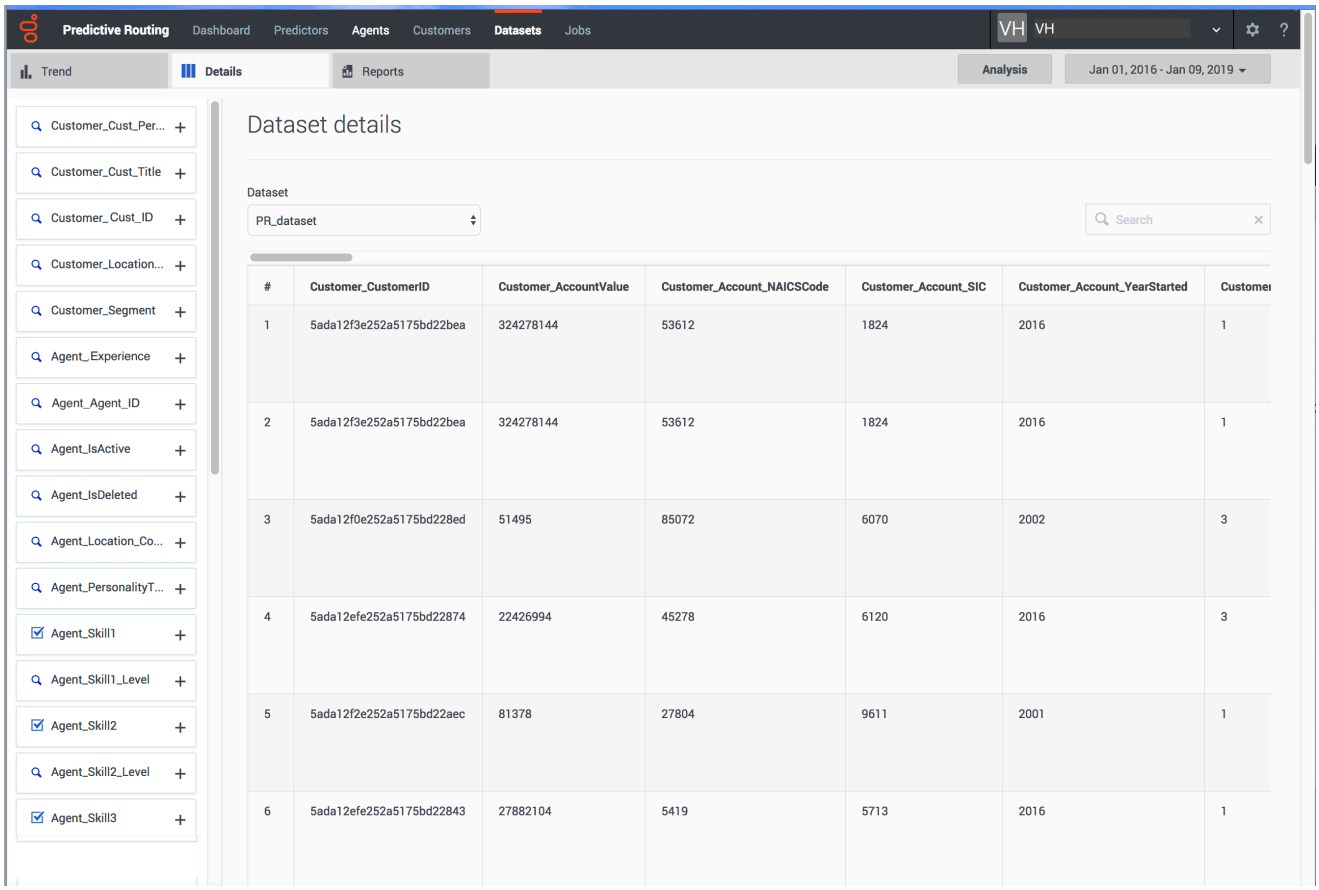


To view dataset trends, do the following steps:

1. Select **Dataset** from the top navigation.

2. Click the **Trends** tab.
3. From the left-hand navigation, select the parameters you want to include. To choose specific facets:
    1. Click the + sign by the facet you want to drill down into.
    2. Click in the text box that appears.
    3. Select the parameters from the drop-down list.
4. To change which dataset you are viewing, select the desired dataset from the **Dataset** drop-down list.
5. To change the graph axis, select the desired facet from the **Plot by** drop-down list.

View dataset details



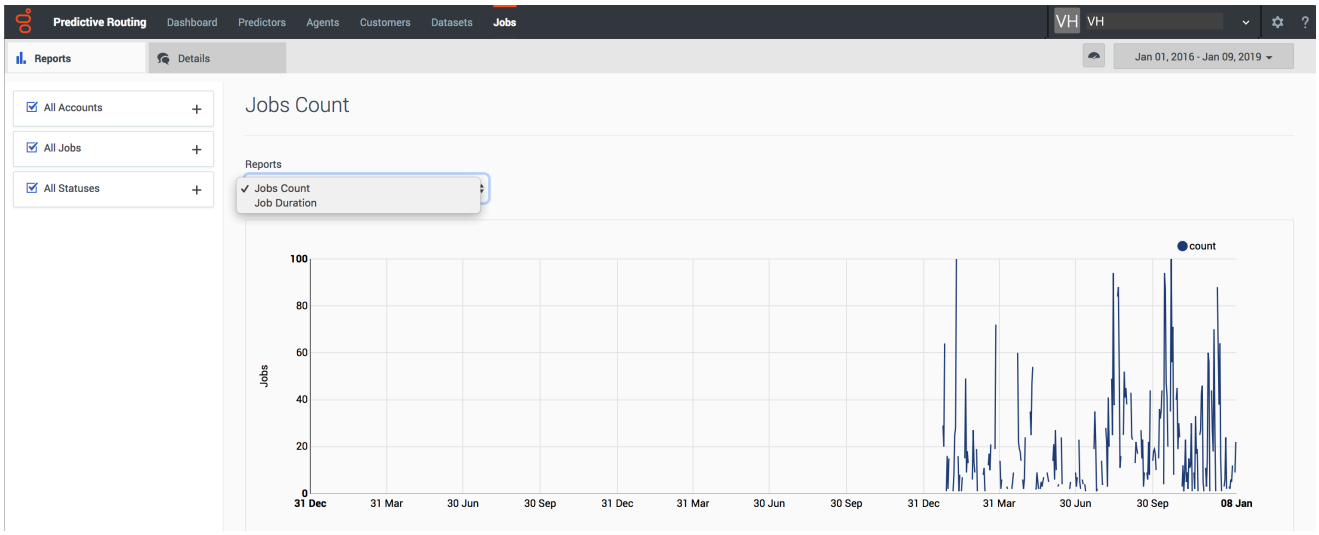
The dataset **Details** tab enables you to drill down into your dataset to view the granular specifics of your data.

> **Important**
>
> If you have many columns in your dataset, some might not be visible in the interface. To view all columns for a row, click that row to open a window containing the complete record. It appears as a two-column table. The first column contains the names of all properties and the second column contains the corresponding values.

1. Select **Dataset** from the top navigation.
2. Click the **Details** tab.
3. From the left-hand navigation, select the parameters you want to include. To choose specific facets:
    1. Click the + sign by the facet you want to drill down into.
    2. Click in the text box that appears.
    3. Select the parameters from the drop-down list.
4. To change which dataset you are viewing, select the desired dataset from the **Dataset** drop-down list.

Monitoring Jobs

Review jobs



Jobs are processes you initiate, such as synchronizing a dataset or analyzing an object such as a predictor, a model, an agent profile or a customer profile. The **Jobs** tab displays a record of the jobs, both completed and in progress, you have run, along with status information.

To view jobs that are in progress or have already completed, click the **Jobs** tab. On the **Jobs** tab, you can review the Jobs for various time periods, and filter them by **Account**, **Job Type**, or **Status**.

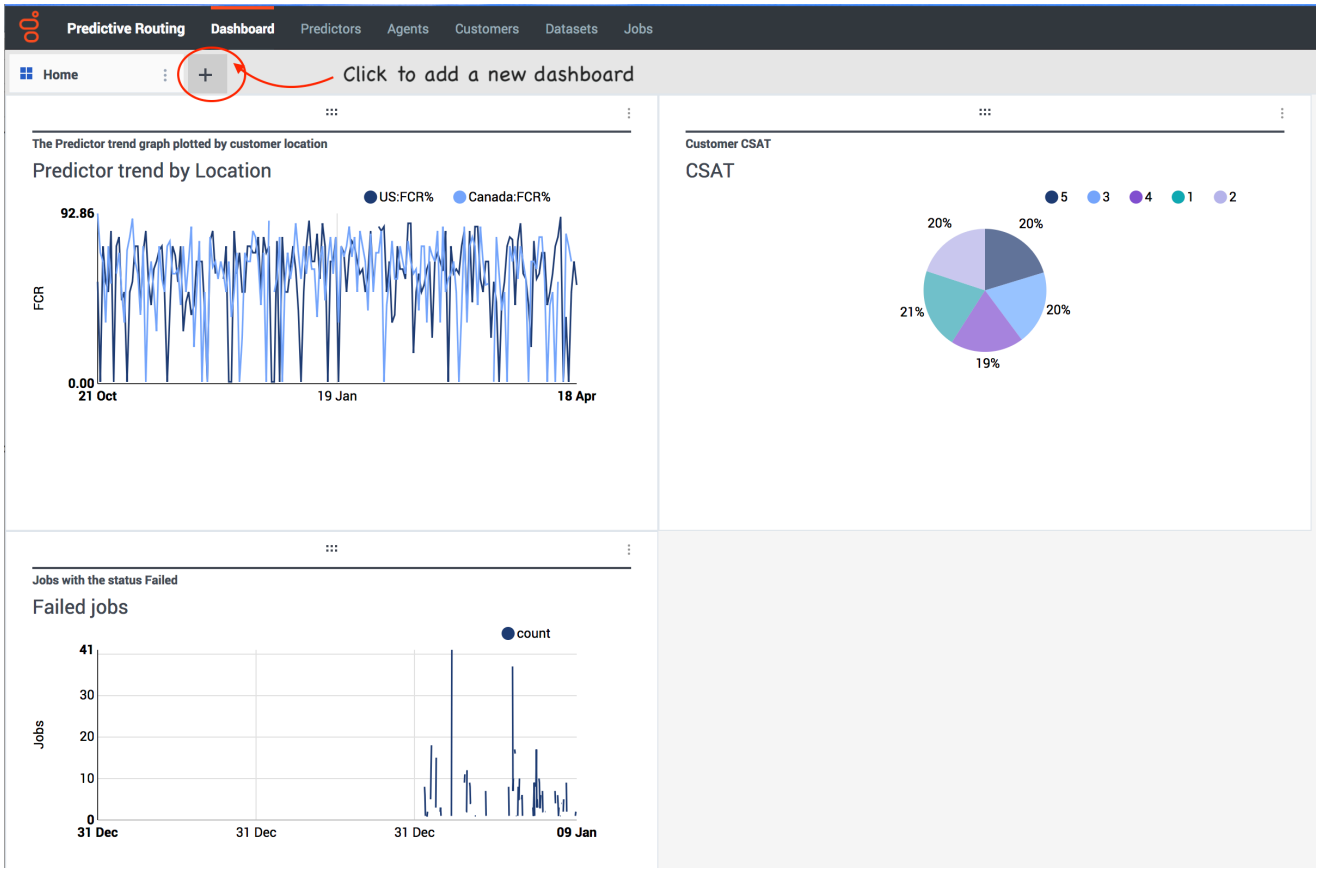
- To view them by **Account**, **Job Type**, or **Status**, click in the corresponding text box and select from the drop-down list that appears.
- To change the time period shown, click the date selector on the right end of the top menu bar and choose the desired date range from the drop-down menu that appears.

On the **Details** tab, you can see a complete list of the jobs for your chosen time period, with their status details.

Viewing Dashboards

Use **Dashboards** to display frequently-viewed charts, graphs, and tables.

Using the **Dashboard**



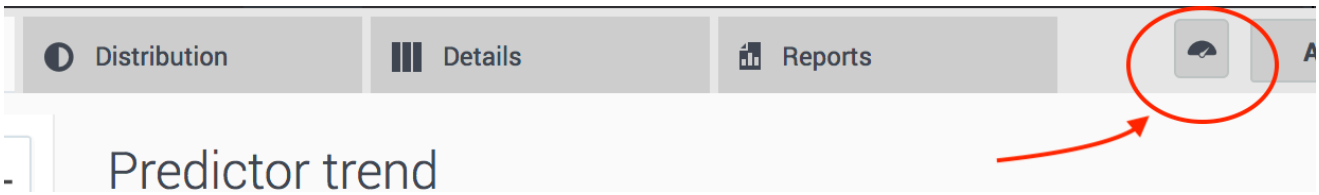
To open the **Dashboard**:

- Click **Dashboard** from the top navigation bar.

To add a dashboard:

- Click the **+** tab.

Add widgets to your **Dashboard**



Wherever you see the **Dashboard** button on the right side of the blue navigation bar:

- Click the button to display the current view onto the **Dashboard**.

To rearrange widgets on the **Dashboard**:

- Click the 6-dots icon on the top bar of the widget and drag it to the desired location.

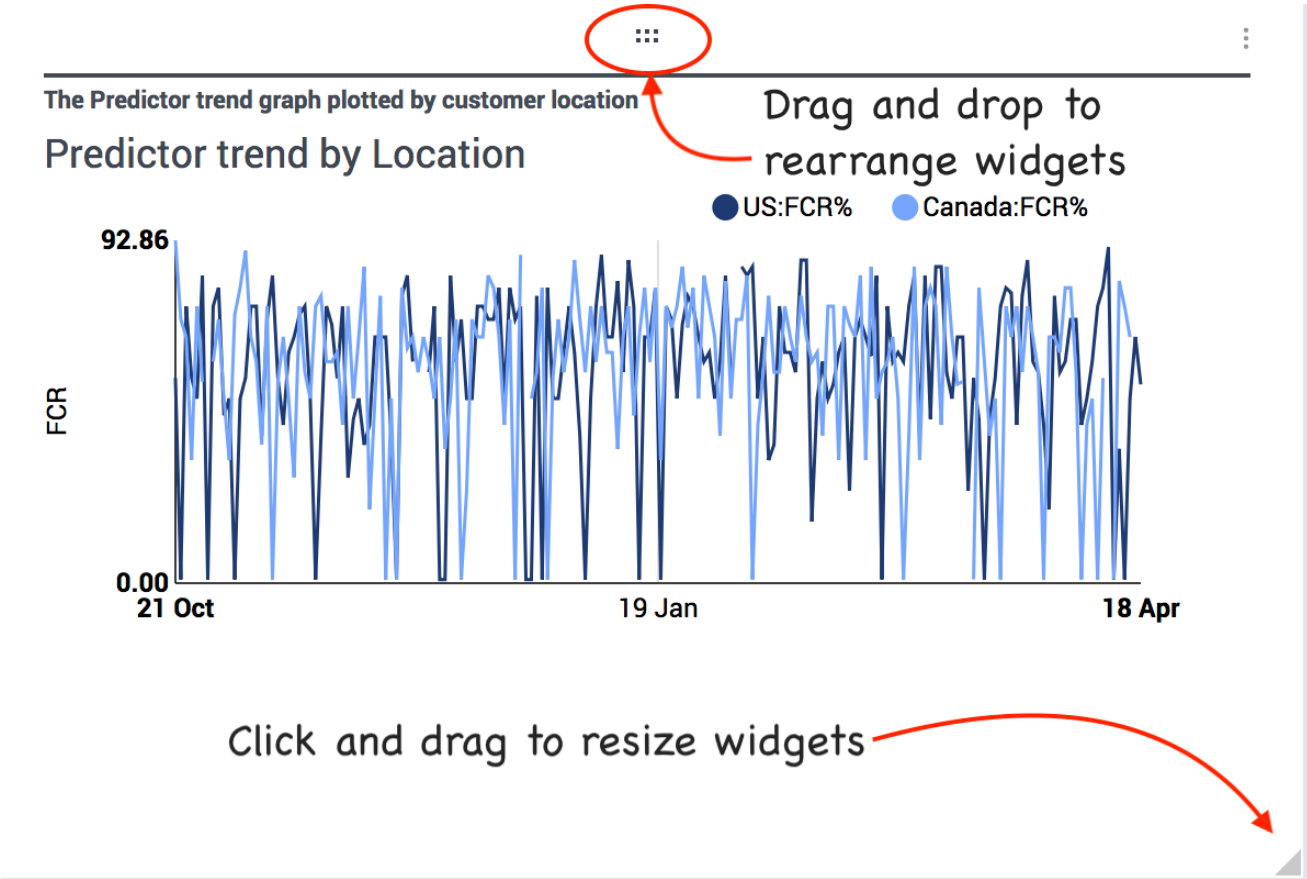
To rename or delete a widget:

- Click the 3 vertical dots icon and select **Rename** or **Delete**.

To resize a widget:

- Click the lower-right corner and drag to the desired size.

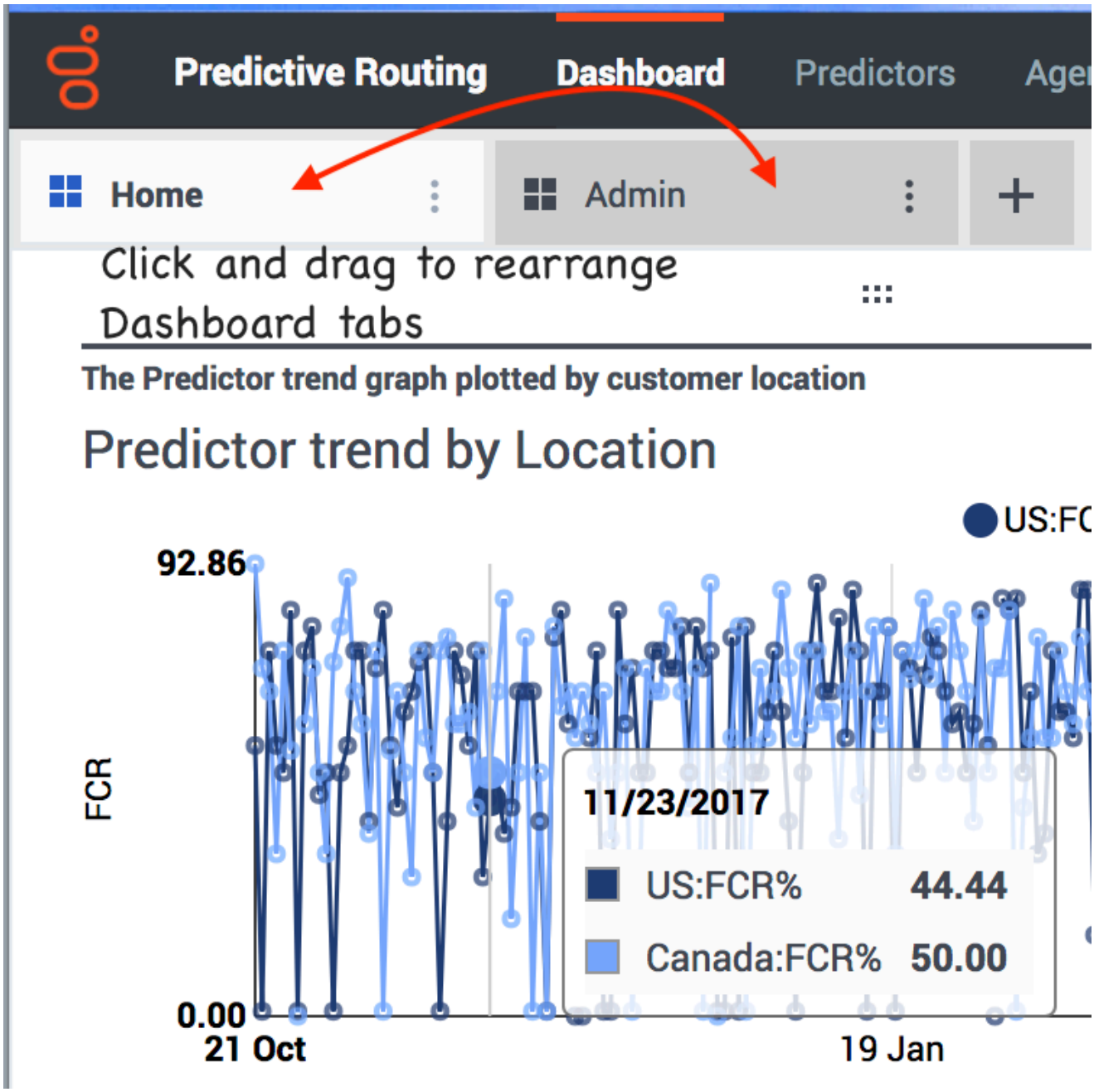
Edit a **Dashboard**



To rename, share, or delete a **Dashboard**:

- Click the three vertical dots on your **Dashboard**'s tab.

Rearrange your **Dashboard** tabs



To change the order of your **Dashboard** tabs, click the "four-square" icon on the left side of the **Dashboard** tab and drag it to the desired position.