SAS® Offer Optimization for Communications 5.4

User's Guide

SAS® Documentation

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SAS® Offer Optimization for Communications 5.4: User's Guide

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Contents

About This Book

Audience

This documentation focuses on explaining the tasks that you can perform by using the SAS Offer Optimization for Communications interface. You might be assigned to a specific role, which determines the tasks that you can perform. SAS Offer Optimization for Communications is designed for the following roles:

- Administrators responsible for setting up and maintaining the application environment and data. Administrators also have the rights over all tasks that can be performed by using the SAS Offer Optimization for Communications interface.
- Business analysts responsible for designing and creating reports and performing tasks that are involved in the workflow of the application.
- Business users responsible for analyzing report data and making decisions based on that data.

For details, see "Managing Roles and Capabilities" on page 9.

Prerequisites

Before you start working with SAS Offer Optimization for Communications, make sure that all the following prerequisite tasks are complete as mentioned in the sequence below:

1. Complete tasks that are detailed in the *SAS Communications Analytics Architecture: Administrator's Guide.*
2. Complete tasks that are detailed in the *SAS Customer Analytics for Communications: Administrator's Guide.*
3. Complete tasks that are detailed in the *SAS Offer Optimization for Communications: Administrator's Guide.*

In addition, here are the prerequisites for using SAS Offer Optimization for Communications:

- A user ID and password for logging on to SAS Offer Optimization for Communications.
- A supported browser installed on your desktop client.
- A user ID and password for logging on to SAS Enterprise Miner to create and register analytical models.

- A user ID and password for logging on to SAS Web Report Studio to generate reports.
- Access to data sources or stored processes that can be used to obtain data for reports.

What's New in SAS Offer Optimization for Communications 5.4

Overview

SAS Offer Optimization for Communications 5.4 has the following changes and enhancements:

- enhanced user interface
- separate workflow for prepaid and postpaid payment mode
- support for multiple types of databases

Enhanced User Interface

SAS Offer Optimization for Communications has an enhanced user interface. This enhancement enables users to perform tasks more quickly and easily.

Separate Workflow for Prepaid and Postpaid Payment Modes

The workflow steps for a project change depending on the payment mode that you have selected for the project. For a project with prepaid payment mode, the **Invoice Recalculation** workflow step is not displayed in the workflow diagram pane. In addition, the configuration details of certain workflow steps, such as **Offer Assembly**, change depending on the payment mode of the project.

Support for MySQL and Teradata

In the previous version, the business data was stored in the SAS database. SAS Offer Optimization for Communications now also supports the Teradata database. Similarly, in the previous version, the application data was stored in the SAS/SHARE database. In the current release, the application data is stored in MySQL.

Accessibility Topic Title

Overview

SAS Offer Optimization for Communications has not been tested for compliance with U.S. Section 508 standards and W3C web content accessibility guidelines. If you have specific questions about the accessibility of SAS products, send them to **accessibility@sas.com** or call SAS Technical Support.

Documentation Format

Please contact **accessibility@sas.com** if you need this document in an alternative digital format.

User Interface Layout

SAS Offer Optimization for Communications provides a workflow-based interface for producing best offers for customers. The application window contains five main sections:

- The top of the window contains the application name and an application bar that includes a menu bar and a **Log Off** button.
- The left side of the window contains a category pane. This pane enables you tot choose the type of object such as business group and project that you want to work with.
- The center of the window (the work area) contains list of objects. You can open the objects and perform relevant tasks.
- The right side of the window contains a pane for docking the Object Preview window.

To customize the application window and its features, select **File** ⇨ **Preferences**. For more information about the layout and the features of the application window, see "Overview of the SAS Offer Optimization for Communications Interface" on page 13..

Themes

An application's theme is the collection of colors, graphics, and fonts that appear in the application. The following themes are provided with this application: SAS Corporate, SAS Blue Steel, SAS High Contrast, SAS Light, and SAS Dark. To change the theme for the application, select **File** ⇨ **Preferences** and go to the **Global Preferences** page.

You can also use keyboard shortcuts to magnify the contents of the browser window or to invert the application colors. For details, see "Keyboard Shortcuts" on page xii.

Note: If you have special requirements for your themes, then contact your system administrator or visual designer about using the SAS Theme Designer for Flex application to build custom themes. SAS Theme Designer for Flex is installed with SAS themes. For more information about this tool, see *SAS Theme Designer for Flex: User's Guide*.

Keyboard Shortcuts

The following table contains the keyboard shortcuts for the application. In the user interface, the shortcuts are displayed within parentheses in tooltips and menu labels.

Note: Some application-level keyboard shortcuts do not work when you first open an application. When that happens, press Tab to place the focus on the application, and then try the keyboard shortcut again.

Note: When you use a keyboard shortcut to activate a button, first give the focus to the field or section that the button is associated with before you use the keyboard shortcut. For example, if a table has an associated button, you must first move the focus to the table before you press Ctrl+?.

Keyboard Shortcuts

Task	Keyboard Control
Open a Help pop-up window from the button *Note:* To ensure that the correct Help is displayed, select the field or section that the button is associated with before you use the keyboard shortcut.	Ctrl+?
Zoom in	Ctrl++
Zoom out	Ctrl+-
Reset the zoom state	Ctrl+0

Task	Keyboard Control
Maximize view (collapses the category pane and the tile pane, and hides the status bar and the application bar, which includes the menu bar and the workspace bar). or Exit maximized view (expands the category pane and the tile pane, and shows the status bar and the application bar).	Ctrl+Alt+Shift+M *Note:* This keyboard shortcut does not work when the focus is on the workspace bar.
Open a pop-up menu.	Shift+F9 (if a menu is available in that context) *Note:* If you use Shift+F9 to display the pop-up menu, then it is always displayed in the top left corner of the user interface control that you are using.
Temporarily invert or revert application colors (for the current session only) *Note:* You can set the **Invert application colors** preference in the Preferences window if you want the color change to persist across sessions.	Ctrl+~
Rename the selected tab.	Make sure that the focus is on the tab. Press F2 and specify the new name. To commit your changes, press Enter. To cancel your changes, press Esc.
Close the selected tab.	Make sure that the focus is on the tab, and then press Delete. *Note:* Some tabs cannot be closed.
Switch in and out of Edit mode for a table cell.	To enter Edit mode, select a cell and press F2. To exit Edit mode, press Esc.
Navigate between table headings and table content	For a two-dimensional table, first make sure that focus is on the table and that you are not in Edit mode. Press Ctrl+F8 to switch focus between column headings and table cells. Use the arrow keys to navigate from heading to heading. For a multidimensional table, first make sure that focus is on a table cell and that you are not in Edit mode. Press Ctrl+F8 to switch focus between column headings, row headings, and table cells. Use the arrow keys to navigate from heading to heading.

Task	Keyboard Control
Navigate the content rows of a table	When table cells are in Edit mode: • Press Tab and Shift+Tab to move from cell to cell horizontally across columns. • Press Enter and Shift+Enter to move from cell to cell vertically across rows. When table cells are not in Edit mode, use the arrow keys to move from cell to cell.
Sort columns in a table	To sort a single column, navigate to the column heading of the column that you want to sort. Press spacebar to sort the column. To sort additional columns, navigate to the column heading of each additional column that you want to sort. Press Ctrl+spacebar.

Recommended Reading

Here is the list of documents that you can refer to while using this document:

- *SAS Communications Analytics Architecture: Administrator's Guide*
- *SAS Customer Analytics for Communications: Administrator's Guide*
- *SAS Offer Optimization for Communications: Administrator's Guide*
- *SAS Communications Analytics Architecture: User's Guide*
- *SAS Customer Analytics for Communications: User's Guide*

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Part 1

Introduction to SAS Offer Optimization for Communications

Chapter 1

About SAS Offer Optimization for Communications

Overview of SAS Offer Optimization for Communications

The communications industry is undergoing an unprecedented change as a result of convergence that is enabled by IP broadband. Products, applications, solutions, and offers that were previously disconnected have to be delivered on to a single platform. Convergence is forcing communications service providers in formerly niche markets such as telecommunications, media, and entertainment to become connected business partners. To succeed in a converged market, communications service providers have to evolve rapidly and adapt effectively to the ongoing business changes. While meeting these challenges, communications service providers also have to satisfy customers' expectations and win their loyalty. As a result, attracting and retaining profitable customers becomes a critical factor for maximizing profits. Therefore, communications service providers need a technology infrastructure that helps them make the right offers, at the right time, and through the right channel.

SAS Offer Optimization for Communications addresses the churn problem in the communications industry and provides inputs for business areas such as campaign management and customer management. This solution also gives you the insight that you need to effectively implement business strategies, retain and nurture customer

relationships, and maximize profits. SAS Offer Optimization for Communications is empowered with the award-winning capabilities of SAS solutions—analytics, data integration, and business intelligence. With its next-generation service architecture, SAS Offer Optimization for Communications offers an extensible platform to reduce customer churn, increase customer lifetime value, and provide authentic data for various channels of customer interaction.

Benefits of Using SAS Offer Optimization for Communications

Reduced Customer Churn

SAS Offer Optimization for Communications anticipates churn behavior through the real-time churn-modeling techniques. It further leverages the automated segmentation model to target the at-risk customers who have higher churn rates. SAS Offer Optimization for Communications, through its core analytical components, aims to retain customers by deriving appropriate offers for them and enabling communications service providers to promote them through appropriate service channels.

Higher Profits

SAS Offer Optimization for Communications takes a quantum leap forward in the speed and accuracy of behavior analysis and prediction by automating the crucial processes of customer profiling, segmentation, and modeling. Using state-of-the-art statistical intelligence and algorithms, the solution quickly analyzes customer behavior. This analysis, in turn, enables communications service providers to identify and target their high-value customers with timely cross-sell and up-sell offers. As a result, communications service providers can meet their customers' communications needs and satisfy their demand for new services. The result is higher profits and more satisfied customers. As customer retention rates rise and customer-acquisition costs drop, profits continue to increase.

Greater Market Share

SAS Offer Optimization for Communications leverages behavior analysis and modeling to deal with customer churn. This feature enables communications service providers to predict which customers are likely to leave, even before the thought occurs to the customer. It also enables rapid dissemination of this churn data to key decision makers and customer contact points within the corporation. As a result, communications service providers can have a powerful edge in retaining their valued customer base, in spite of competitive efforts to entice those customers away. Decreased churn and higher customer retention translate to significant gains in the market share.

Improved Return on Investment

With SAS Offer Optimization for Communications, communications service providers incur lower up-front costs in order to obtain the tools that are necessary to gather, analyze, and store data. Using this data, communications service providers can assess customer churn. Moreover, they can further leverage this data to create effective customer retention programs. As a result, they can measure improved return on

investment (ROI) in terms of decreased churn, higher marketing response rates, and drop in overall customer acquisition expenditures.

Solution Features

Customer-Centric Database

SAS Offer Optimization for Communications is empowered with fully documented, customer-centric dimensional models that contain information about an operator's portfolio of customers. The information contains historical, highly detailed, transformed, and aggregated customer data. The data layer is designed to support maximum flexibility in the types of relationships that can exist in operations.

Optimized Data Management

SAS Offer Optimization for Communications requires data from various operational and transactional systems such as the billing system, the customer relationship management system, the order management system, and the activity-based management system. The flexible architecture ensures seamless integration with all these systems to extract the required data and information.

Support for Multiple Product Lines

SAS Offer Optimization for Communications is available for fixed and mobile communications service providers with prepaid or postpaid customers. It is also available for a few hybrid price plans that are designed by combining the two types of product lines.

Optimized Analytical Techniques

SAS Offer Optimization for Communications implements the state-of-the-art optimization techniques for all its core analytical objectives:

- Divide the target segment into homogenous clusters.
- Derive representative customers for each cluster.
- Determine the best offers in a ranked order for each representative customer and for each customer of the target segment.

Seamless Integration with Other Analytical Models

SAS Offer Optimization for Communications needs certain analytical inputs such as customer lifetime value, churn scores, cross-sell and up-sell scores, payment risk scores, and profitability values. Hence, it is tightly integrated with all these models that facilitate customer retention.

Dual Modes of Operation

You can operate on each project that you define in SAS Offer Optimization for Communications in two modes, design mode and batch mode.

Design mode
: In the design mode, users perform the project-related tasks by using the SAS Offer Optimization for Communications interface. Also, in this mode, a sample of customers is drawn from the customer base. Therefore, all activities and analyses are based on sample data. Users can configure and perform tasks until they are satisfied with the results. Users can save the configuration setup and the results for batch mode processing.

Batch mode
: The configuration setup that users finalize in the design mode for each project is promoted in the batch mode. In the batch mode, tasks are performed automatically without much manual intervention. Results are derived and reports are generated based on the data of the entire customer base.

Automated Workflow

SAS Offer Optimization for Communications ensures a structured working environment for all its user groups through its predefined workflow. The automated workflow supports the following objectives of the solution:

- Provide a guided development and management of the solution strategy in order to support customer retention initiatives.
- Automate functional tasks and analytical processes.
- Support a flexible architecture to enable changes in the workflow based on unique requirements of the communications service provider.
- Offer prebuilt capabilities to support a collaborative environment for all user groups.

Effective Reporting

In most stages of the workflow, SAS Offer Optimization for Communications enables users to generate customized reports and analyze results. This feature helps users verify and confirm results with their business requirements. Based on these reports, users can decide whether they have to configure a certain workflow step again.

SAS Offer Optimization for Communications also supports the business reporting features. These reports help decision makers to quickly develop strategies for their business goals and take appropriate actions at the right time.

How Does SAS Offer Optimization for Communications Work?

SAS Offer Optimization for Communications is a comprehensive solution that interacts with external source systems in order to produce best offers for customers. This solution can be divided into the following components:

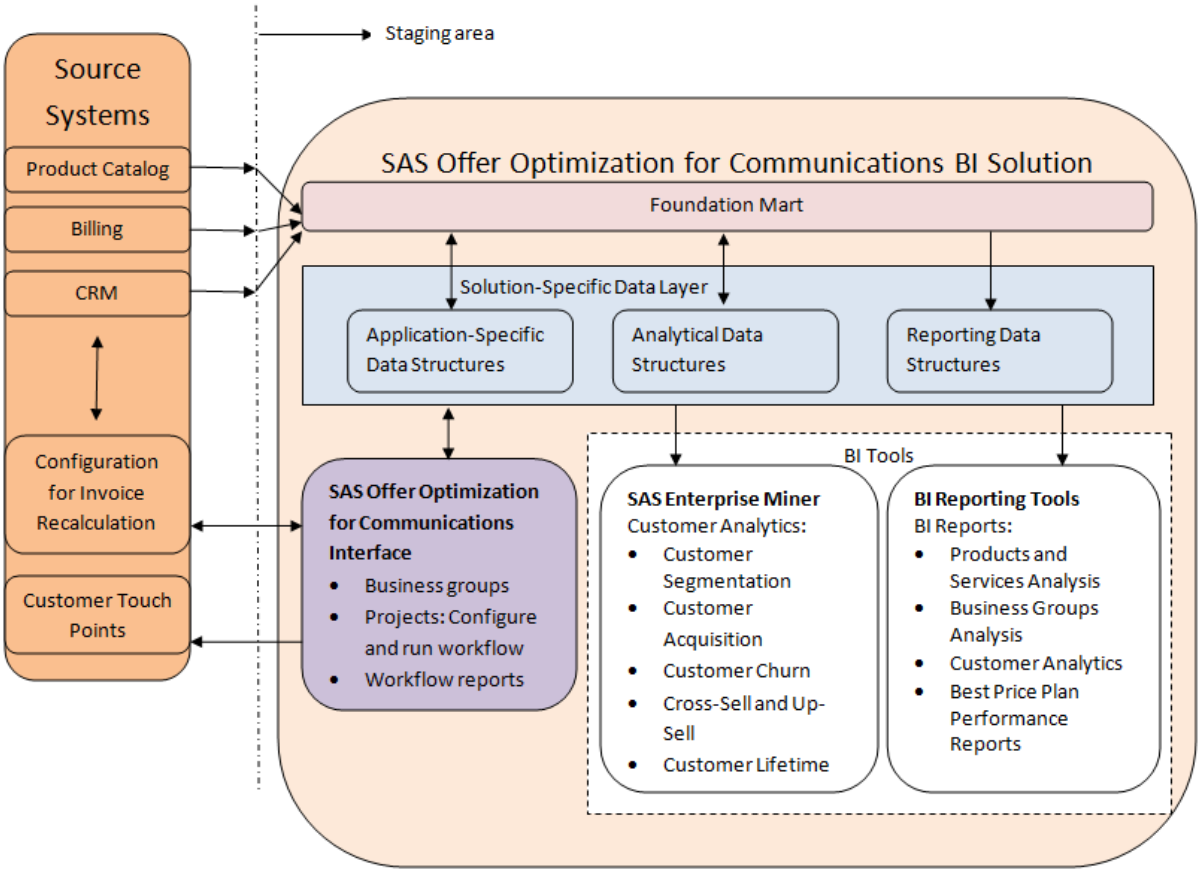
Foundation mart
: stores communications-related data that is extracted from external source systems.

Solution-specific data layer
: stores data that is required for application processing, analytical processing, and business reporting.

SAS Offer Optimization for Communications interface
: workflow-based application to define business groups, configure and run projects, view reports, and produce best offers for customers in the target segment.

BI Tools
: workbench for analytical modelers to define analytical models. Also, provides reporting tools for business analysts to analyze business reports and make business decisions.

Figure 1.1 *Working of SAS Offer Optimization for Communications*



The SAS Offer Optimization for Communications workflow explains the interactions among various components. To summarize, the solution workflow contains the following steps:

1. Populate data into the common data layer from the external source systems through the staging area.
2. Populate data into the solution-specific data layer:
   - BI reporting data. For details, see the *SAS Communications Analytics Architecture: Administrator's Guide*.
   - Analytical data. For details, see the *SAS Customer Analytics for Communications: Administrator's Guide*.
   - Applilcation-specific data. For details, see the *SAS Offer Optimization for Communications: Administrator's Guide*.

3. Log on to SAS Offer Optimization for Communications with the profile of an administrator.
   a. Define business groups.
   b. Run process to add customers to business groups.

   Note: For tasks that are detailed in step 3, see *Chapter 6 Managing Business Groups* in this guide.
4. Log on to SAS Customer Analytics for Communications to complete tasks pertaining to the following analytical models:
   - customer segmentation
   - customer acquisition
   - customer churn
   - cross-sell and up-sell
   - customer lifetime value

   For details, see the *SAS Customer Analytics for Communications: User's Guide*.
5. View business reports in SAS Web Report Studio. For details, see *SAS Communications Analytics Architecture: User's Guide*.
   a. Analyze BI reports for customer analytics.
   b. Analyze business groups reports.
   c. Identify business problems associated with each business group.
6. Log on to SAS Offer Optimization for Communications with a certain profile. For details, see "Managing Roles and Capabilities" on page 9.
   a. Define projects with specific objectives for different business groups.
   b. Configure and run project workflow to derive representative customers.
   c. Export information about representative customers to external source systems.
   d. Import billing details of representative customers and recalculate invoices. This step is applicable to projects that are defined for the postpaid payment mode.
   e. Produce best offers for customers in the target segment.
   f. Promote the project to batch mode.

   Note: For tasks that are detailed in step 6, see the relevant chapters of this guide.
7. Run the project in batch mode and produce best offers for each customer in the customer base.
8. Export information about best offers to external source systems.

   Note: For details about steps 7 and 8, see *SAS Offer Optimization for Communications: Administrator's Guide*.
9. Log on to SAS Web Report Studio with a certain profile and view reports to evaluate the performance of SAS Offer Optimization for Communications. For details, see the *SAS Communications Analytics Architecture: User's Guide*.

Chapter 2

Managing Access to SAS Offer Optimization for Communications

Managing Roles and Capabilities

Different users of SAS Offer Optimization for Communications might have access to different functionality depending on the roles that are assigned to them. Each role is mapped to a set of predefined capabilities. A capability, also known as an application action, defines operations that a user can perform. SAS Offer Optimization for Communications has three predefined roles—administrator, business analyst, and business user. Capabilities are further categorized into three levels—General, Analytical, and Advanced.

General Capabilities

Each role is assigned the general capabilities. The following are examples of general capabilities:

- View information about a business group.
- View information about a project and its workflow.
- View reports.
- Send e-mail notifications.

Analytical Capabilities

Analytical capabilities are assigned to administrators and business analysts. However, administrators and business analysts are not assigned the same analytical capabilities. The analytical capabilities of adding and managing business groups are assigned only to administrators. Similarly, the analytical capabilities of creating and managing reports in SAS Web Report Studio are assigned only to business analysts. The following are examples of analytical capabilities that are commonly assigned to administrators and business analysts:

- Create, manage, and share projects.
- Define or import workflow of the project.
- Run and manage workflow steps of the project.
- Define reports in SAS Offer Optimization for Communications.

Advanced Capabilities

Advanced capabilities are assigned to administrators and business analysts. The following are examples of advanced capabilities that are assigned to both the roles:

- Delete a project.
- Reset a workflow step of a project.

Log On to SAS Offer Optimization for Communications as a Registered User

To log on to SAS Offer Optimization for Communications:

1. To display the SAS Offer Optimization for Communications logon window, click on the URL that is supplied by your system administrator or paste it in the address field of your browser. For example, you might enter **`http://server01.abc.com:8080/SASOfferOptForComm`** as the URL.

Display 2.1 *Log On Window for SAS Offer Optimization for Communications*

2. To log on:
   a. In the **User name** field, enter your user ID.
   b. In the **Password** field, enter the password for the user ID that you have just specified.

c. Click **Log On**.

The main application window appears. For details, see "Overview of the SAS Offer Optimization for Communications Interface" on page 13.

Note: Your password is case-sensitive. Also, your user ID might be case-sensitive depending on the operating system that is used to host the web application server. If you need assistance, contact your system administrator.

Log Off from SAS Offer Optimization for Communications

To log off from SAS Offer Optimization for Communications, on the Application bar, click **Log Off** .

If your connection to SAS Offer Optimization for Communications remains inactive for a certain time, then your session might time out. By default, the session time-out due to inactivity is 30 minutes. Your administrator can change this duration. The application prompts you about your inactive session, and you can log on and continue with your session. However, if you lose your connection, then you must begin at the same point where you last saved your work. As a best practice, save your work frequently.

The following is an example of the message that appears when your session has timed out.

Display 2.2 *Session Timed Out Message for SAS Offer Optimization for Communications*

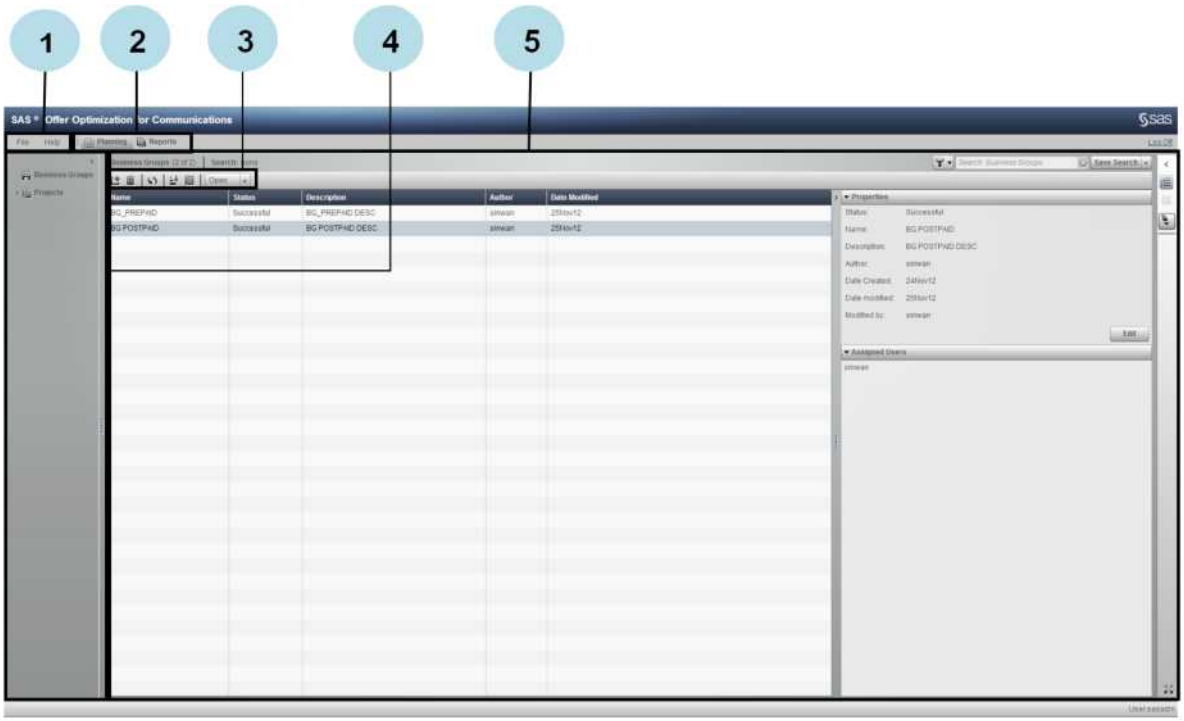
Chapter 3

The SAS Offer Optimization for Communications Interface

Overview of the SAS Offer Optimization for Communications Interface

When you log on to SAS Offer Optimization for Communications, the main application window appears. The main application window comprises the application bar and the workspace. The application bar and workspace are further divided into various sections as depicted in the diagram below.

Figure 3.1 *SAS Offer Optimization for Communications User Interface*



1 Menu bar

2 Workspace bar

3 Toolbar

4 Category pane

5 Workspace

Using the Application Bar

Overview

The application bar is located at the top of the application window and is part of the application banner. The application bar contains the menu bar, the workspace buttons, and the **Log Off** option.

The Menu Bar

The File Menu

The following options are available on the **File** menu:

Recent Work
: enables you to quickly access the recent most objects such as business groups or projects that you are working on.

Preferences
: enables you to define your preferences for displaying information in the user interface.

Log Off
: enables you to log off from the application.

The Help Menu

The following options are available on the **Help** menu:

User's Guide (PDF)
: opens the *SAS Offer Optimization for Communications: User's Guide* in a separate browser window.

SAS on the Web
: includes links to product support page, SAS customer support, and SAS home page. The product support page gives information about the documentation that is available for SAS Offer Optimization for Communications.

About SAS Offer Optimization for Communications 5.4
: displays copyright and other information about SAS Offer Optimization for Communications 5.4.

The Workspace Buttons

The workspace buttons enable you to navigate across workspaces.

Table 3.1 *Workspace Buttons*

Button	Button Name	Purpose
	Planning	enables you to work with objects such as business groups and projects.
	Reports	enables you to work with workflow reports.

The Log Off Option

The **Log Off** option enables you to log off from the application.

Working in the Workspaces

Overview of the Workspaces

The SAS Offer Optimization for Communications interface contains workspaces for performing a group of related tasks within the application. You can navigate across the workspaces by using the workspace buttons that are available on the application bar.

The SAS Offer Optimization for Communications interface contains the following workspaces:

- Business Groups
- Projects
- Reports

The Category Pane

The category pane enables you to select an object, a business group, or a project that you want to work on.

The Toolbar

The toolbar contains options that enable you to quickly complete certain commonly performed tasks.

Note: The toolbar options might not be the same for each workspace.

Table 3.2 *Toolbar Options*

Icon	Description	Action
	New	Defines a new object such as a business group and a project.
	Delete	Deletes an object.
	Refresh	Restores the details of an object.
Not available	Menu	Provides options to open an object or make it available in the Tile pane.

Object Navigator

The object navigator displays a list of objects that are defined for the type of object that you select in the category pane.

Details Pane

The details pane displays information about the object that you have selected in the object navigator.

Tile Pane

The Tile pane displays the objects that you have opened from the object navigator.

The Status Bar

The status bar indicates the progress of a task that is being currently executed.

Help Overview

Help is embedded in the SAS Offer Optimization for Communications interface as various help components. For example, help pop-ups and tooltips give required information to users whenever needed. In addition, the *SAS Offer Optimization for Communications: User's Guide* is available from the **Help** menu.

The following types of online Help are available with SAS Offer Optimization for Communications:

Tooltip Help
: displays short, descriptive information about fields, columns, and icons in a pane. Tooltip Help appears automatically, when you move your pointer over an item on your screen. For example, tooltips display the purpose of each toolbar option.

Pop-up Help
: displays detailed information about fields and columns in a pane. Pop-up Help is represented using the Help icon. Click  to view the information, which is displayed in a pop-up dialog box. For example, while working in a window, users might need complete details of certain fields, in order to provide appropriate information.

Help Text
: displays information persistently in the interface near an associated field, group of fields, or a table. For example, data entry instructions and introductory text for fields and tables are provided.

Chapter 4

Performing Common Tasks in SAS Offer Optimization for Communications

Overview of Commonly Performed Tasks

Here are the common components of the SAS Offer Optimization for Communications interface:

- panes
- sections
- tables
- lists

This chapter explains the common tasks that you can perform when you work on these components.

Resize a Pane

You can resize a pane if the default size of the pane does not display complete information. Also, you can resize a certain pane in order to provide more area for other panes.

To resize a pane:

1. Move your pointer to the horizontal or vertical divider.
2. When your pointer changes to a , drag to resize the pane.

Resize a Window

You can resize a window if the default size of the window does not display complete information.

To resize a window:

1. Move your pointer to any of the borders of the window.
2. When your pointer changes to a , drag to resize the window.

Working with Tables

Change the Width of a Column

If the default width of a column does not display complete information, you can change the column width. To change the width of a column, drag the boundary on the right side of the column heading until the column is the width that you want.

Move a Column

If the order in which the columns are displayed does not meet your needs, you can change the sequence of the columns. To move a column, click the column heading and drag the column to the desired location.

Change the Sort Order of a Column

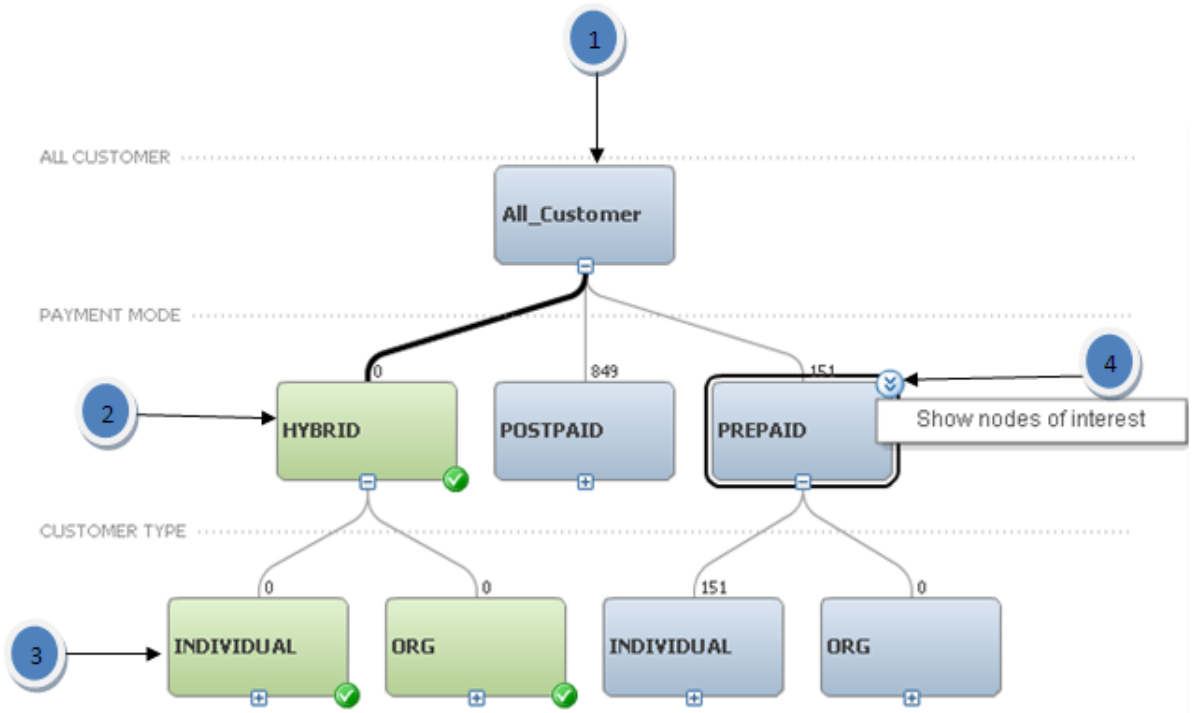
You can sort data by only a single column at a time. To change the order in which a column is sorted, click the up or down arrow that is displayed in the column heading.

About Hierarchical Lists

Overview

In certain panes, information is displayed in a list that progresses from top to bottom. These lists are called hierarchical lists. A hierarchical list contains one or more levels of information displayed in the form of nodes. Each node represents a certain value or a definition. The hierarchical structure indicates the relationships and dependencies that exist between the nodes.

Figure 4.1 *Structure of a Hierarchical List*



1 Primary node

2 Parent node

3 Child node

4 Pop-up menu

Node Types

The first level of the hierarchical list contains a single node, which is called the primary node. Any subsequent level of the list is called a child level. At each child level, there can be one or more nodes, which are called child nodes. Each child node originates from a single parent node, which is a child node at a previous level.

Mode Types

A hierarchical list can be either in View mode or Edit mode.

In View mode, the hierarchical list displays information that you select or define at various levels. You can expand and collapse the child nodes.

In Edit mode, each node has a pop-up menu. The pop-up menu enables you to perform certain tasks.

Examples

Hierarchical lists are used while defining business groups and target segments. For details, see “Working with Hierarchical Lists for Defining Selection Criteria for

Business Groups" on page 32 and "Working with Hierarchical Lists for Defining a Target Segment" on page 72.

Working in Multiple Windows at a Time

SAS Offer Optimization for Communications enables you to work in multiple windows at a time. This feature enables you to compare definitions of various objects such as business groups, projects, and reports. For example, you can compare the selection criteria of two or more business groups in separate windows. You can also use this feature to work on multiple objects of similar types together.

To open multiple windows:

1. From the list that is displayed in the respective workspace, select the object that you want to open.
2. On the toolbar, click the menu, and then select **Send to Tile Pane**.
3. Repeat steps 1 and 2 for the other objects.
4. In the Tile pane, hold down the **CTRL** key and select the objects that you want to view. Each object opens in a separate window.

Part 2

Working in the Business Groups and Projects Workspaces

Chapter 5

Managing Business Groups

About Business Groups

Communications service providers divide their customer base into distinct groups in order to map it with their business operations and goals. The customer base is divided into groups based on certain business rules. Business rules are the strategic parameters that are defined according to the goals that are set by an organization. These parameters are mostly static and therefore do not change frequently.

In order to divide the customer base according to the strategic parameters, SAS Offer Optimization for Communications enables you to define distinct customer groups. Each group is identified by a name and a description and is called a business group. Business groups are created based on a set of predefined variables. The values of each variable are also predefined. The unique combination of a variable and the values that you select for that variable is the selection criterion for the business group. You can define one or more selection criteria for a business group. In addition, you can define a hierarchy in which you want to define the selection criteria. Customers who satisfy all selection criteria are added as members of the business group. Moreover, the selection criteria that you define for a business group are unique across business groups. In other words, the selection criterion that you have added to a business group cannot be added to another business group. As a result, a customer can belong to only one business group.

You can create and manage business groups using the Business Groups workspace.

For example, you can define a business group based on the following predefined variables and values:

The following table indicates the predefined variables and values that are configured for defining business groups.

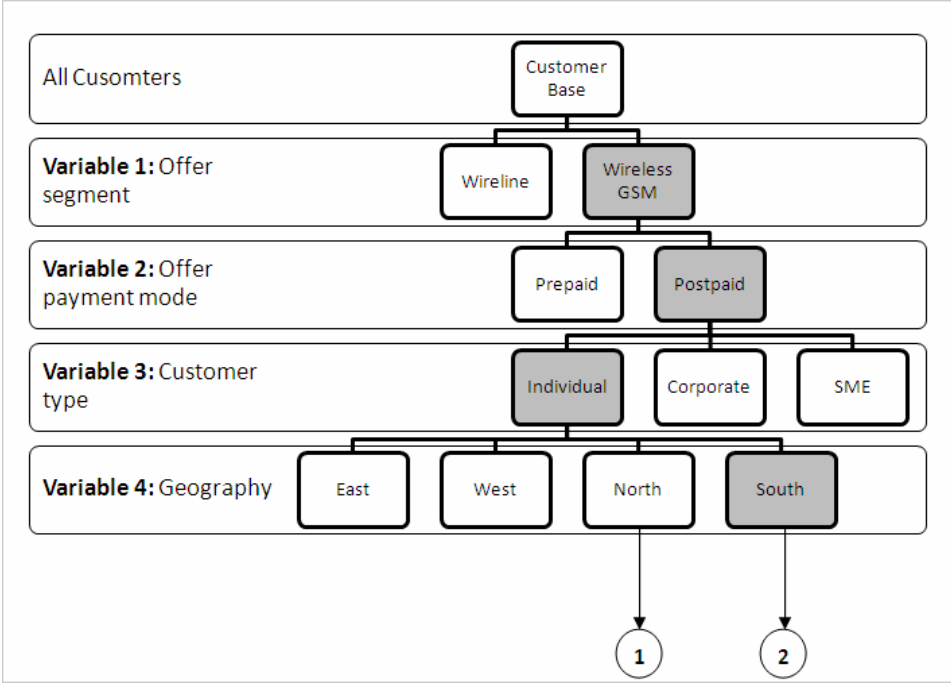
Table 5.1 *Predefined Variables and Values*

Variable Name	Variable Values
Offer segment	• Wireline • Wireless GSM
Offer payment mode	• Prepaid • Postpaid
Customer type	• Individual • Corporate • SME
Geography	• East • West • North • South

For details about how to configure variables and their values, see *SAS Offer Optimization for Communications: Administrator's Guide*.

Based on these predefined variables and values, you can define the selection criteria for your business group as depicted in the following diagram.

Figure 5.1 *Example of Selection Criteria for a Business Group*



1 Deselected value

2 Selected value

Therefore, customers who satisfy the following criteria are added to the business group:

- Offer segment = Wireless GSM
- Offer payment mode = Postpaid
- Customer type = Individual
- Geography = South

About Managing Business Groups

You can create a business group only if you have administrative rights. As an administrator, you can perform the following tasks:

- Add customers to a business group.
- Assign users to a business group.
- Change the details of a business group.
- Delete a business group.

If you do not have administrative rights, you can view only the details of the business groups that are created and managed by your administrator.

Overview of the Business Groups Workspace

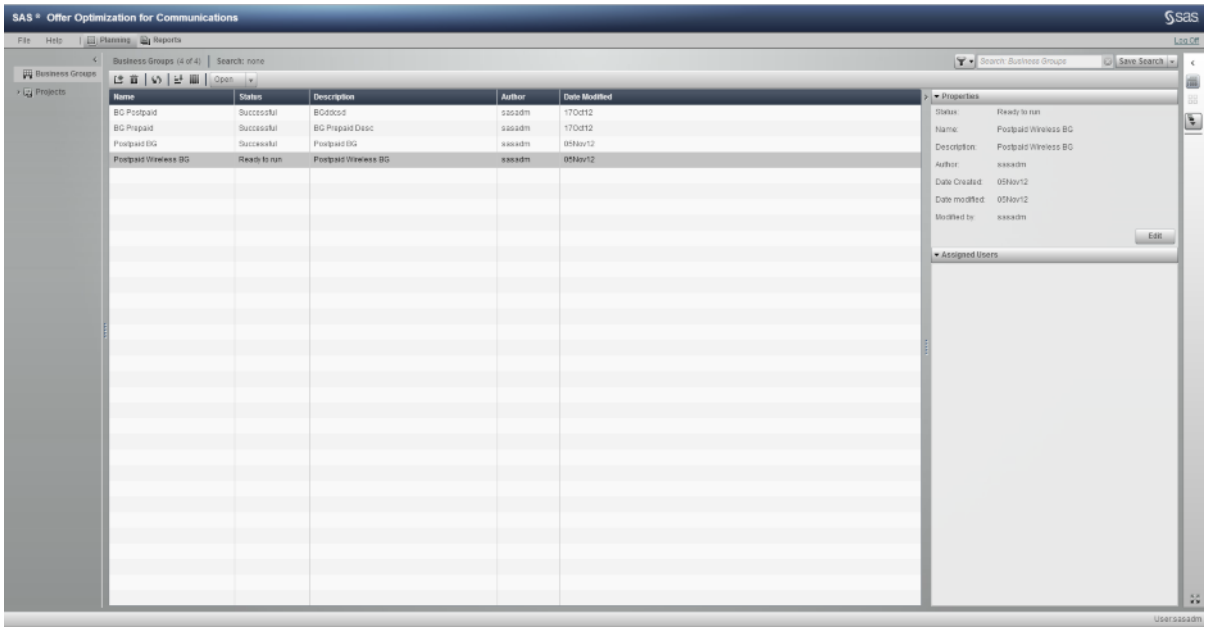
Select a Business Group

As an administrator, you can view details of all business groups. However, if you do not have administrative rights, then you can view details of only those business groups that your administrator has assigned to you. The business groups that are assigned to you are displayed in the **Business Groups** list.

To select a business group:

1. In the category pane, select **Business Groups**.
2. From the **Business Groups** list, select the business group whose details you want to view. The details of the business group are displayed in the Properties pane.

Display 5.1 *Business Groups Workspace*



Viewing Properties of a Business Group

The **Properties** pane displays the following information about the business group:

Status
displays the current status of the business group.

Table 5.2 *Processing Status for a Business Group*

Status	Description
Ready to run	indicates that you can run the process to add customers to this business group.

Status	Description
Awaiting inputs	indicates that you have to specify the selection criteria for adding customers to this business group.
Running	indicates that the process to add customers to this business group is in progress.
Successful	indicates that customers are added to this business group.
Failed	indicates that one or more errors occurred when the process to add customers was run.

Name
displays the name of the business group.

Description
displays the description of the business group.

Author
displays the name of the user who has defined the business group.

Date created
displays the date on which the business group was defined.

Date modified
displays the date on which the details of the business group were modified.

Modified by
displays the name of the user who has modified the details of the business group.

Viewing Users of the Business Groups

The **Assigned Users** pane displays the users who can view the details of the business group. Only these users can create and manage projects that are associated with this business group. An empty list indicates that the administrator has not assigned any users for this business group.

Viewing the Selection Criteria

To view the selection criteria of the business group:

1. In the **Business Groups** list, double-click the business group whose selection criteria you want to view. Alternatively, on the toolbar, select **Open** from the menu. The Business Group window appears.
2. Expand the nodes of the hierarchical list to view the selection criteria that are defined for the business group. Each level represents a variable, and each node indicates the value for the variable. You can view either all nodes or only the selected nodes.

TIP **Customer count** displays the number of customers who satisfy the selection criteria that you have defined for this business group. This number also indicates the total number of customers in the business group.

The Toolbar

When you open a business group, the following options are available on the toolbar:

Table 5.3 Toolbar Options

Icon	Description	Action
	Run	Adds customers to the business group.
	Edit	Modifies details of an object.
	Send e-mail notification	Enables you to send an e-mail to the e-mail ID that your administrator has configured.
	Assign Users	Defines user access for business groups.
No icon	Menu item: All Nodes	Displays all the nodes of the hierarchical list that you added for the selection criteria.
No icon	Menu item: Selected Nodes	Displays the nodes of the hierarchical list that you have selected for the selection criteria.

Define a Business Group

Defining a business group involves the following main tasks:

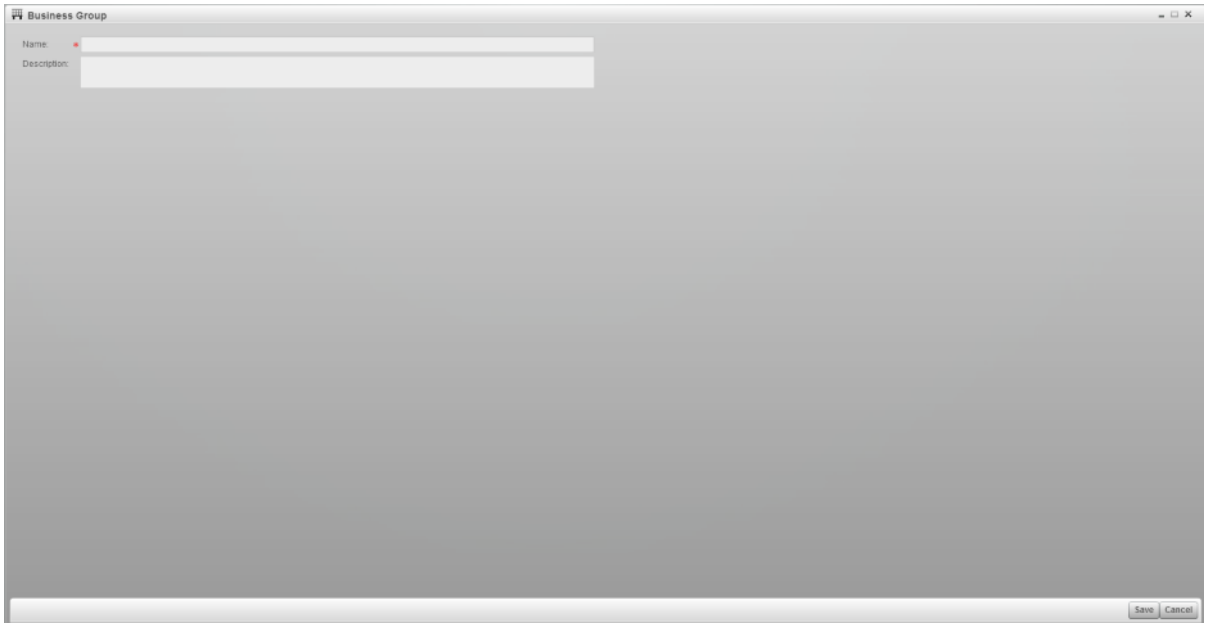
- Identify the business group with a name and a description.
- Define the selection criteria for adding customers to the business group.

Note: Before you begin defining a business group, make sure that you are familiar with hierarchical lists. For details, see "About Hierarchical Lists" on page 20.

To create a business group:

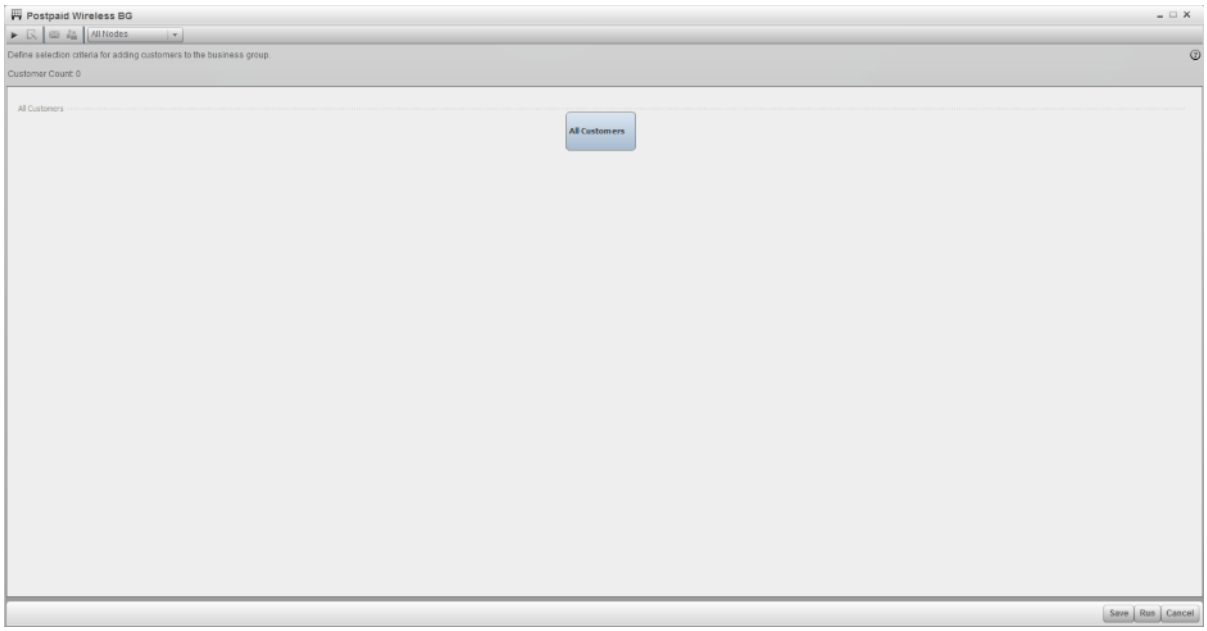
1. On the Application bar, select **Planning**.
2. In the category pane, select **Business Groups**.
3. On the toolbar, select . The Business Group window appears.

Display 5.2 *The Business Group Window*



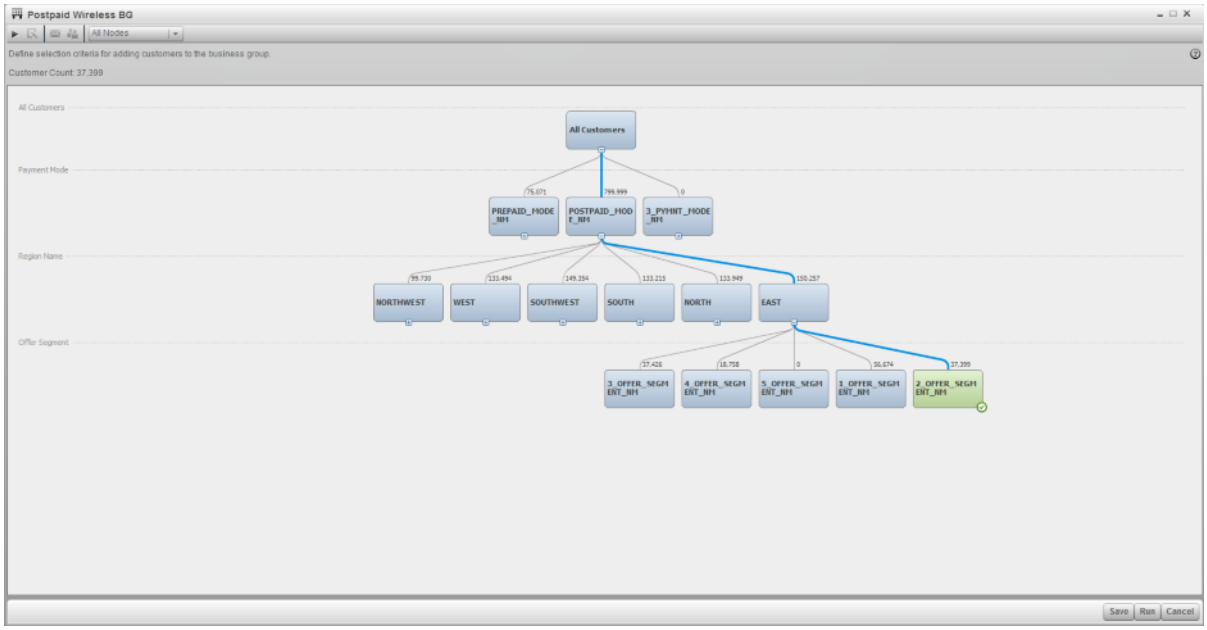
4. Enter a name for the business group. The business group will be identified by this name.
5. Enter a short description for the business group.
6. Click **Save**. Now you can define the selection criteria for the business group. By default, the primary node that represents the entire customer base is displayed in the hierarchical list.

Display 5.3 *Selection Criteria Window*



7. To define the selection criteria, click the pop-up button of the primary node, and then select **Add child level**. For details, see "Working with Hierarchical Lists for Defining Selection Criteria for Business Groups" on page 32.
8. Select the nodes that you want to add as selection criteria.

Display 5.4 *Selected Nodes*



TIP **Customer count** displays the number of customers who satisfy the selection criteria that you have defined for this business group. This number also indicates the total number of customers that will be added to the business group.

9. Click **Save**.
10. (Optional) To add customers to the business group, click **Run**.

Working with Hierarchical Lists for Defining Selection Criteria for Business Groups

Prerequisites

Before using the hierarchical lists, make sure that you are familiar with their basic functionality. For details, see "About Hierarchical Lists" on page 20.

Overview

When you define selection criteria for adding customers to a business group, the hierarchical list opens in Edit mode. To specify the selection criteria, you have to first add one or more child levels. The sequence in which you add variables defines the hierarchy of the variables that you want to consider for selecting customers. After this, you have to select one or more child nodes to indicate the values that you want to consider for each variable. The hierarchical list has two views. You can either view all nodes or only selected nodes.

Icons in a Node

Each node has one or more icons. A few of the icons that are displayed in a node might differ depending on the action that you take on the node. The following table lists all icons that are displayed in a node and the purpose of each icon.

Table 5.4 *Icons in a Node*

Icon	Purpose
	opens a pop-up menu.
	indicates that the child node is selected and included in the selection criteria of the business group that you are defining.
	indicates that this node is considered in the selection criterion of some other business group. The node to which this icon is attached is deactivated.
	indicates that a new child node is added for a selected parent node after you have saved the business group. That is, a new value is added for a variable that you have included in the selection criteria of a business group.
	expands the child nodes that originate from a parent node.
	collapses the child nodes that originate from a parent node.

Pop-up Menu of a Node

Each node of the hierarchical list has a pop-up menu. The options on the pop-up menu differ depending on the current mode of the hierarchical list and the type of the node. The following options are available on the pop-up menu:

Show nodes of interest
displays the nodes that you have selected at various levels of the hierarchical list.

Show all nodes
displays all nodes of the hierarchical list.

Add child level
displays a list of variables that are not added at previous levels of the hierarchical list. From the list, select a variable that you want to add at the specific level.

Select node
selects a child node. The value that this node represents is added in the selection criteria.

Deselect node
deselects a child node. The value that this node represents is removed from the selection criteria.

Clean node
cleans a dirty node.

Expand all nodes
displays all child nodes of each parent node.

Collapse all nodes
displays all the parent nodes at each level.

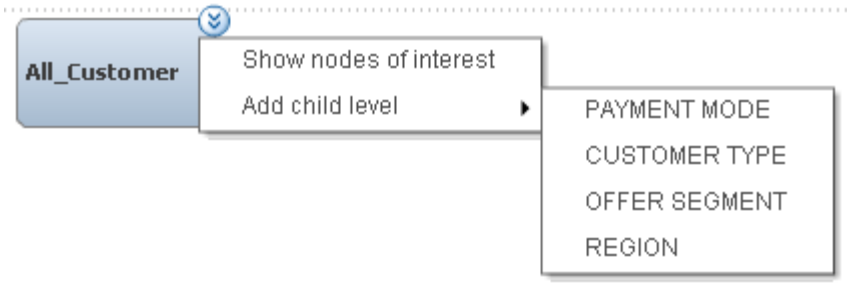
Add One or More Child Levels

You can define one or more child levels. The number of child levels that you can define depends on the number of variables that you have defined for setting up the business rules of a business group. Each child level represents a variable. A child node represents a value of the variable that is selected at the child level.

To add child levels:

1. Click the primary node.
2. From the pop-up menu, select **Add child level**.

Display 5.5 *Add Child Level*



3. From the list, select a variable that you want to add as the first level of the selection criterion. The values of the variable that you add are displayed as child nodes. For example, if you select the geography variable, then the values East, West, North, and South are added as child nodes.

   Note: At each subsequent level, the variable that is added at the previous level is not available for selection.

4. (Optional) Select a child node, and then select **Add child level** from the pop-up menu. Select the variable that you want to add as the next level of the selection criterion. The values of this variable are added as child nodes for each parent node. For example, you add the payment mode variable at the next level. For each parent node, two child nodes, prepaid and postpaid, are added.

   TIP Similarly, you can add child nodes for the next levels.

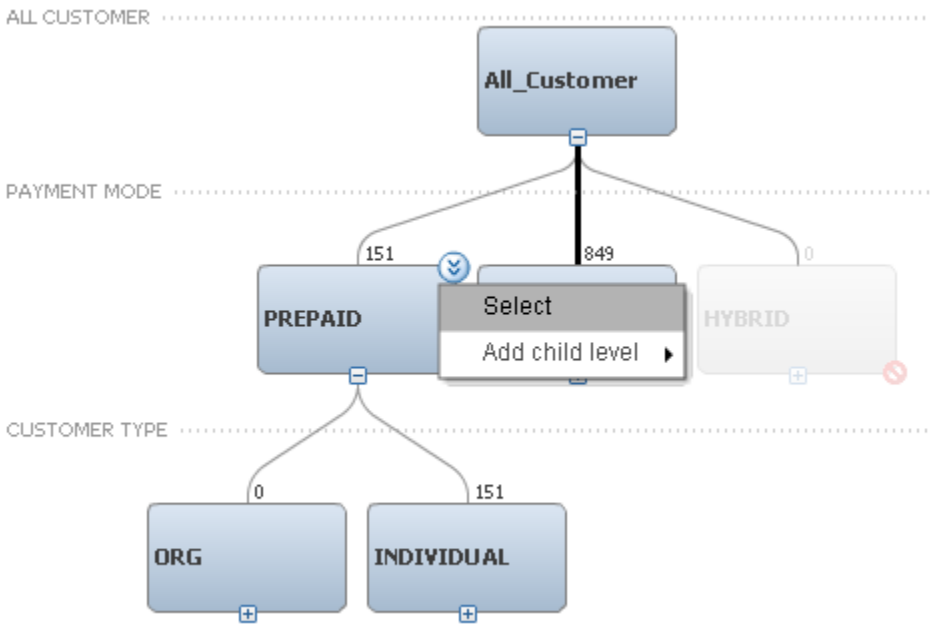
Select a Child Node

After you add variables, you can select the values for the variables. If you select a node at the highest level (from the top), then all the child nodes that originate from the parent node are automatically selected. This is also true for child levels that you have not yet added. Therefore, you need to individually select nodes from bottom to top if you want to select only particular values for the selection criteria.

To select a child node:

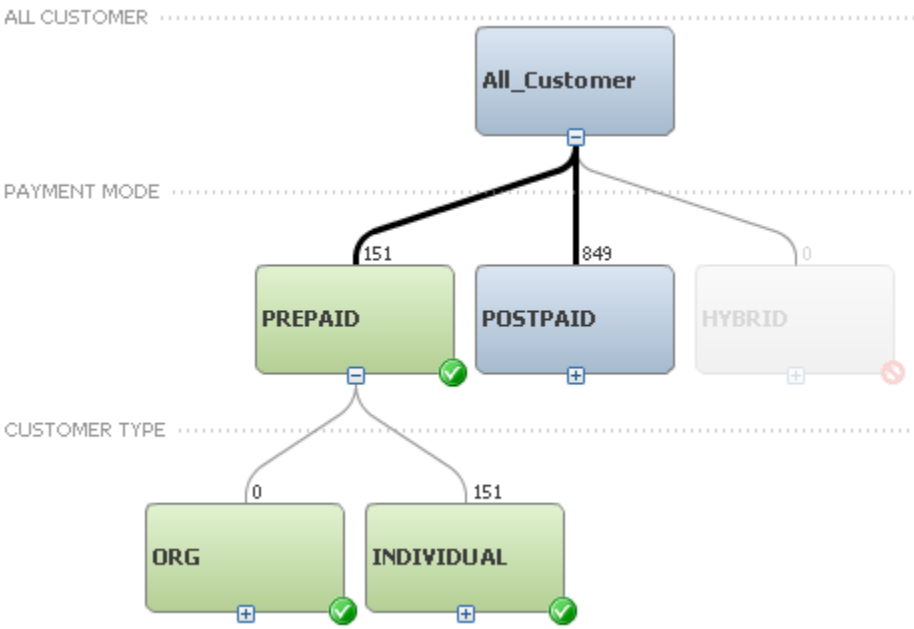
1. Click the node that you want to include in the selection criteria.

Display 5.6 *Select Node*



2. From the pop-up menu, select the **Select** option. The selected child node is depicted in a different color to distinguish it from the child nodes that are not selected.

Display 5.7 *Selected Nodes*



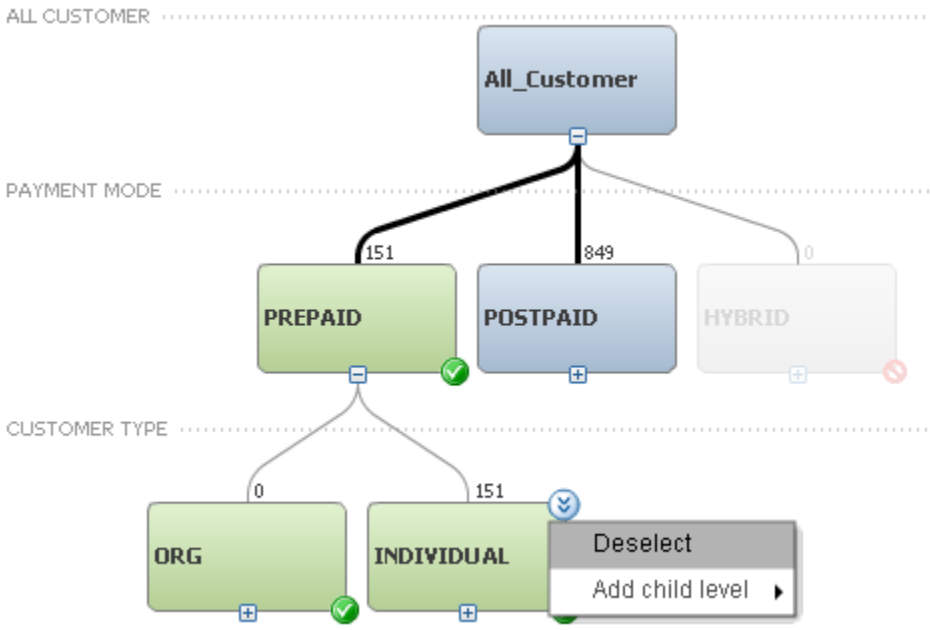
Note: In some cases, you might not be able to select the parent node in the selection criteria. The reason can be that one or more child nodes of this parent node are already used as selection criteria for some other business group.

Deselect a Node

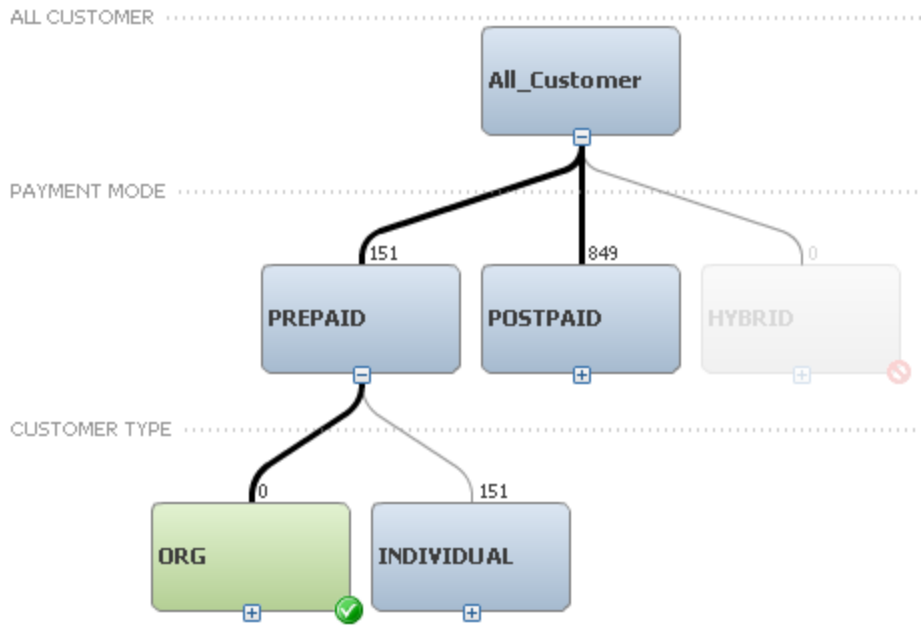
You can remove a node that you have added in the selection criteria. You can either deselect a parent node or a particular child node.

To deselect a node:

1. Click the node that you want to deselect.



2. From the pop-up menu, select **Deselect**. If this is a parent node, all the child nodes that originate from this node, are also deselected. Otherwise, only the selected node is excluded from the selection criteria.



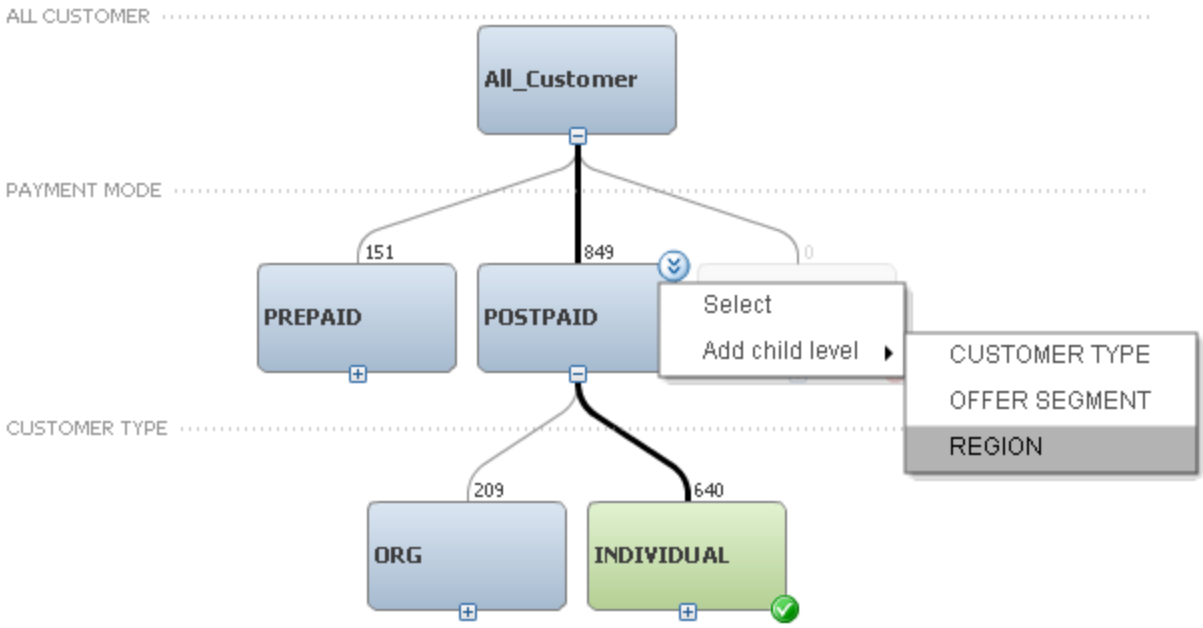
Change a Child Level

You can change the hierarchy of variables that you have defined. However, if you change the hierarchy of variables, then you will lose the selection criteria that you have defined for the current and subsequent levels. Therefore, you must consider this impact before changing the hierarchy of variables.

To change a child level:

1. Click a child node, which is at the level that you want to change.
2. From the pop-up menu, select **Add child level**.
3. Select a variable from the list. The list contains variables that are not added at any levels or that are added at subsequent levels.

Display 5.8 *Change a Child Level*



The new variable and its values are added at the current level. If this is not the last level of the hierarchical list, you will lose the selection criteria that you had defined for the current and the subsequent levels. You have to define the selection criteria again.

Clean a Node

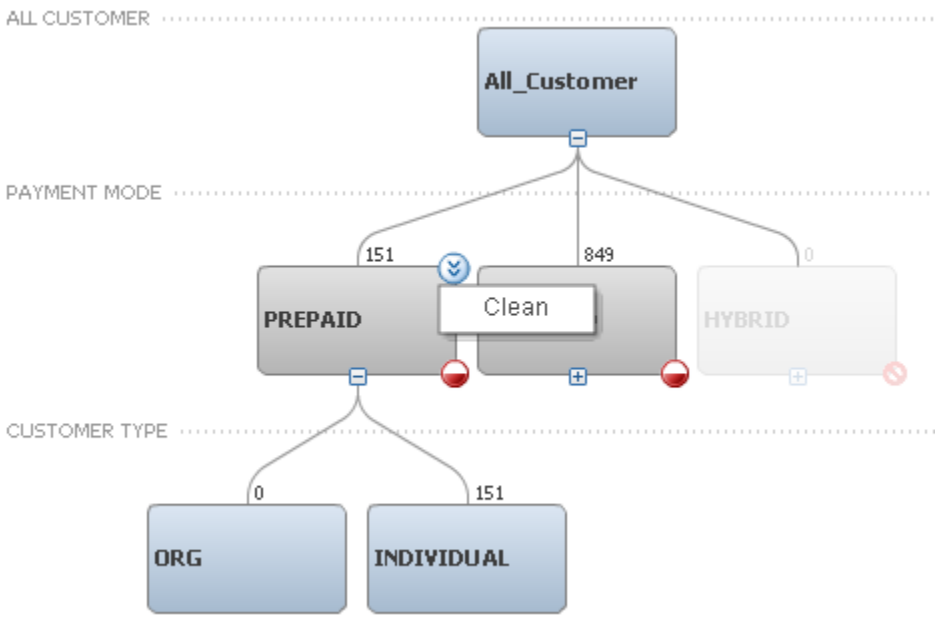
A parent node that you have selected can be marked as a dirty node. This indicates that a new child node is added below this parent node, and you have to reconsider your selection. If you clean the selected parent node, then it will be deselected. You can check the new child node that is added, and then decide whether you want to select the parent node or select specific child nodes individually.

Note: If you clean a dirty node, you must run the business group.

To clean a node:

1. Select the dirty node that you want to clean.

Display 5.9 *Clean Node*



2. From the pop-up menu, select **Clean node**. The icon that represents a dirty node disappears.

Change the View of the Hierarchical List

You can view either all nodes of the hierarchical list or focus only on the selected nodes. There are two methods to change the mode of the hierarchical list.

To view only the selected nodes, use any one of the following methods:

- From the pop-up menu of the parent node, select **Show nodes of interest**.
- On the toolbar, click the menu button, and then select **Selected Nodes**.

To view all nodes of the hierarchical list, use any one of the following methods:

- From the pop-up menu of the parent node, select **Show all nodes**.
- On the toolbar, click the menu button, and then select **All Nodes**.

Example: Defining a Business Group

Define Selection Criteria

In this example, you define a business group named Wireless Postpaid. You want to define the following levels of selection criteria.

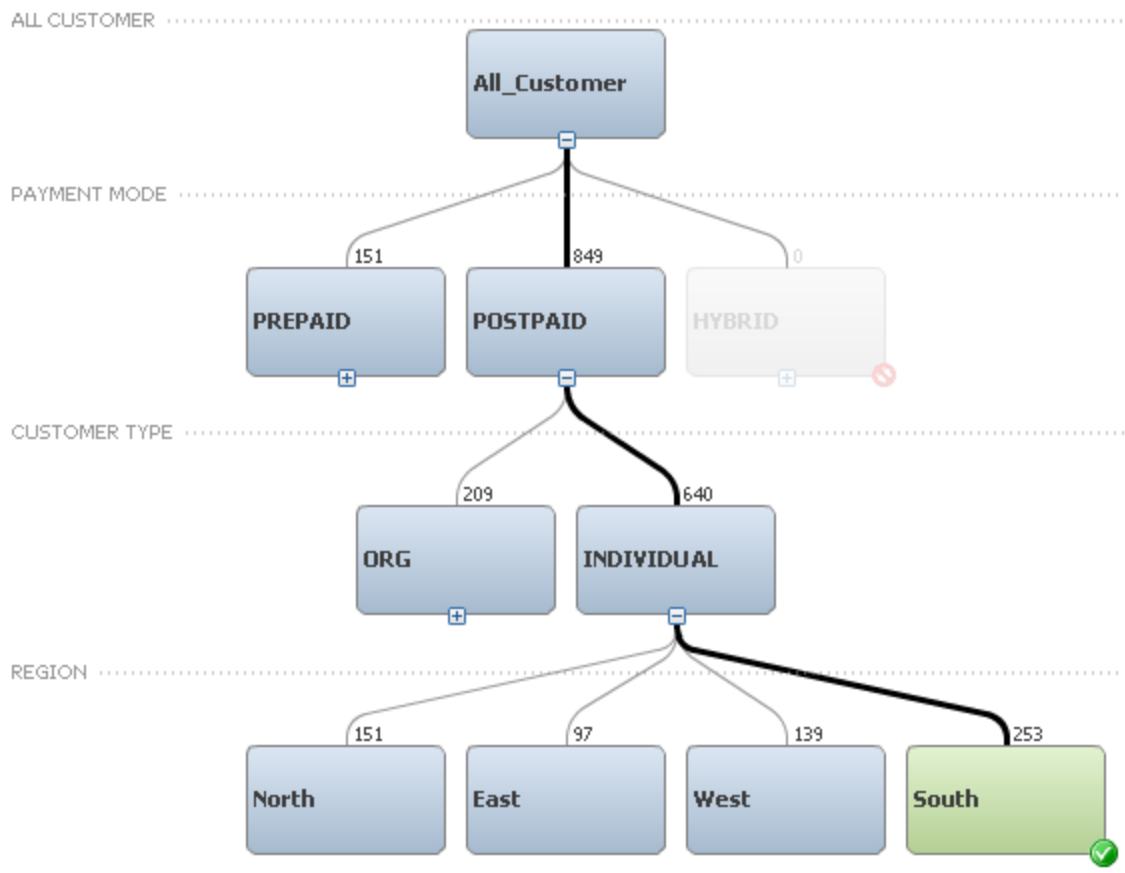
Table 5.5 *Selection Criteria for a Business Group*

Variable Name	Available Values	Selected Value
Payment mode	Postpaid, Prepaid, and Hybrid	Postpaid
Customer type	Individual and Organization	Individual
Region	East, West, North, and South	South

To define these selection criteria:

1. Add child levels in the following order:
   a. Payment mode
   b. Customer type
   c. Geography
2. Expand the nodes that are displayed below the **Postpaid** node. Make sure that you are viewing child nodes that originate from this parent node.

Display 5.10 *Selection Criteria for a Business Group*



3. Select the **South** child node that originates from the **Individual** parent node. The required nodes are automatically selected.
4. Click **Save**.

Reading the Customer Count at Various Levels

At each node, a number that represents the customer count is displayed. This feature helps you understand the distribution of your customer base according to the business rules that you have set up. For the selection criteria that you have defined above, the distribution of your customers at various levels of the selection criteria can be as follows.

Table 5.6 *Customer Distribution in a Business Group*

Level	Selected Node	Customer Count	Description
0	Primary	1000	The total population in the customer base is 1000.
1	Postpaid	849	Out of the 1000 customers, 849 are postpaid customers.
2	Individual	640	Out of the 849 postpaid customers, 640 customers are of the Individual type.
3	South	253	Out of the 640 customers, 253 customers belong to the South region. Therefore, the customer count for this business group is 253.

Adding Customers to a Business Group

Overview

After you define a business group, you have to identify the customers who belong to this business group. In order to perform this task, you have to run a process. This process filters customers from the customer base, depending on the selection criteria that you have defined for the business group. A customer can belong to only one business group.

There are two methods for adding customers to a business group. You can use either the toolbar or the Edit Business Group window.

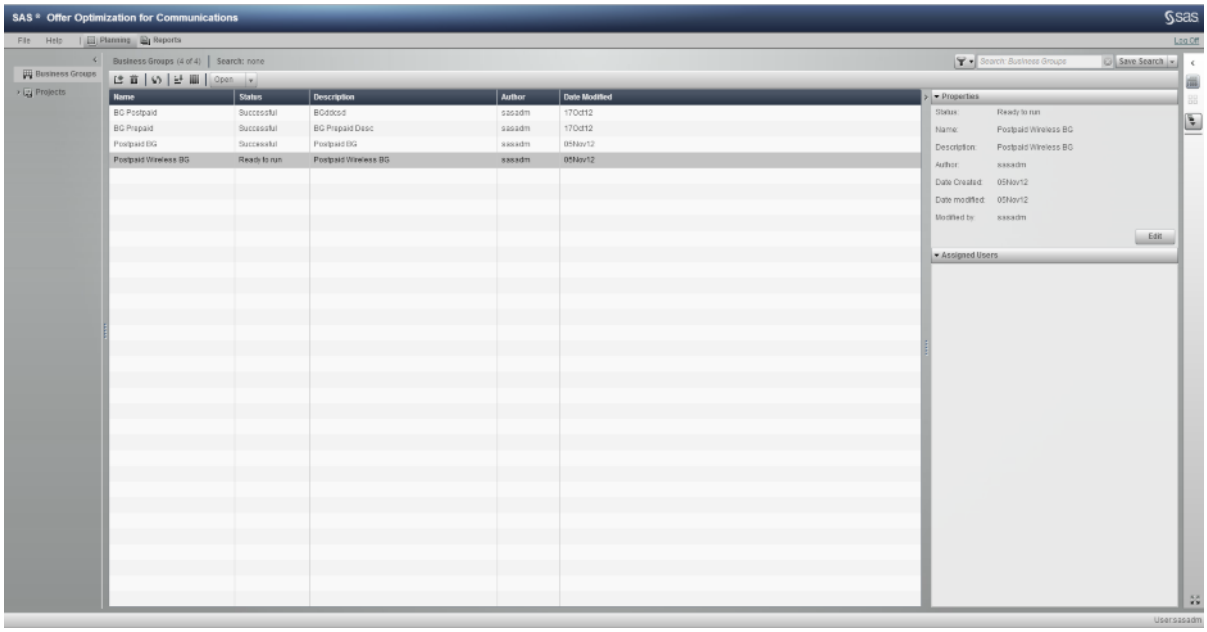
Add Customers to a Business Group Using the Toolbar

To add customers to a business group:

1. In the category pane, select **Business Groups**.

2. From the **Business Groups** list, double-click the business group to which you want to add customers.

Display 5.11 *Business Groups Workspace*



TIP Business groups to which customers are already added are identified with **Successful** status.

3. (Optional) Review the selection criteria that you have defined for the business group.
4. On the toolbar, click ▶.

   If the process runs successfully, then the status of the business group changes to **Successful**.

   Note: If there are any errors while adding customers to a business group, the status of the business group changes to **Failed**. Resolve the errors and run the process again.

Add Customers to a Business Group Using the Business Group Window

Use this method to make certain changes to the selection criteria. You can first make the required changes, and then run the business group to add customers to it.

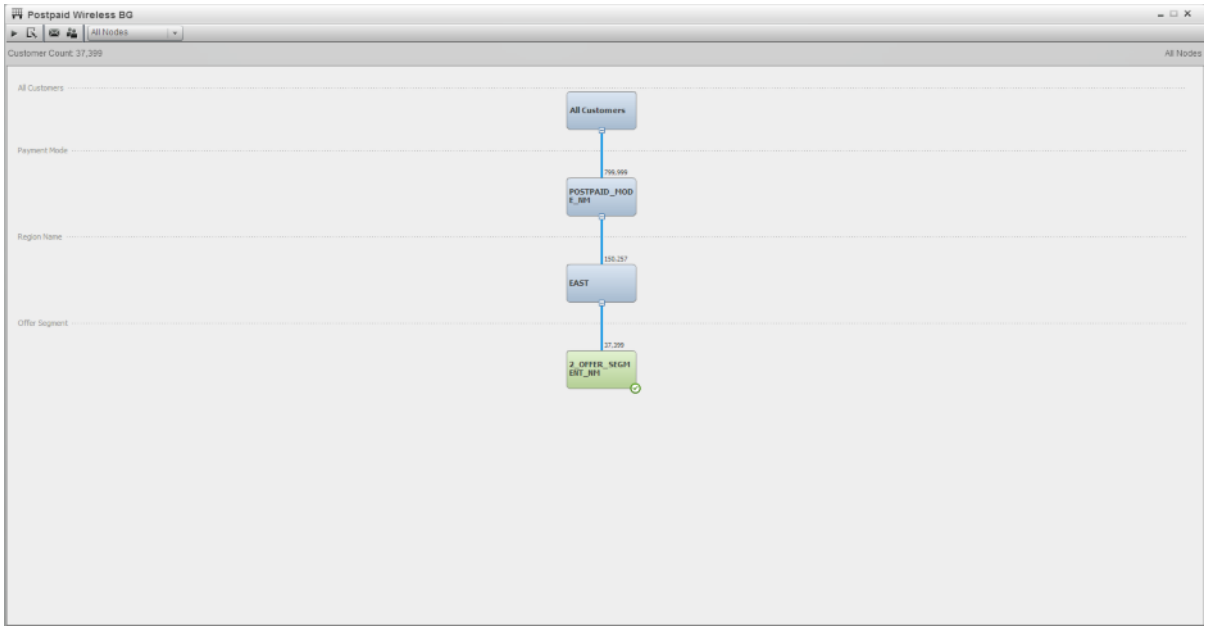
To add customers to a business group:

1. In the category pane, select **Business Groups**.
2. From the **Business Groups** list, double-click the business group to which you want to add customers.

   TIP Business groups to which customers are already added are identified with **Successful** status.

3. On the toolbar, click . The Business Group window appears.

Display 5.12 *Selection Criteria*



4. (Optional) Review the selection criteria and make appropriate changes if required.
5. Click **Run**. If the process runs successfully, then the status of the business group changes to **Successful**.

   Note: If there are any errors while adding customers to a business group, the status of the business group changes to **Failed**. Resolve the errors and run the process again.

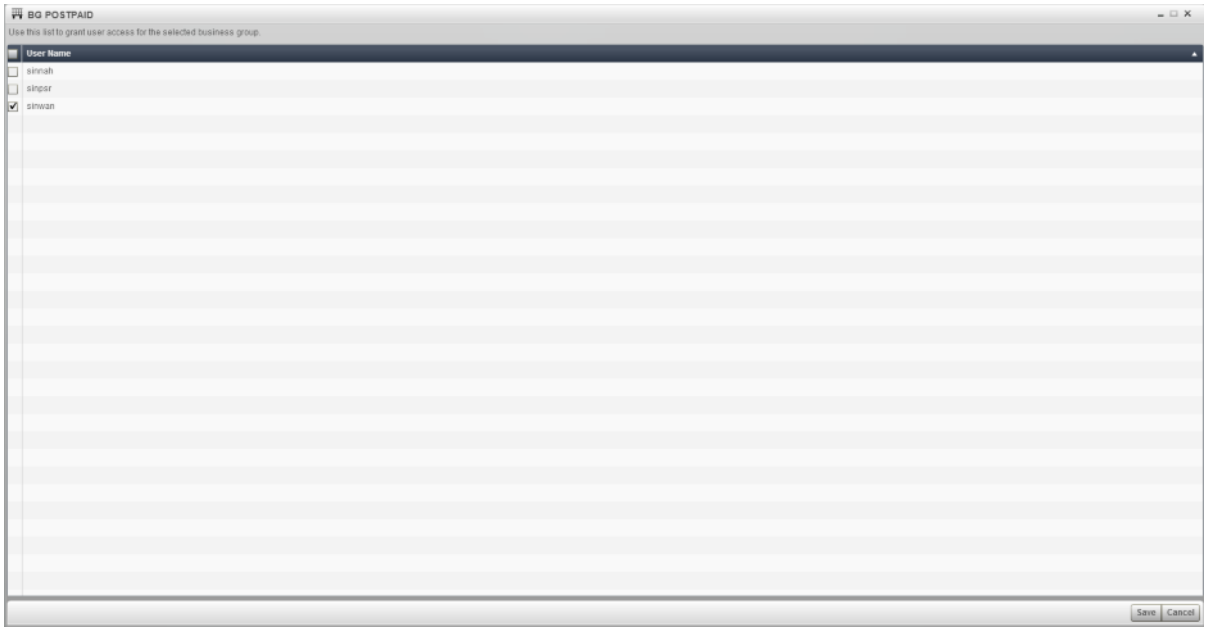
Define User Access for Business Groups

As an administrator, you can define user access for a business group. You can assign one or more users to a business group. Users who are assigned to a business group can view the details of that business group. The assigned users can also create projects for the business group or view details of other projects that are defined for the business group.

To assign users to a business group:

1. In the **Business Groups** list, double-click the business group for which you want to assign users.
2. On the toolbar, select  . The Business Group window appears.

Display 5.13 *Assign Users to Business Group*



3. Select the users whom you want to assign to the business group.
4. Click **Save**.

Edit a Business Group

Overview

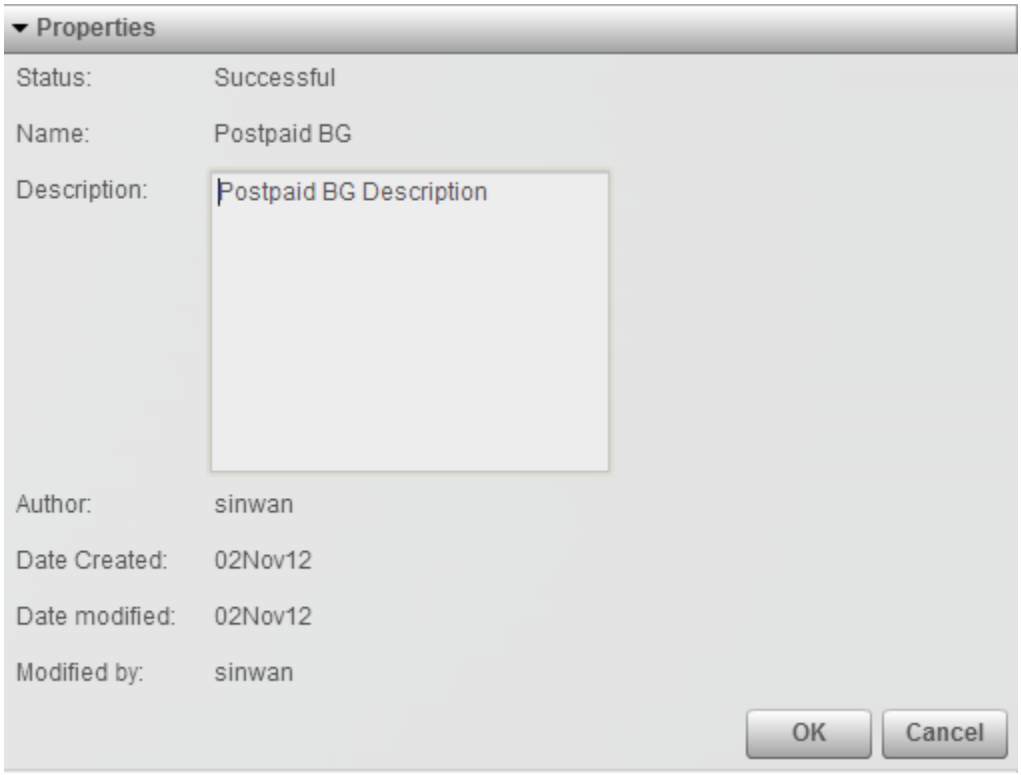
You can edit a business group only if you have administrative rights. Editing the description of a business group does not affect any underlying task. However, if you are changing the selection criteria, then you have to consider the effect of this action on the associated tasks. For details, see *SAS Offer Optimization for Communications: Administrator's Guide*. Also, if you change the selection criteria, make sure that you also run the process of adding customers to the business group.

Edit the Description of a Business Group

To edit the description of a business group:

1. From the **Business Groups** list, select the business group whose description you want to change.
2. In the Properties pane, click **Edit**.

Display 5.14 *Properties Pane of a Business Group*



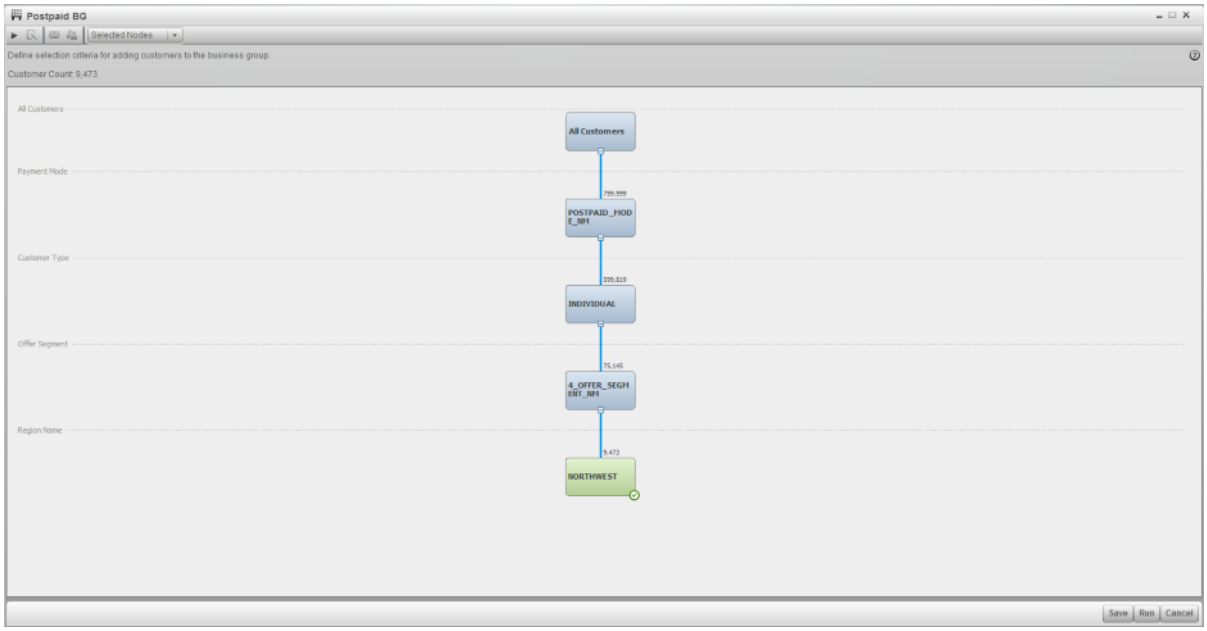
3. Change the description of the business group.
4. Click **OK**.

Edit the Selection Criteria of a Business Group

To edit the selection criteria of a business group:

1. From the **Business Groups** list, double-click the business group that you want to edit.
2. On the toolbar, select . The Business Group window appears.

Display 5.15 *The Business Group Window*



3. Change the selection criteria of the business group according to your requirement. For details, see "Working with Hierarchical Lists for Defining Selection Criteria for Business Groups" on page 32.
4. (Optional) Click **Save**.
5. Click **Run**.

Delete a Business Group

You can delete a business group only if you have administrative rights and only if it does not have any projects that are running in the batch mode. Therefore, before deleting a project, pull the projects that are in the batch mode to the design mode. For details, see "Pull a Project to Design Mode" on page 66. If you delete a business group that has one ore more projects associated with it, then these projects are also deleted. For details about the back-end activities that you have to complete after you delete a business group, see *SAS Offer Optimization for Communications Administrator's Guide*.

To delete a business group:

1. In the category pane, select **Business Groups**.
2. From the **Business Groups** list, select the business group that you want to delete.
3. On the toolbar, select  .

Running Back-End Processes

After you create business groups, administrators have to perform back-end activities. For details, see *SAS Offer Optimization for Communications Administrator's Guide*. You can then begin working on projects.

Viewing Reports for Business Groups

SAS Offer Optimization for Communications offers you business reporting features to analyze customer distribution and usage and revenue patterns across business groups. For details, see *SAS Communications Analytics Architecture: User's Guide*.

Chapter 6

Managing Projects

About Projects

SAS Offer Optimization for Communications is built around the concept of projects. After you analyze business groups reports, you can identify the problems associated with each business group. You can then define one or more projects for each business group. A project is a group that you define and associate with a particular business group. A project focuses on a specific business problem. Also, a project enables you to group, organize, and track all your tasks that you need to perform in order to address the business problem. You can create and manage your projects using the **Projects** workspace.

Projects are further categorized as **My Projects** and **Shared Projects**. The projects that you create are available as **My Projects** . You can perform all the tasks on these projects. Projects that other users have created and shared are available as **Shared Projects**. You can view only the details about these projects.

A project can be in any one of the following modes:

Design mode
: A project is in design mode until you run all the workflow steps. After you complete all the workflow steps successfully, you complete one run of your project in design mode. You can then push a project to batch mode.

Batch mode
: After you push a project to batch mode, all workflow steps that you perform in design mode are automatically run on the entire population (customer base). You can

view the progress of the project run in the details pane. If you are not satisfied with the results that are derived in batch mode, you can pull a project back into design mode. You can configure and run the workflow steps again and then push it to batch mode.

Overview of the Projects Workspace

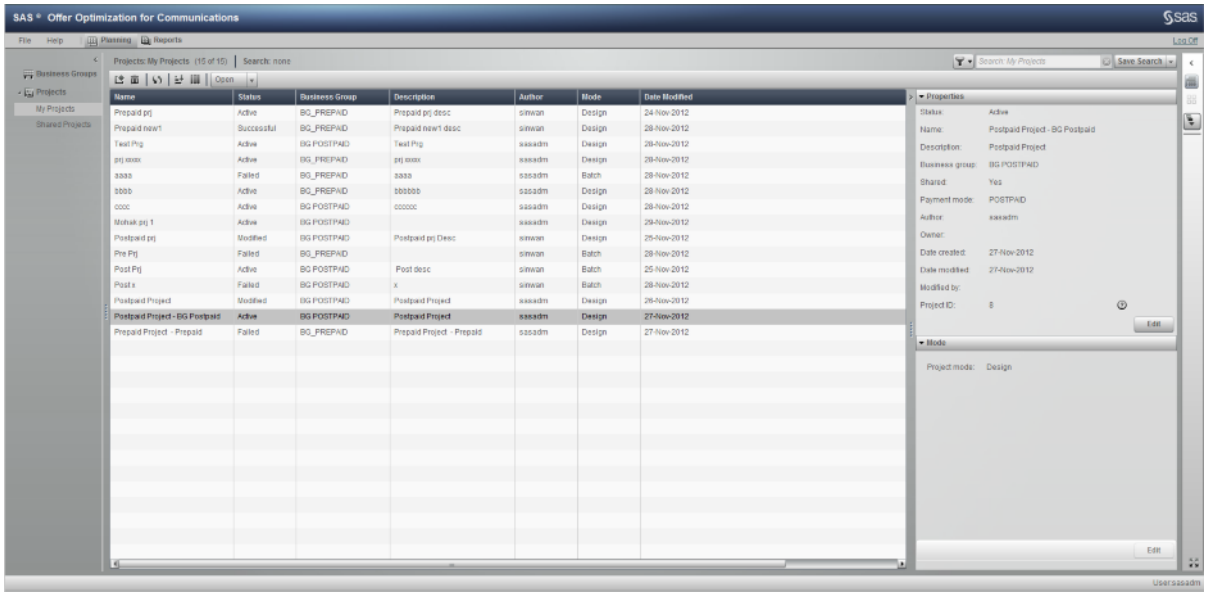
Select a Project

You can view details of a project for which you are either an author or an owner. You can also view details of shared projects. The projects that you own are displayed in the **My Projects** list. The projects that other users share are displayed in the **Shared Projects** list.

To select the project whose details you want to view:

1. In the category pane, select **Projects** .
2. Select **My Projects** or **Shared Projects**.
3. From the **My Projects** list or from the **Shared Projects** list, select the project whose details you want to view. The project details are displayed in the **Properties** pane.

Display 6.1 *Projects Workspace*



Viewing the Properties of a Project

The **Properties** pane displays the following information about the project:

Status
displays the current status of the project.

Table 6.1 *Processing Status for a Project*

Status	Description
Active	indicates that a project has one or more active workflow steps.
Modified	indicates that a workflow step of a project is being configured.
Running	indicates that one of the workflow steps is being run.
Successful	indicates that all workflow steps of a project workflow are successfully run.
Failed	indicates that a workflow step of a project has not run successfully. If the project is in design mode, you can view the error details. To do so, select the workflow step and on the toolbar, select  . Contact your administrator if you need any assistance with the error details. If the project is in the batch mode, your administrator can access the log file and view the error details.

Name
displays the name of the project.

Description
displays the description of the project.

Business group
displays the name of the business group that is associated with the project.

Shared project
indicates whether the project is shared with other users.

Payment mode
indicates the mode of payment of customers. The target segment that is defined for this project will contain customers who have the selected payment mode.

Author
displays the name of the user who has defined the project.

Owner
displays the owner of the project. For a new project, the author and the owner are the same user. However, after you create a project, your administrator can change the owner. The user who is the owner of the project can perform all tasks for a project and run its workflow.

Date created
displays the date on which the project is defined.

Date modified
displays the date on which the details of the project are modified.

Modified by
displays the name of the user who has modified the details of the project.

Project ID
displays the ID that is generated for the project. The project ID that is displayed here helps you identify the location on the server where the results of your project are stored. This is applicable only if your Foundation data mart is in SAS. In this case, the project-specific results are stored at **<APP_DATA>/SASOfferOptforCommServer/5.4/data/ooc_data/projectdata/prjPP_DATA>/SASOfferOptforCommServer/5.4/data/ooc_data/projectdata/prj<Project ID>/prjdata** . In this path, <APP_DATA> indicates the location of the folder that stores the application-specific data. For example, on a Windows machine, the application-specific data can be stored at the following location: C:/SAS/Config/Lev1/Appdata. Further, if the project ID is 22, then results will be stored at C:/SAS/Config/Lev1/Appdata/SASOfferOptforCommServer/5.4/data/ooc_data/projectdata/prj22/prjdata.

Identifying the Mode of a Project

The Mode pane displays the project's current mode. A project can be either in design mode or batch mode. In this pane, you can also push a project from design mode to batch mode or pull a project from batch mode to design mode.

Viewing the Workflow Steps of a Project

To view the workflow steps of a project, double-click the project from the **My Projects** or **Shared Projects** list. Alternatively, you can also select the project, and on the Application bar, select the **Open** menu option.

About Managing Projects

Depending on your assigned role, you can create projects and work on them. You can create projects for business groups that are assigned to you. A project can be associated with only one business group. However, you can create multiple projects for a business group. When you create a project, you are the author and the owner of the project. Therefore, you can also modify or delete projects that you have created. However, if your administrator changes the owner of the project, you as an author can view only details of the project. The owner of the project can work on the project and perform all the tasks related to it.

Create a Project

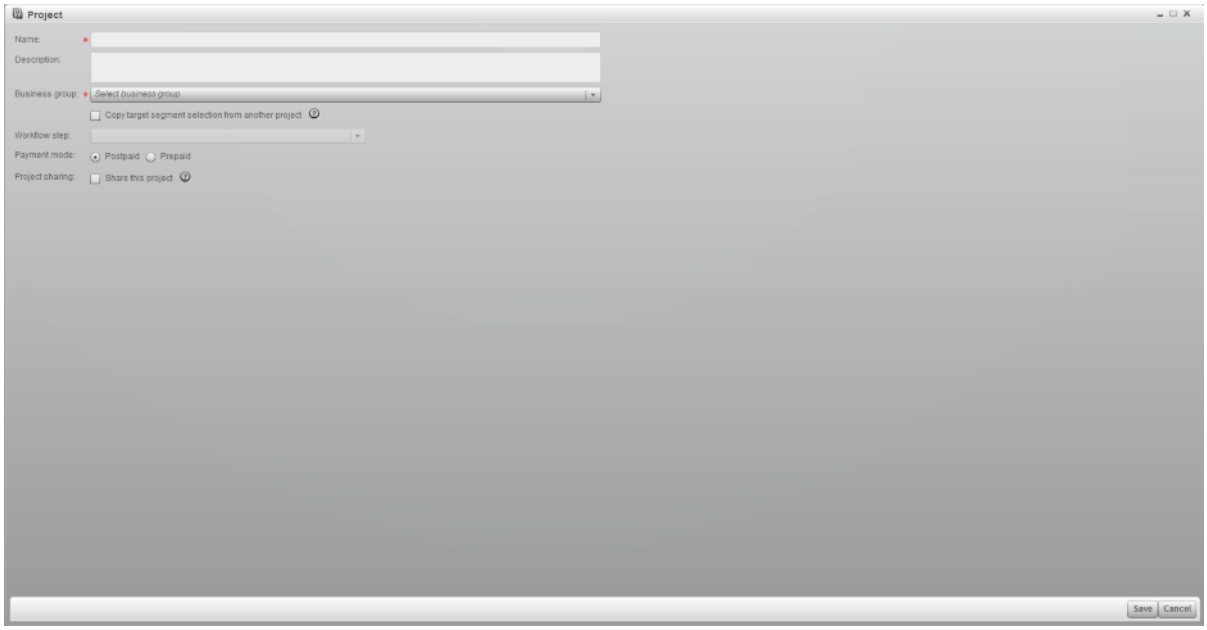
You can define a project for a business group that is assigned to you. After you create a project, a default workflow is attached to it. You can view this workflow when you open the project.

When you define a project, you are the author and the owner of the project. Therefore, you can perform all tasks for a project until the administrator changes the project owner. After your administrator changes the owner, you can view only the details of the project.

To create a project:

1. In the category pane, select **Projects**.
2. On the toolbar, select . The Project window appears.

Display 6.2 *Project Window*

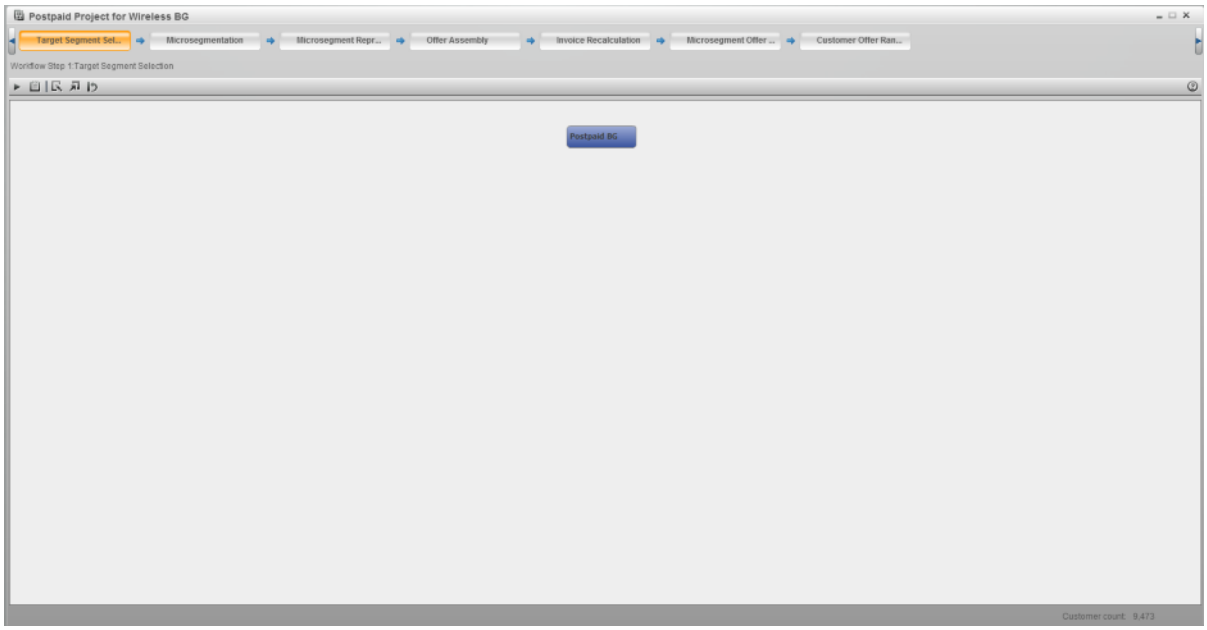


3. Enter the following details:
   a. In the **Name** field, enter a suitable name for the project.
   b. In the **Description** field, enter a short description for the project.
   c. Select the business group for which you are defining this project. The **Business group** list displays only those business groups that are assigned to you.
   d. To share your project with other users, select the **Share this project** check box. When you share the project, other users can view only the details about the project.
   e. In order to copy the target segment selection workflow step, select the **Copy target segment selection from another project** check box. This option enables you to copy the criteria that you define for filtering customers from the business group.
   f. From the list, select the project whose target segment selection workflow step that you want to copy. The list displays projects of the business group that you have selected.
   g. Select the **Payment mode**. This option enables you to filter customers from the business group based on the payment mode. This option also ensures that the customers in the target segment have the same type of payment mode. For example, if you select the **Prepaid** option, then customers who have prepaid payment mode are filtered from the business group. In other words, the target segment that you define for this project will contain customers who have prepaid payment mode.

      Note: Depending on the payment mode that you select, the workflow steps of the project change.

4. Click **Save**. The project is added to your **My Projects** list and its workflow is displayed.

Display 6.3 *Project Workflow*



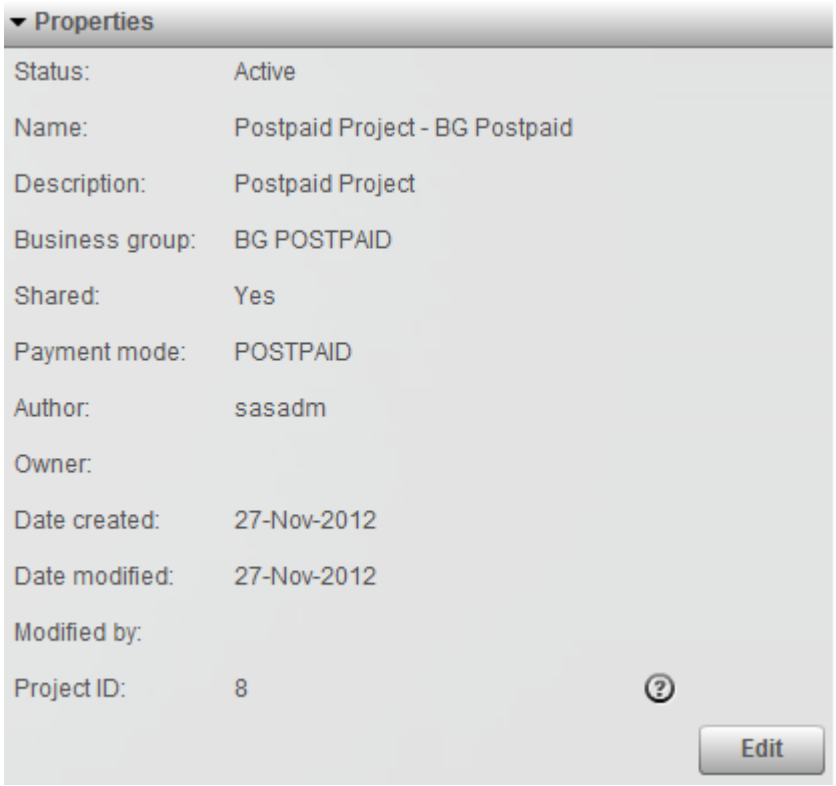
Change the Project Owner

When you create a project, you are the default owner of the project. However, according to the business requirements, your administrator can assign the ownership of the project to another user.

To change the project owner:

1. In the category pane, from the **My Projects** list, select the project for which you want to change the owner.
2. In the **Properties** pane, click **Edit**.

Display 6.4 *Project Properties Pane*



3. From the **Owner** list, select the user whom you want to assign as the owner of the project. The list displays users that are assigned to the business group associated with the project.
4. Click **OK**.

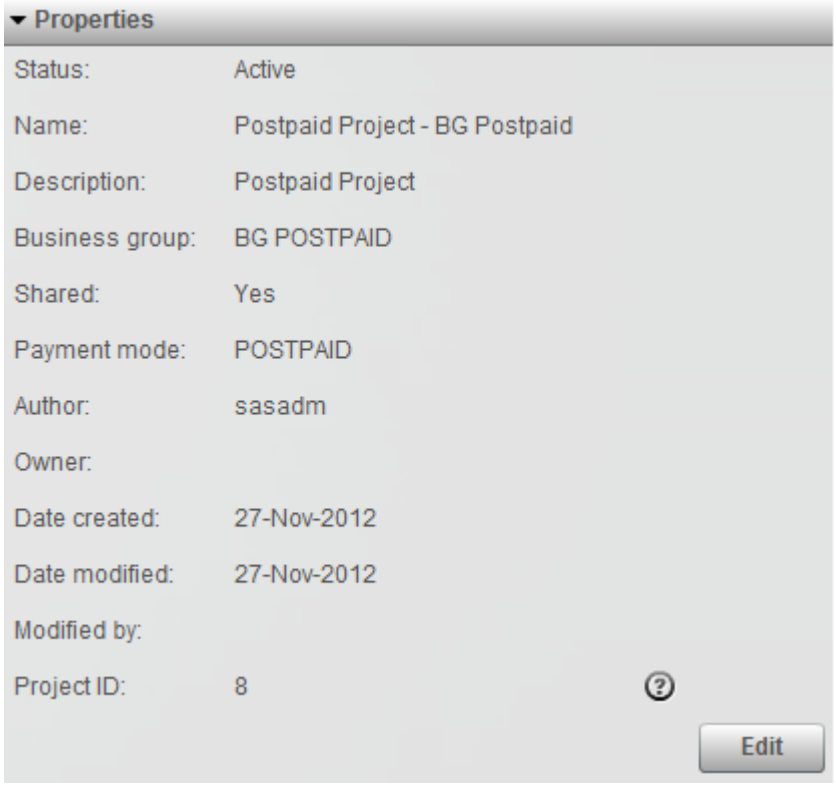
Edit a Project

You can edit a project if you are the owner of the project. You can edit only specific information about a project.

To edit a project:

1. In the category pane, from the **My Projects** list, select the project that you want to edit.
2. In the **Properties** pane, click **Edit**.

Display 6.5 *Project Properties Pane*



3. Change the project information according to your requirements.

   Note: You can change the description, the shared status, and the owner of the project.

4. Click **OK**.

Delete a Project

You can delete a project if you are the owner of the project, but only if the project is in design mode. If you want to delete a project that is in batch mode, you have to first pull it to design mode. For details, see "Pull a Project to Design Mode" on page 66.

To delete a project:

1. In the category pane, select **My Projects** .
2. From the **My Projects** list, select the project that you want to delete.
3. On the toolbar, select .

Part 3

Workflow Steps

Chapter 7

Introduction to the Project Workflow

About Project Workflows

In SAS Offer Optimization for Communications, each project has a workflow that enables you to complete your tasks in a structured manner. The project workflow provides you a guided approach for performing tasks that are associated with your project. When you open a project, its default workflow is displayed in the workflow diagram pane. The workflow diagram indicates the workflow steps of the project. The details of the current workflow step are displayed in the workflow step pane. The workflow steps of a project differ depending on the payment mode (postpaid or prepaid) that you have selected for the project. In addition, the details that you configure for certain workflow steps differ depending on the payment mode of the project.

Working with the Project Workflow

Open a Project

When you work on a workflow step, make sure that you select the correct project. For quick reference, the project name is displayed as the window title.

To open a project:

1. In the category pane, select **My Projects**.

2. In the **My Projects** list, double-click the project that you want to work on. Alternatively, select the project, and then on the toolbar, select **Open** on the menu. The project workflow window appears.

Configure and Run Workflow Steps

The project workflow window enables you to perform project tasks. Refer to the workflow diagram pane to get a quick overview of the progress of the project. For details, see "Using the Workflow Diagram Pane" on page 60. In the **Workflow Step** pane, you can view the information about a workflow step.

You can configure a workflow step only after you have successfully run the previous workflow step. When you successfully run all workflow steps, a project completes its one run in design mode.

Note: You can work on the project workflow if you are the owner of the project.

To complete a project run in design mode:

1. In the workflow diagram pane, select **Target Segment Selection**.
   a. On the toolbar, select  .
   b. Configure the workflow step. For details, see "Defining a Target Segment" on page 68.
   c. On the toolbar, select ▶.
2. In the workflow diagram pane, select **Microsegmentation**.
   a. On the toolbar, select  .
   b. Configure and run the workflow step. For details see, "Create Microsegments" on page 82.
3. In the workflow diagram pane, select **Microsegment Representation**.
   a. (Optional) On the toolbar, select  .
   b. (Optional) Configure the workflow step. For details, see "Draw Representative Customers Based on the Customized Parameter Setup" on page 92.
   c. On the toolbar, select ▶.
4. In the workflow diagram pane, select **Offer Assembly**.
   a. (Optional) On the toolbar, select  .
   b. (Optional) Configure the workflow step. For details, see "Assembling Offers for Representative Customers" on page 97.
   c. On the toolbar, select ▶.
5. In the workflow diagram pane, select **Invoice Recalculation**. This workflow step is displayed if you are working on a project whose payment mode is postpaid.
   a. (Optional) On the toolbar, select .
   b. (Optional) Configure the workflow step. For details, see "Recalculate Invoices" on page 108.
   c. On the toolbar, select ▶.
6. In the workflow diagram pane, select **Microsegment Offer Ranking**.

a. On the toolbar, select  .

b. Configure the workflow step. For details, see "Configure Offer Ranking Setup at Microsegment Level" on page 113.

c. On the toolbar, select ▶.

7. In the workflow diagram pane, select **Customer Offer Ranking**.

a. (Optional) On the toolbar, select  .

b. (Optional) Configure the workflow step. For details, see "Configuring the Offer Ranking Setup at Customer Level" on page 117.

c. On the toolbar, select ▶.

Working in the Workflow Step Pane

Overview

The **Workflow Step** pane displays information about the current workflow step. This information includes configuration details and results of the workflow step. In this pane, you can perform certain common tasks for a workflow step of a project that is in design mode. For a project that is in batch mode, the**Workflow Step** pane displays the configuration and results of each workflow step. If you want to make any changes, you have to pull the project to design mode.

Toolbar

The toolbar enables you to perform certain common tasks for each workflow step. The options that are available in the toolbar might differ depending on the task that you perform. You can use this toolbar to perform tasks on a workflow step of a project that is in design mode. If a project is in the batch mode, the options on this toolbar are deactivated.

Table 7.1 *Options on Toolbar*

Button	Purpose
	customizes the default setup of the workflow step.
	reverts the changes that were made to the setup of the workflow step.
	displays information about errors that occurred when the workflow step was run.
	runs the workflow step.
	imports details from a workflow step of another project. This option is available only for the **Target Segment Selection** workflow step.

Using the Workflow Diagram Pane

Overview

The workflow diagram pane shows the workflow steps of the project. It also gives the sequence of workflow steps and displays the processing status of each workflow step. The workflow steps that are displayed in the workflow diagram change depending on the payment mode that you select for the project.

Display 7.1 *The Workflow Diagram Pane*

Workflow Steps

A workflow step represents an individual stage of the workflow. Here is the list of project workflow steps and the objective of each step:

1. **Target Segment Selection**

   Derive a subset of customers from the business group based on certain filter criteria. The subset of customers is called a target segment.

2. **Microsegmentation**

   Create homogeneous groups (also called clusters) of the target segment using the appropriate clustering technique. Identify each group with a unique description in accord with the business definition. Such a group is also called a microsegment.

3. **Microsegment Representation**

   Derive a predefined number of customers from each microsegment such that the revenue and usage patterns of these customers represent the corresponding values for the entire microsegment. These customers are called representative customers.

4. **Offer Assembly**

   Determine suitable offers for the representative customers from the product catalog based on certain business rules.

5. **Invoice Recalculation**

   Retrieve invoice information for each combination of representative customer and offer and recalculate invoices for the current usage of representative customers. This workflow step is applicable only for projects whose payment mode is postpaid. Therefore, if you open a project for which you have selected a prepaid payment mode, this workflow step is not displayed in the workflow diagram pane.

6. **Microsegment Offer Ranking**

   Produce best offers in ranked order for representative customers.

7. **Customer Offer Ranking**

   Produce best offers in ranked order for all customers in a microsegment.

Processing Status

Each workflow step can either be active or inactive. A workflow step is automatically activated when the previous workflow step runs successfully. An active workflow step can have any one of the following processing status:

Table 7.2 *Processing Status of Workflow Steps*

Icon	Status	Description
	Successful	The workflow step was successfully run without any errors.
	Failed	Errors occurred when this workflow step was run. You have to resolve the errors and run the workflow step again.
	Running	The workflow step is currently running.
	Modified	The workflow step is configured, and you can run the workflow step.

Chapter 8

Performing Common Tasks for Workflow Steps

About Common Workflow Tasks

After you define a project, the default workflow with predefined workflow steps is displayed in the workflow diagram pane. You must perform workflow steps in the sequence shown in the diagram. For each workflow step, you can perform certain common tasks. The tasks that you can perform differ depending on the workflow step that you are currently working on. Using the toolbar, you can perform the following common tasks:

- Configure a workflow step.
- Run a workflow step.
- View the log for a workflow step.
- Reset a workflow step.

Note: You can perform any of these tasks on a workflow step only if the project is in design mode and you are the owner of the project. The toolbar is deactivated if the project is in batch mode.

Configure a Workflow Step

SAS Offer Optimization for Communications provides a default configuration setup for each workflow step. If you do not want to customize this setup, you can directly run the

workflow step. You can also change the setup according to your business requirements. You can configure and run a workflow step until you are satisfied with the results of the workflow step. However, if you change the configuration of a workflow step, all the subsequent workflow steps that have successfully run are reset to the default setup. Therefore, you have to configure and run these workflow steps again.

Note: You can configure a workflow step only if the project is in design mode.

To configure a workflow step:

1. In the workflow diagram pane, select the workflow step that you want to configure.
2. On the toolbar, select . A window appears.
3. Change the details as needed.
4. Click **Save**.

   Note: After you change the configuration of a workflow step, make sure that you run the workflow step.

Run a Workflow Step

After you configure a workflow step, you can immediately run the workflow step using the **Run** button that is available in the window. You can also run a workflow step using the toolbar.

To run a workflow step:

1. In the workflow diagram pane, select the workflow step that you want to run.
2. On the toolbar, select . The processing status of the workflow step changes to **Successful** or **Failed**.

Import the Target Segment Selection Workflow Step

When you define a project, you can decide whether you want to copy the target segment from another project. However, if you want to make this decision at a later stage, you can import the target segment from another project using the toolbar. This feature enables you to replicate a target segment across projects of a business group. You can further configure the target segment according to your requirements.

To import the target segment selection workflow step:

1. In the workflow diagram pane, select the **Target Segment Selection** workflow step.
2. On the toolbar, select . The Import Target Segment Selection details are displayed.
3. From the list, select the project whose target segment selection workflow step that you want to copy. The list displays projects of the business group that you have selected for your current project.

4. View the filter criteria that are defined for the target segment of the selected project. Make sure that you are importing the workflow step from the correct project.
5. Click **Save**.

Reset a Workflow Step

In order to discard the changes that you have made to the default configuration for a workflow step, you can reset the workflow step. However, when you reset a workflow step, the subsequent workflow steps that you have configured and run are deactivated. You have to configure and run them again.

To reset a workflow step:

1. In the workflow diagram pane, select the workflow step.
2. On the toolbar, select  . The processing status of the workflow step changes to **Active**.

Design Mode and Batch Mode of a Project

Overview

After you successfully complete a project run in design mode, you can promote it to batch mode. When a project is in batch mode, you have to perform certain back-end activities in order to run its workflow. However, you can view the progress of the current or last batch run of the project in the project workflow window. At any time, you can pull the project back into design mode if you want to configure a workflow step.

Push a Project to Batch Mode

You can push a project to batch mode if the **Project mode** is **Design**. All the workflow steps of the project must be completed successfully.

To push a project to batch mode:

1. From the **My Projects** list, select the project that you want to promote to batch mode.
2. In the **Mode** pane, click **Edit**.
3. From the **Project mode** list, select **Batch**.
4. Select the frequency for scheduling the project runs in batch mode. For example, select the **Weekly** option if you want to run the project every week. The frequency that you select here is used by the scheduler to schedule the projects in batch mode. For details, see *SAS Offer Optimization for Communications Administrator's Guide*.
5. Click **OK**. After you promote a project to batch mode, options on the toolbar are deactivated. You can view only the status and results of each workflow step.

Pull a Project to Design Mode

A project that is promoted to batch mode can be pulled back to the design mode.

To pull a project to design mode:

1. From the **My Projects** list, select the project that you want to pull back to the design mode.
2. In the **Mode** pane, click **Edit**.
3. From the **Project mode** list, select **Design**.
4. Click **OK**. After you pull back a project to design mode, options on the toolbar is activated. You can work with the workflow steps according to your requirements.

Chapter 9

Target Segmentation

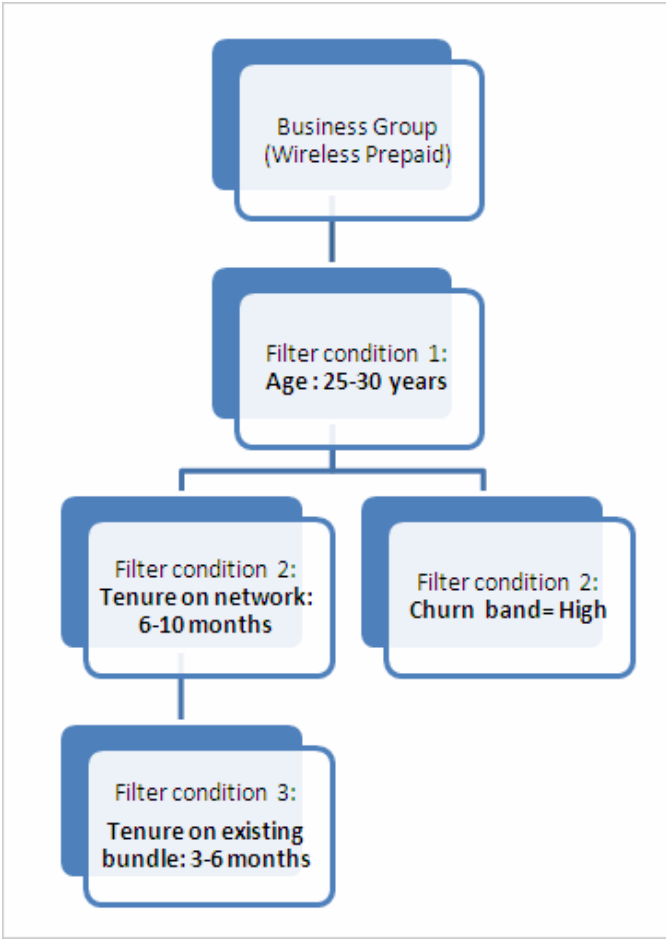
About Target Segments

After you analyze the business groups reports, you can identify the highly profitable customers of a business group, who usually have a high ARPU (average revenue per user). In order to focus on this subset of a business group, you have to define the target population. The target population is derived from the business group based on certain business rules. These business rules are different from the business rules that are defined for a business group. The subset of customers that is derived from the business group is called a target segment.

SAS Offer Optimization for Communications enables you to define a target segment based on a set of predefined variables. Using these variables, you can define filter criteria for deriving the target segment from the business group. You can define the filter criteria using a hierarchical list. This feature enables you to explore the customer distribution in the business group based on a set of conditions. Moreover, you can define the target segment after analyzing the customer counts at each level of the filter criteria.

For example, you can define filter criteria for a target segment as shown in the diagram below.

Figure 9.1 *Sample Filter Criteria for a Target Segment*



Defining a Target Segment

Overview

Defining a target segment involves the following tasks:

- Identify the target segment with a name and a description.
- Define filter criteria for deriving the target segment from the business group.

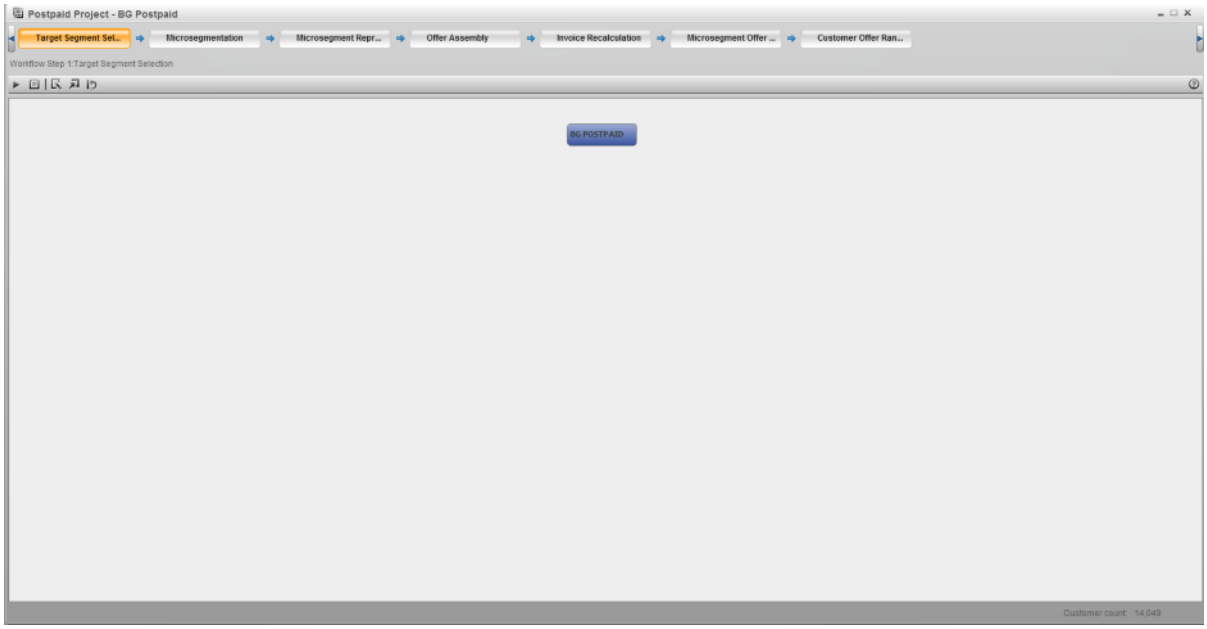
Note: Before you begin defining a target segment, make sure that you are familiar with hierarchical lists. For details, see "About Hierarchical Lists" on page 20.

Define a Target Segment

To define a target segment:

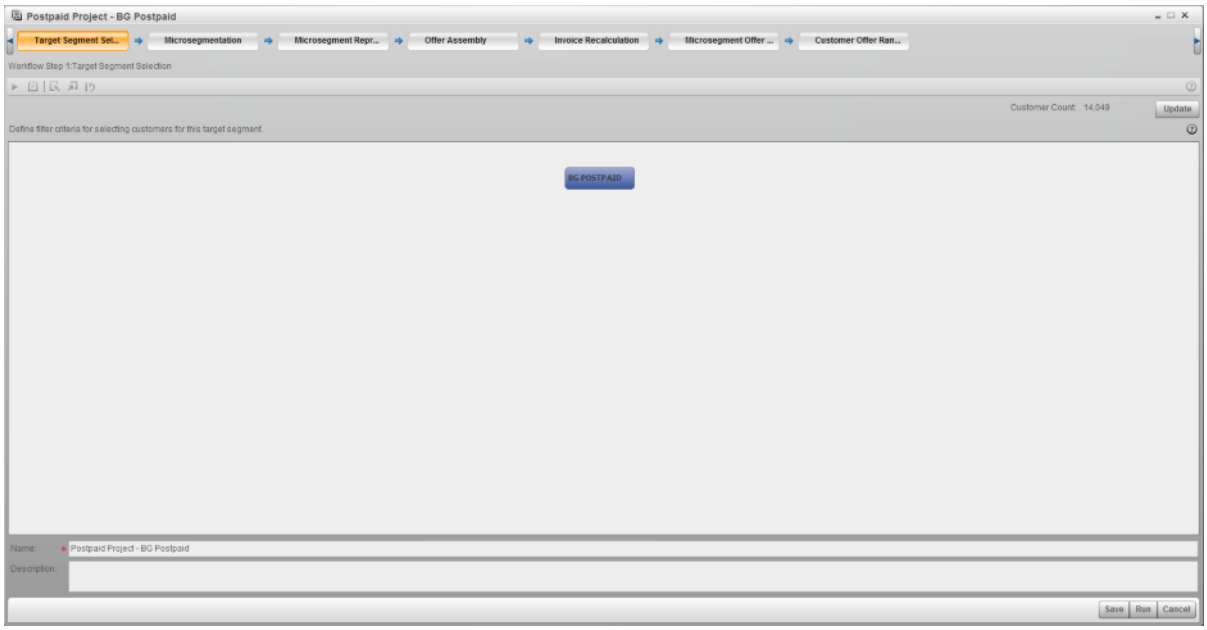
1. In the workflow diagram pane, select **Target Segment Selection**. The Target Segment Selection details are displayed.

Display 9.1 *Target Segment Selection: View Derails*



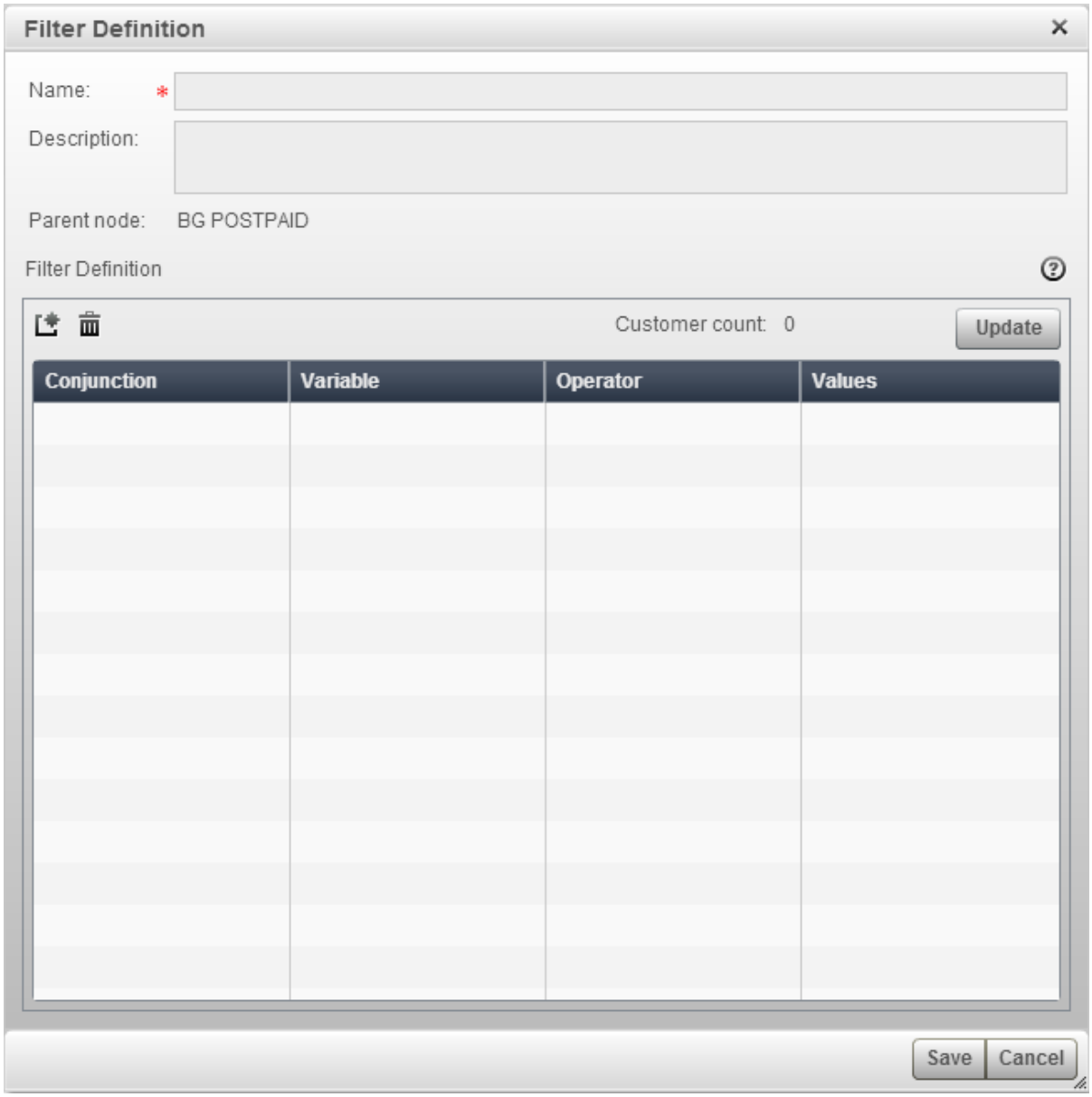
2. On the toolbar, select . The details for defining Target Segment Selection filters are displayed.

Display 9.2 *Target Segment Selection Window*



3. Enter the following information about the target segment.
   a. In the **Name** field, the default name for the target segment is displayed. You can change this name.
   b. In the **Description** field, enter a brief description about the target segment.
4. In the hierarchical list, select the primary node. The primary node represents the business group from which you will derive the target segment.
5. From the pop-up menu of the node, select **Add** to add a filter definition. The Filter Definition window appears.

Display 9.3 *Filter Definition Window*



6. Enter the following details for the filter definition.
   a. In the **Name** field, enter the filter name. The name that you enter here is assigned as the node name in the hierarchical list. Make sure that you enter an appropriate name in order to easily identify the filter definition. You can view the filter name when you move the mouse pointer over the filter node.
   b. In the **Description** field, enter the description of the filter.

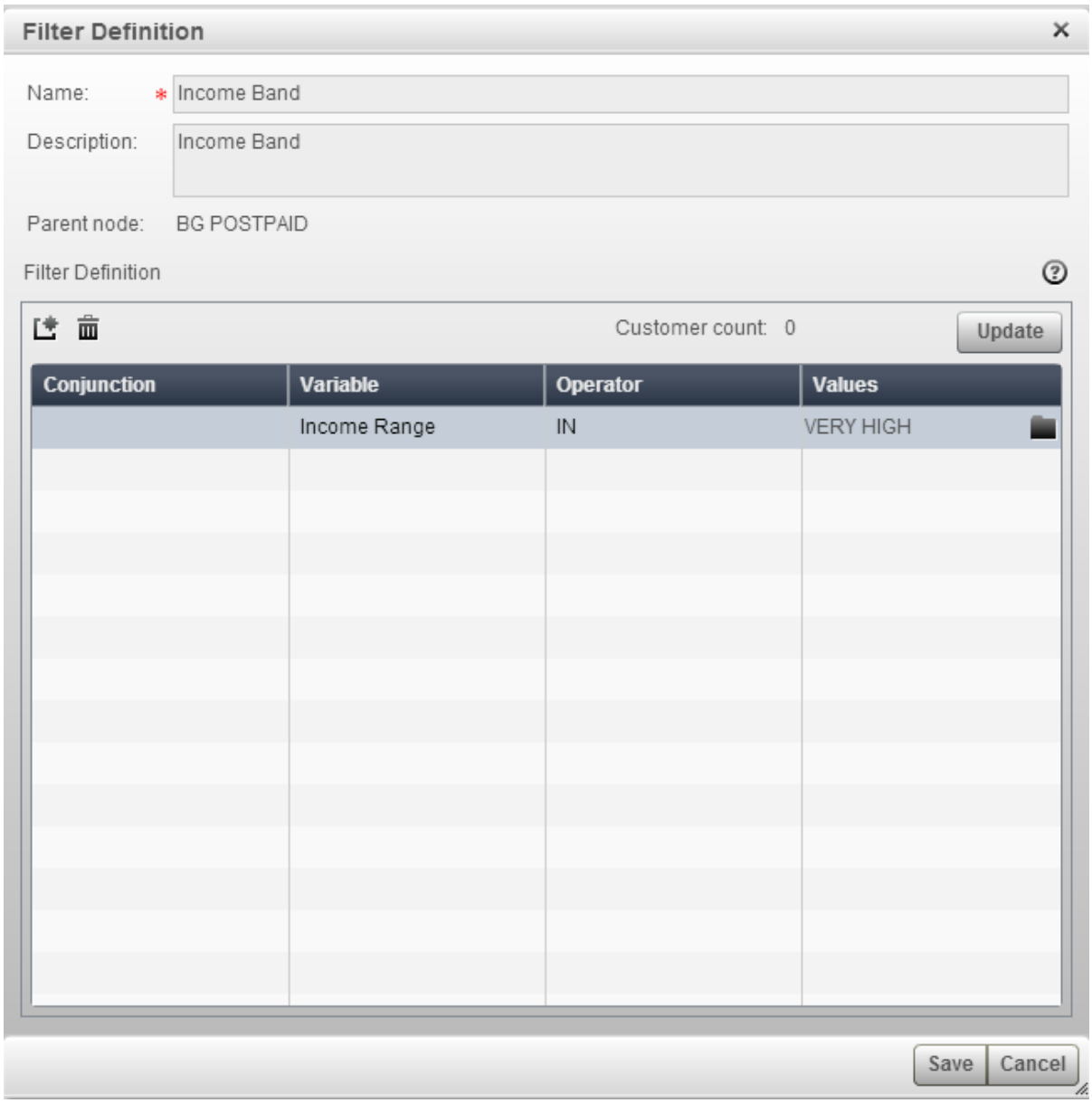
      TIP The node in the hierarchical list from which this filter definition originates is displayed as the **Parent node**.

7. Define filter conditions in order to filter customers from the business group.
   a. To add a row, click .
   b. From the **Variable** list, select the filter variable. The list contains variables based on which target segment is derived from a business group.

c. From the **Operators** list, select the operator for filtering the values. The values in this list differ depending on which type of variable you select. For character variables, you can use text operators such as **=** (equal to) and **NOT IN**. For numeric variables, you can use arithmetic operators such as **=** (equal to), **<>** (Not equal to), **<** (less than), and **>** (greater than).

d. In the **Values** column, specify the filter value. For numeric values, enter the filter value in the field. However, for character variables, select a value from the list. To do so, click

Display 9.4 *Filter Definition Window*

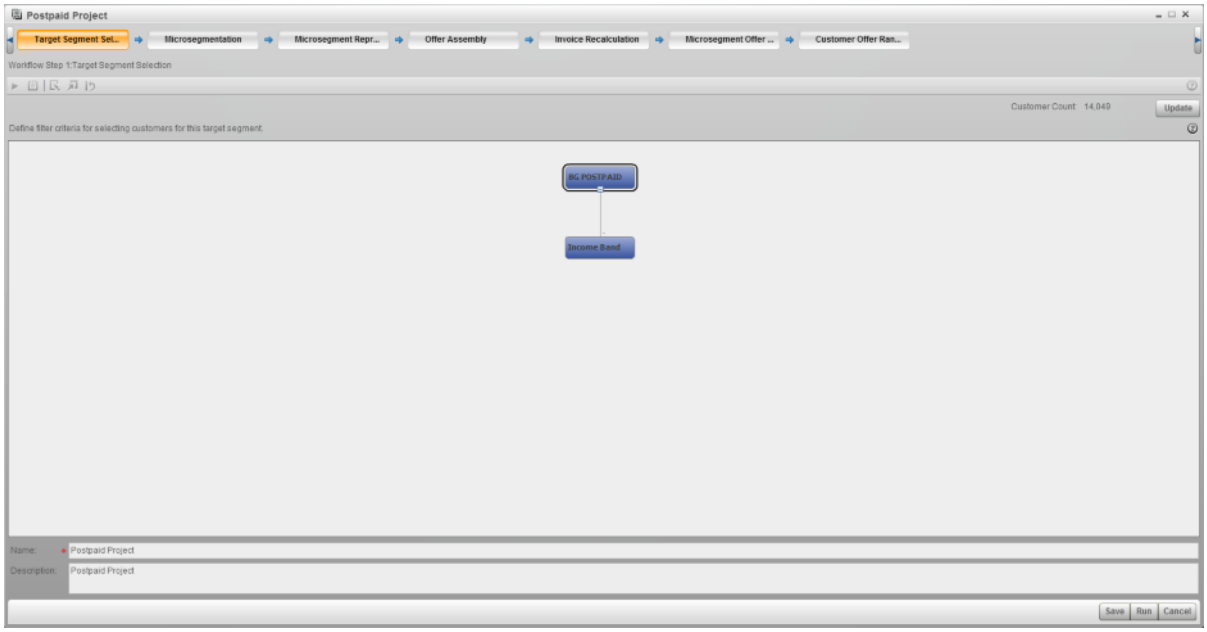


8. (Optional) Similarly, you can specify other filter conditions. You have to select a **Conjunction** from the list. If you want a customer to satisfy the current condition along with the previous conditions, select **AND**. Otherwise, select **OR**.

   TIP At each stage of the filter definition, you can verify the number of customers who satisfy the filter definitions that you have specified so far. To do so, click **Update**.

9. Click **Save**. The filter definition is added as a child node of the primary node.

Display 9.5 *Filter Hierarchy*



10. (Optional) Select the primary node or the child node, and repeat steps from 6 to 9 to define more levels of filter definitions.

    Note: You can add one or more child nodes to a parent node. The customer count will always be the number of customers who satisfy the filter conditions at the lowest level of the child nodes in each branch. For details, see "Working with Hierarchical Lists for Defining a Target Segment" on page 72.

Working with Hierarchical Lists for Defining a Target Segment

Overview

The hierarchical list enables you to define filter criteria for a target segment. At each level of the hierarchical list, you can add one or more nodes. Each node has a pop-up menu, which enables you to work on the filter criteria.

In the Edit mode, the pop-up menu of a node enables you to perform the following tasks.

- Add a child node.
- Edit a node.
- Delete a node.
- Copy a node.
- Move a node.

Pop-up Menu of a Node

In the selected node, click . The pop-up menu appears. The following options are available on the pop-up menu of a node:

Add
enables you to add a node, which represents a filter definition of the target segment.

Edit
enables you to edit a filter definition.

Copy
enables you to create a copy of a filter definition.

Delete
enables you to delete a filter definition and all the child definitions attached to it.

Move
enables you to move a filter definition from one level to another.

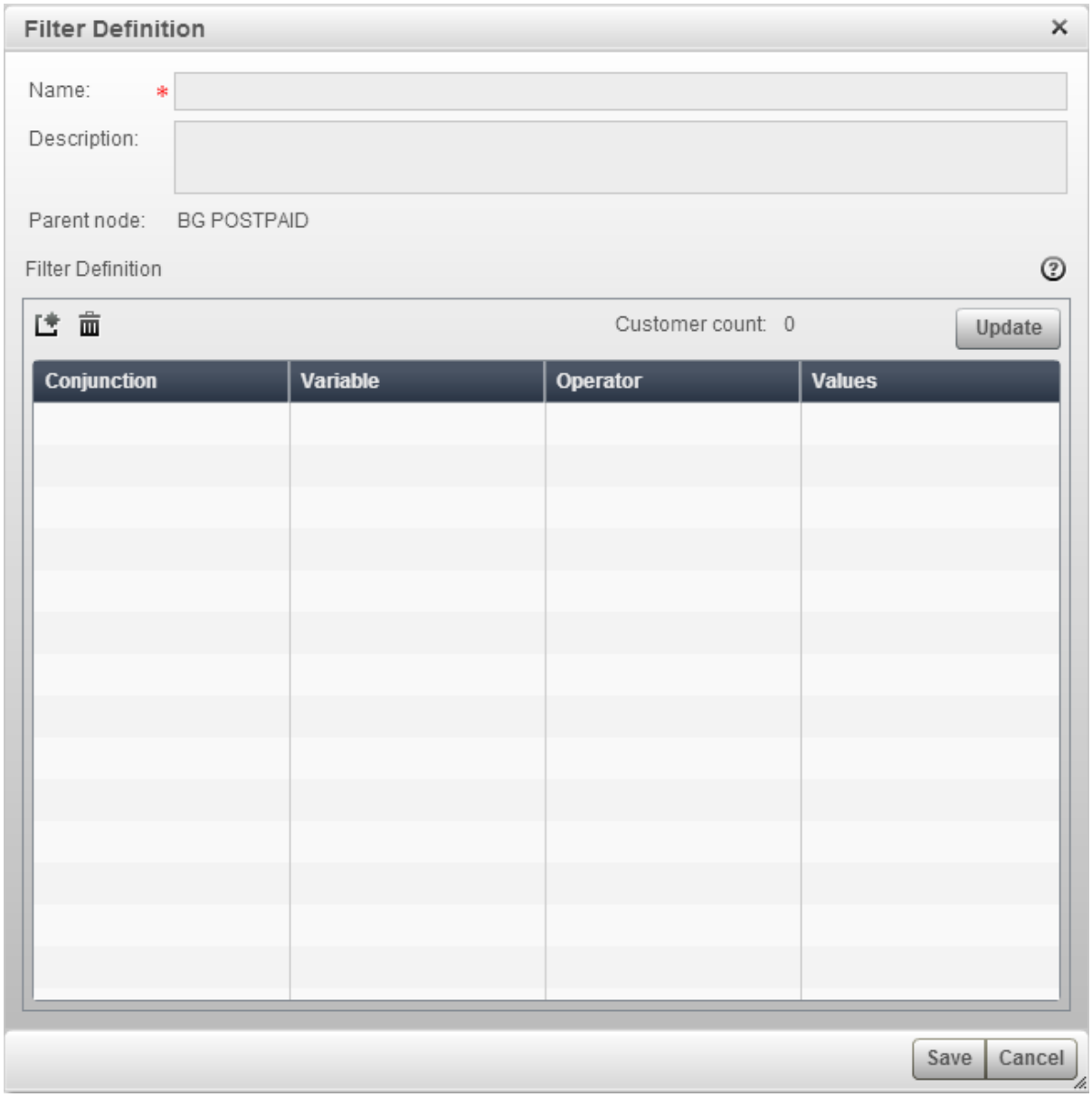
Add a Child Node

You can add a node for a parent node. Each child node represents a filter definition. A child node automatically inherits the filter definition that is defined at the parent node.

To add a child node:

1. Select the parent node below that you want to add the new node.
2. From the pop-up menu, select **Add** . The Filter Definition window appears in which you can specify the filter conditions.

Display 9.6 *New Filter*



Delete a Node

When you delete a node, all its child nodes are also deleted.

To delete a node:

1. Select the node that you want to delete.
2. From the pop-up menu, select **Delete**.

Move a Node

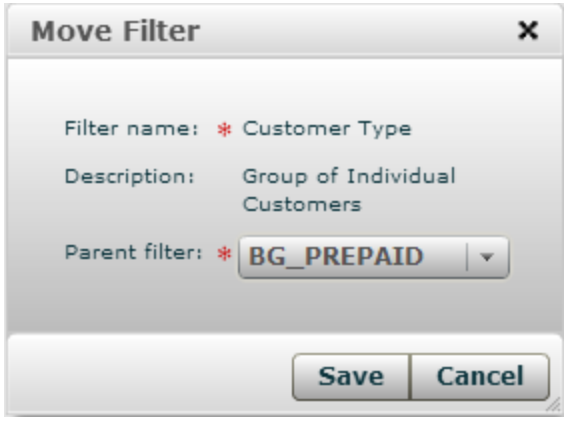
You can move a node from its current level to another level, which can be either above or below the current level. If the node has one or more child nodes, then they are also

moved with their parent node. However, you cannot move a parent node to the level of its own child node.

To move a node:

1. Select the node that you want to move.
2. From the pop-up menu, select **Move**. The Move Filter window appears.

Display 9.7 *Move Filter Window*



3. Select the parent node where you want to move the node.
4. Click **OK**.

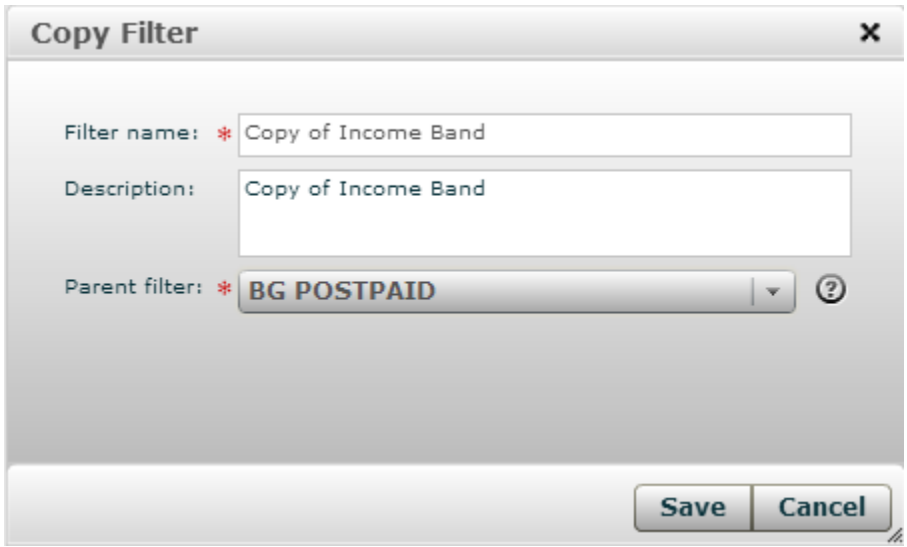
Copy a Node

You can copy a node from its current level to another level, which can be either above or below the current level. If you want to copy a parent node along with its child nodes, you have to copy each node individually.

To copy a node:

1. Select the node that you want to copy.
2. From the pop-up menu, select **Copy**. The Copy Filter window appears.

Display 9.8 *Copy Filter Window*



3. Select the parent node where you want to copy the node.
4. Click **OK**.

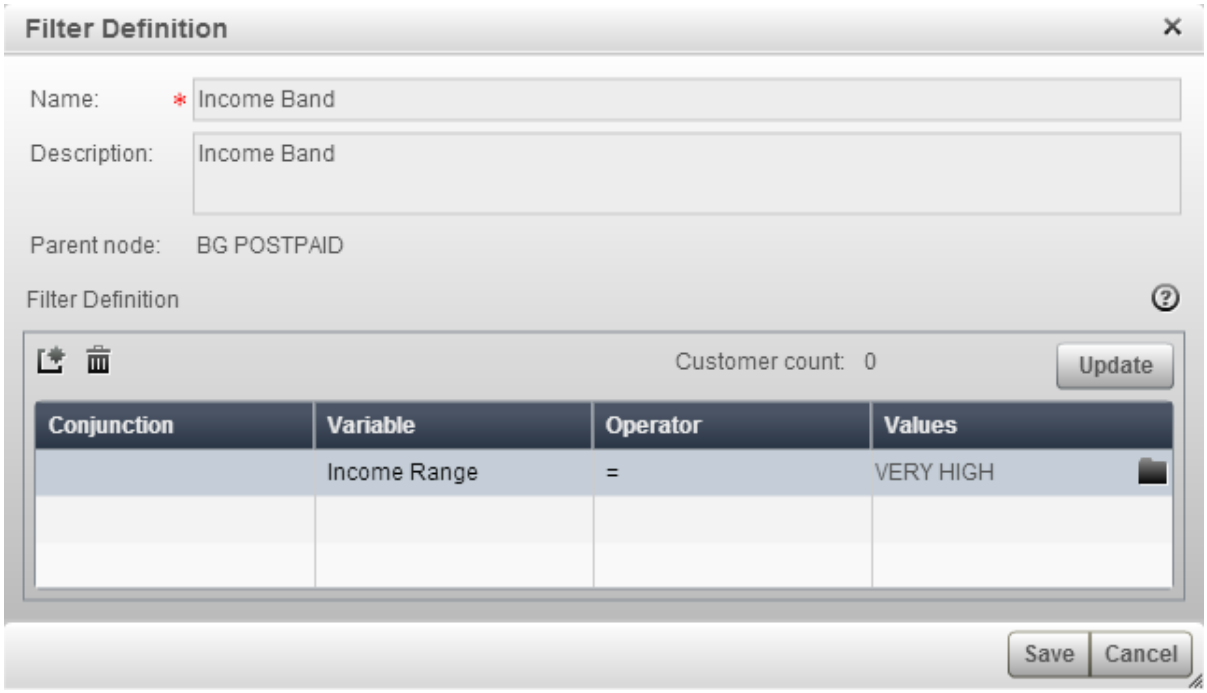
Edit a Node

You can change the filter conditions that each node represents.

To edit a node:

1. Select the node that you want to edit.
2. From the pop-up menu, select **Edit**. The Filter Definition window appears. In this window, you can view the filter conditions that you have defined.

Display 9.9 *Edit Filter*



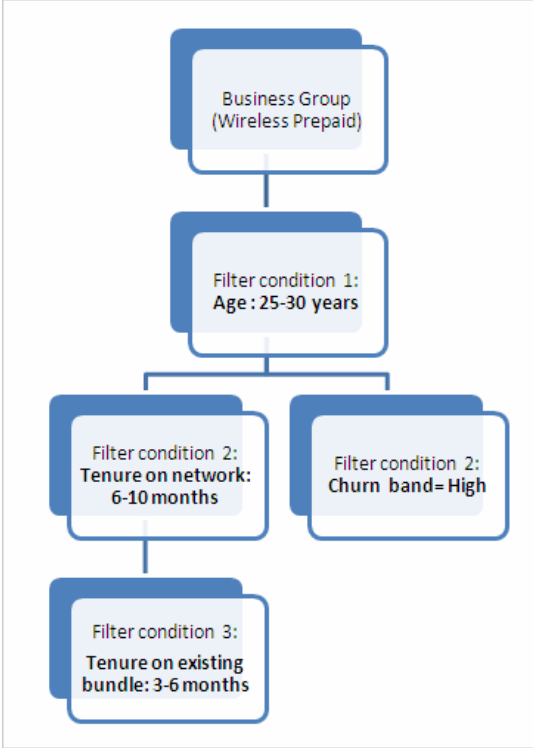
3. Change the filter conditions.
4. Click **Save**.

Example: Defining a Target Segment

Define Filter Criteria

You have defined a business group, Wireless Prepaid, with a customer count of five million. From this business group, you want to focus only on customers who satisfy the following filter criteria:

Figure 9.2 *Sample Filter Criteria for a Target Segment*



The target segment contains customers who satisfy either of the following set of conditions:

Condition set 1
: Customers with age greater than 25 years whose tenure on the network is greater than six months and tenure on the existing offer is greater than three months.

Condition set 2
: Customers of age greater than 25 who have a high churn score.

To define the filter criteria:

1. In the hierarchical list, add a node for the **Wireless Prepaid** business group.
2. In the Filter window, enter the filter name and description.
3. Click and, in the row that is added in the table, enter the following details:

   Variables
   : From the list, select the **Age band code** variable.

   Operators
   : From the list, select the = (equal to) operator.

   Values
   : Click . From the list, select the **25–30** age band.

   TIP Click **Update**. The number of customers in the business group whose age is greater than 25 is displayed.
4. Click **Save**.
5. In the hierarchical list, select the **Age** node and select **Add** from the pop-up menu.
6. In the New Filter window, enter the filter name and description.

7. Click and, in the row that is added in the table, enter the following details:

   Variables
   From the list, select the **Tenure on network** variable.

   Operators
   From the list, select the = (equal to) operator.

   Values
   Click . From the list, select the **6–10 months** churn band.

   TIP Click **Update**. The number of customers in the business group whose age is greater than 25 and whose tenure on network is in the 6–10 months band is displayed.

8. Click **Save**.
9. In the hierarchical list, select the **Age** node and select **Add** from the pop-up menu.
10. In the New Filter window, enter the filter name and description.
11. Click and, in the row that is added in the table, enter the following details:

    Variables
    From the list, select the **Churn band code** variable.

    Operators
    From the list, select the = (equal to) operator.

    Values
    Click . From the list, select the **High** churn band.

    TIP Click **Update**. The number of customers in the business group whose age is in the 25–30 age band and whose churn score is high is displayed.

12. Click **Save**.
13. In the hierarchical list, select the **Tenure on network** node and select **Add** from the pop-up menu.
14. In the New Filter window, enter the filter name and description.
15. Click and, in the row that is added in the table, enter the following details:

    Variables
    From the list, select the **Tenure on existing bundle** variable.

    Operators
    From the list, select the = (equal to) operator.

    Values
    Click . From the list, select the **3–6 months** band.

    TIP Click **Update**. The number of customers in the business group who satisfy the following criteria is displayed:

    - Age of the customer is in the 25–30 range.
    - Tenure on network is in the 6–10 months band.
    - Tenure on existing offer is in the 3–6 months band.

16. Click **Save**.

TIP The target segment would contain customers who satisfy either or both of the following set of conditions:

- Age is in the 25–30 band, and churn score is high.
- Age is in the 25–30 band, tenure on network is in the 6–10 months band, and tenure on existing bundle is in the 3–6 months band.

Derive Customers for a Target Segment

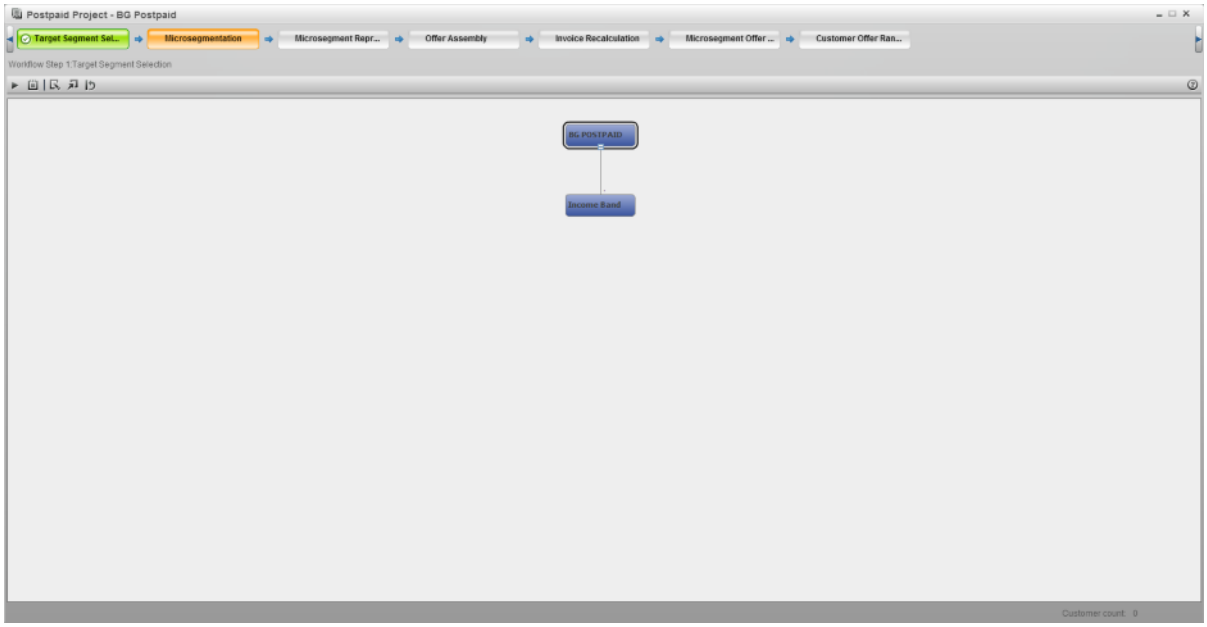
In order to filter customers from the business group, you have to run the **Target Segment Selection** workflow step.

To derive customers for a target segment:

1. From the **My Projects** list, double-click the project that you are working on.
2. In the workflow diagram pane, select **Target Segment Selection**.
3. On the toolbar, ▶ .

   TIP Alternatively, to run the workflow step, in the Target Segment Selection window click **Run**.

Display 9.10 *Target Segment Selection*



If the process runs successfully, a subset of customers is derived from the business group based on the filter criteria. This subset of customers forms the target segment. The target segment is the actionable population for the subsequent workflow steps of the project.

Target Segmentation Reports

After you run the **Target Segment Selection** workflow step, you can define reports for this workflow step. These reports can be generated each time you run the project. For details, see *Chapter 16 Generating Workflow Reports* of this guide.

Chapter 10

Microsegmentation

Overview of Microsegmentation

Definition

Microsegmentation divides the target segment into a specific number of groups such that customers within each group have similar revenue and usage patterns. Microsegmentation involves two processes—clustering and profiling.

Clustering

In the clustering process, using the statistical clustering technique, the target segment is divided into customer groups that are called clusters. Each cluster represents a group of customers who have homogeneous patterns for variables that are related to usage and revenue. Conversely, there is heterogeneity across clusters. For example, one cluster might have customers who have high usage for voice calls and another might have customers with very low usage for voice calls.

The clustering technique requires the following inputs:

- Variables that define the revenue and usage pattern of the customers.
- Parameters that are required by the clustering technique.

SAS Offer Optimization for Communications provides a default setup for these inputs. The mandatory variables (also called statistically significant variables) are automatically selected. Similarly, a default value is set up for each clustering parameter.

Table 10.1 *Recommended Default Values for Clustering Parameters*

Parameter Description	Default Value
Maximum number of clusters	5
Elbow criterion	0.01
Convergence criterion	0.01

You can create clusters based on the default setup. Alternatively, you can also change the default setup and create microsegments.

Profiling

Profiling enables you to add a business description for each cluster. Each such cluster that is associated with a business description is called a microsegment. Microsegments form the actionable groups for further processes of the workflow.

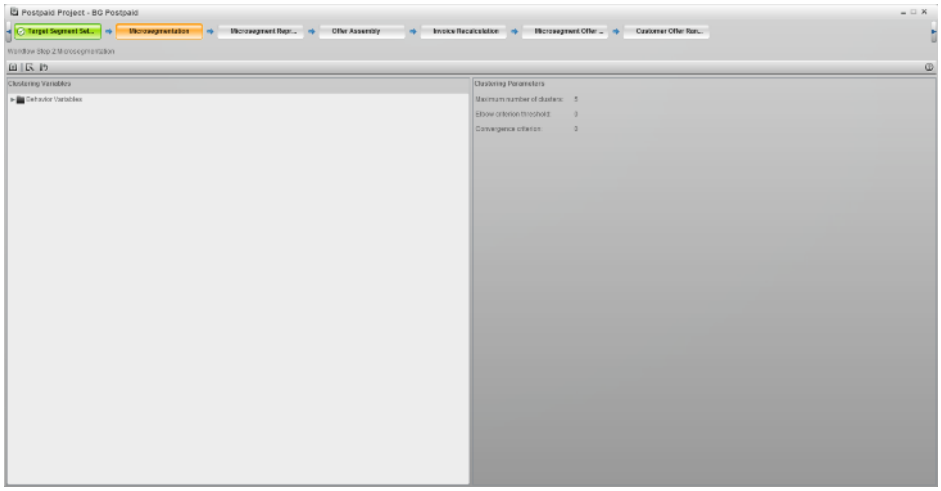
Create Microsegments

Create Clusters

To create clusters:

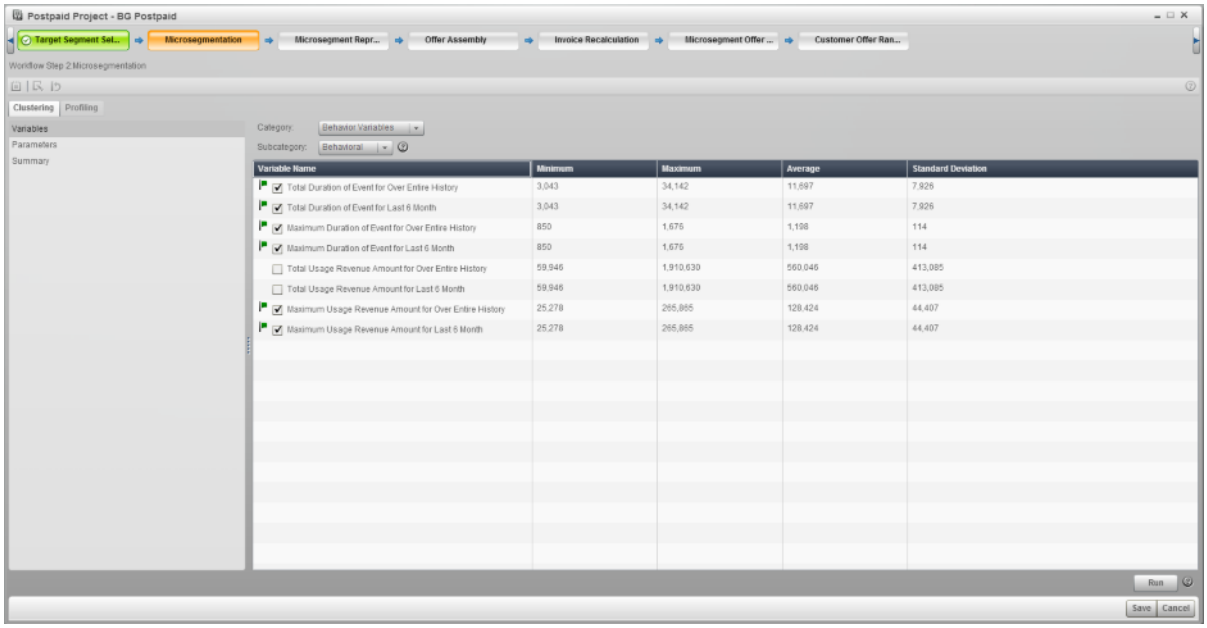
1. In the workflow diagram pane, select **Microsegmentation**. The Microsegmentation details are displayed.

Display 10.1 *Microsegmentation: View Details*



2. On the toolbar, select . The Microsegmentation pane appears.

Display 10.2 *Microsegmentation — Clustering Tab*



Note: SAS Offer Optimization for Communications provides a default setup to create clusters. If you want to create clusters based on this setup, skip steps 4 to 7 and perform step 8 directly.

3. Select the **Clustering** tab. On the wizard pages, specify the inputs that are required for creating clusters in the target segment.
4. (Optional) Select the **Variables** page and complete the following steps:
   a. Select the **Category** and **Subcategory** of the variable. The **Variables** list displays mandatory and non-mandatory variables that are defined for the selected combinations of the categories and subcategories. Mandatory variables are automatically selected, and these are statistically significant variables. However, you can also deselect any of the mandatory variables if you do not want the best offers to be produced based on these variables. In addition, you can select non-mandatory variables according to your business requirements.

      TIP A mandatory variable is represented with a icon beside it.

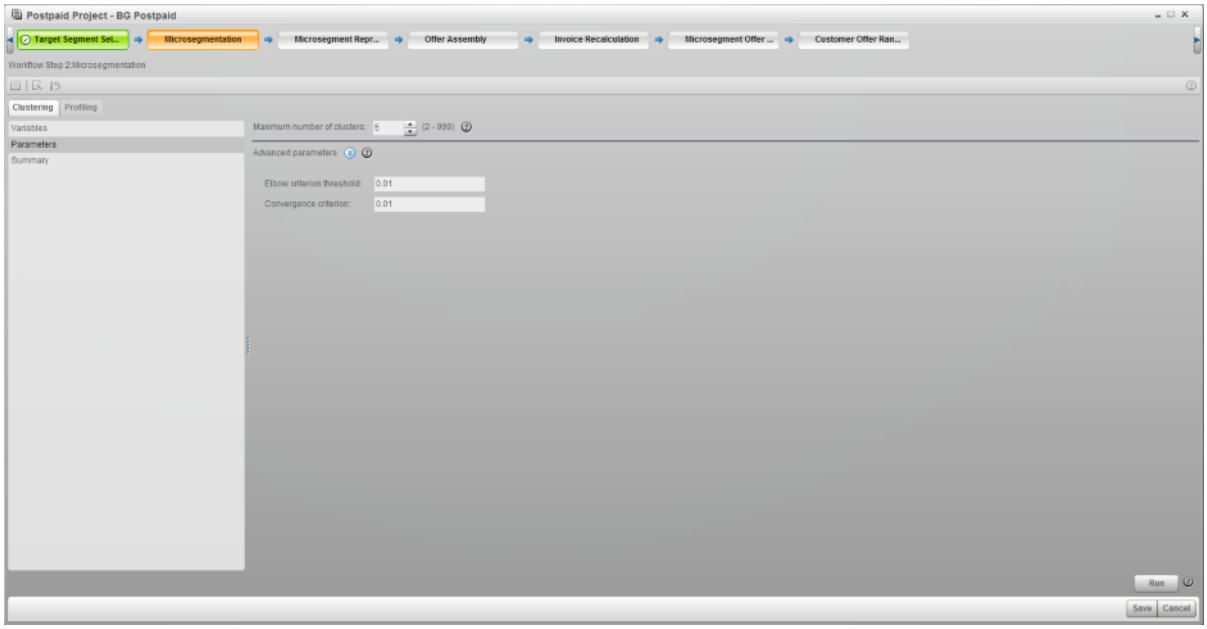
   b. Review the values that are displayed in each column of the variable. This information might help you when you select non-mandatory variables. The column values indicate how the variable is represented in the target segment. For example, consider the `Total OB SMS CNT` variable that represents the total number of outbound SMS in the target segment. The values that are displayed in the **Minimum**, **Maximum**, **Average**, and **Standard Deviation** columns indicate the corresponding values for usage of outbound SMS in the target segment.

   c. Select the additional variables that you want to consider for creating clusters in the target segment.

   TIP Repeat steps 5a to 5c above to include variables that belong to a combination of another category and subcategory.

5. (Optional) Select the **Parameters** page and specify the parameter values:

Display 10.3 *Microsegmentation Parameters Page*

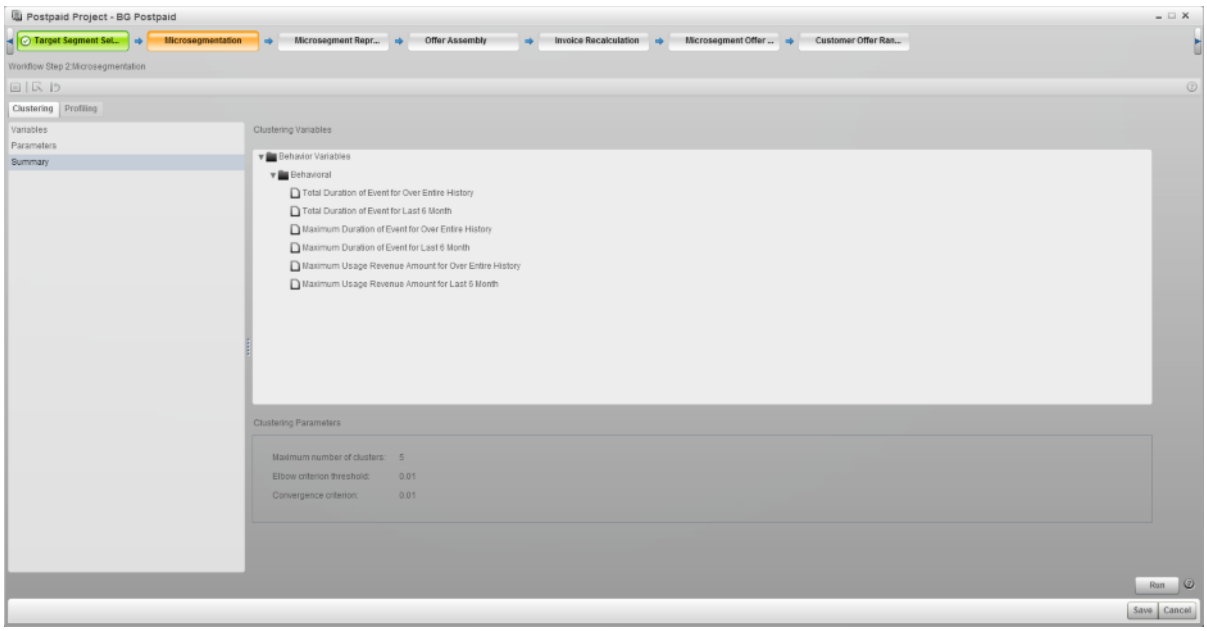


a. In the **Maximum number of clusters** field, enter or select the value for the maximum number of clusters that you want to create in the target segment. However, the number of clusters that are created depends on the clustering technique that is used for creating clusters.

b. Click and enter values for **Elbow criterion threshold** and **Convergence criterion**. It is recommended that you consult your statistical analyst when you enter values for these variables. For details, see "Clustering Parameters" on page 143.

6. (Optional) To view the variables that you have selected and the parameter setup that you have configured, select the **Summary** page.

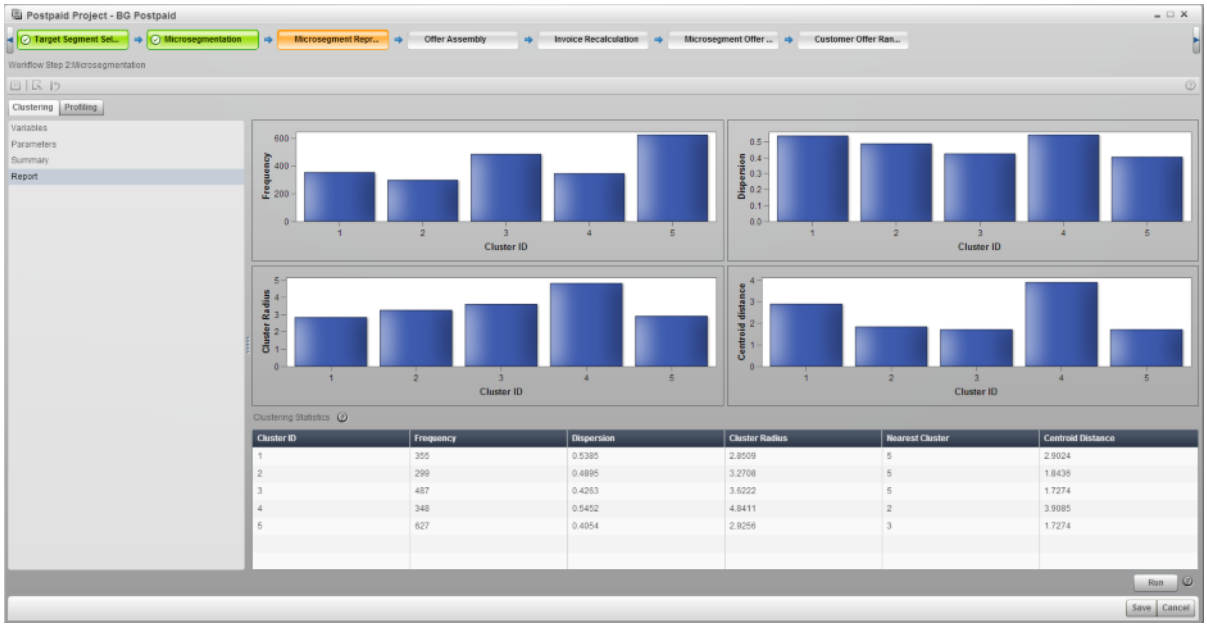
Display 10.4 *Clustering — Summary Page*



7. Click **Run**. A new page, **Report** is added.

8. Select the **Clustering Report** page and view the clustering summary.

Display 10.5 *Clustering Report*



a. Review the values that are displayed for various clustering statistics such as Frequency, Dispersion, Centroid Radius, Nearest Cluster, and Centroid Distance.

Frequency
This column indicates the number of observations in the cluster. That is, this column gives the total number of customers in the cluster.

Dispersion
This column indicates the root mean squared across variables of the cluster standard deviations, which is equal to the root mean square distance between the observations in the clusters. This statistic explains the spread within the cluster. The lower the value of the spread, the less is the variation within the cluster. As a result, the higher is the homogeneity in that cluster.

Cluster radius
This column identifies the cluster that has a mean closest to the mean of the current cluster. This column also indicates the cluster that has more similar characteristics than the rest of the clusters when the characteristics of the customers in the current cluster are compared.

Centroid distance
This column indicates the distance between the centroids (means) of the current cluster and the nearest other cluster.

b. View the graphs that are generated. These graphs explain the homogeneity within the clusters.

- The Cluster ID versus Frequency graph indicates the number of customers in each cluster.
- The Cluster ID versus Dispersion graph indicates the variation of the observations within the cluster. The lesser the variation, the higher is the homogeneity within the cluster.
- The Cluster ID versus Farthest observation graph indicates the distance between the cluster centroid and the observation that is the farthest from the

cluster centroid. This graph represents the radius of the cluster. The greater the radius, the greater is the spread of the observations within the cluster.

- The Cluster ID versus Centroid distance graph indicates the distance between the centroids of the current cluster and the cluster that is nearest to it.

Note: If the clusters that are created do not satisfy your business requirements, you can configure the clustering setup again. Repeat steps 2 to 7.

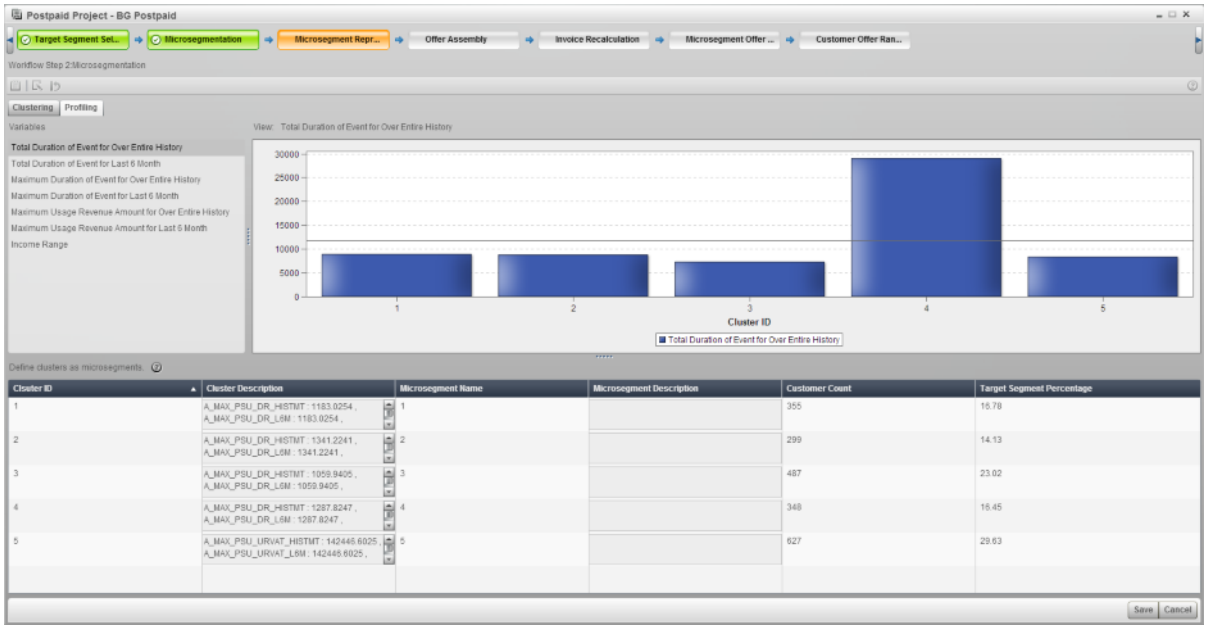
9. Click **Run**.

Define a Business Profile for a Cluster

To define a business profile for a cluster:

1. Select the **Profiling** tab. The **Profiling** tab is enabled after clusters are successfully created. On this tab, you can approve the clusters that are statistically derived.

Display 10.6 *Microsegmentation — Profiling Tab*



2. From the **Variables** list, select variables and view the representation of those variables across the clusters. The graphical representation of each variable across clusters can help you enter an appropriate description for the cluster.
3. View the following information that is displayed for each cluster:

Cluster ID
displays the cluster number that is generated after running the clustering process.

Cluster Description
displays the description that is analytically derived fro the cluster.

Customer Count
displays the number of customers in the microsegment.

Target Segment Percentage
displays the percentage that this microsegment forms in the target segment. For example, if this value is 35, then it indicates that this microsegment forms 35% of the target population.

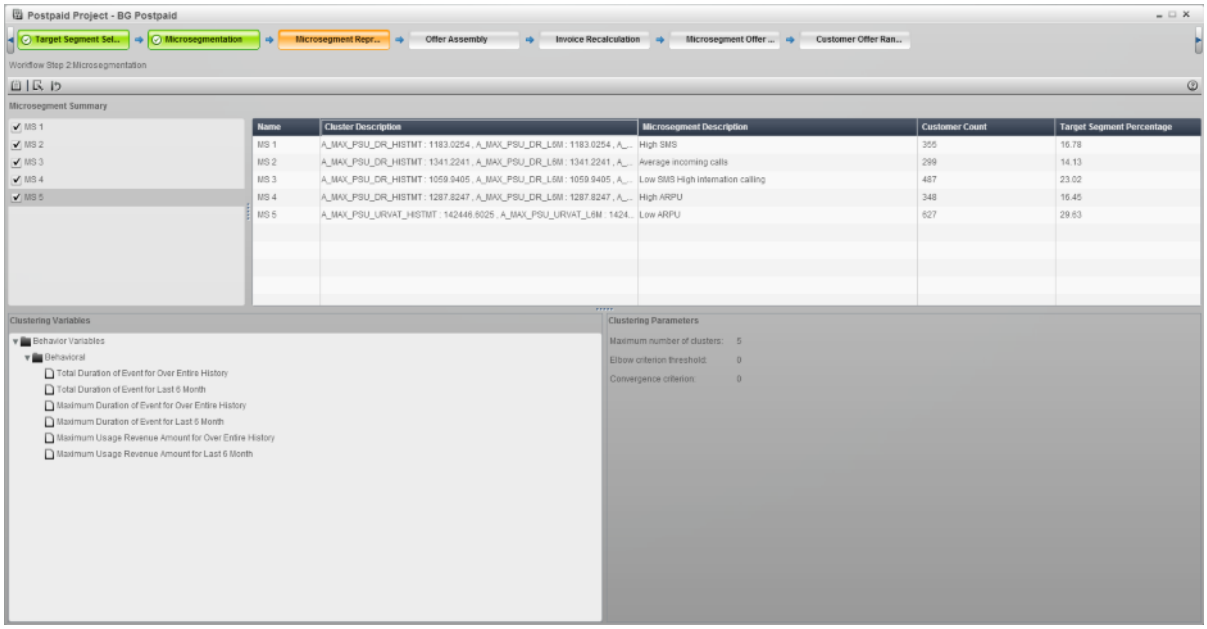
4. Enter a suitable name and description for each cluster. These details help you identify the cluster in accord with your business definitions. For example, you can enter the following description for a microsegment: *Very high number outbound voice calls to Onnet mobile in peak hours. Call duration is relatively high. Voice usage charges are high. Low MMS and SMS usage.*

   Note: You should proceed with the **Microsegment Representation** workflow step only after you enter a name for each cluster in the target segment.

5. Click **Save**. The details that you have specified in the Microsegment Summary page.

   TIP Select the microsegments whose details you want to view.

Display 10.7 *Microsegmentation Workflow Step Pane*



Microsegmentation Reports

After you run the **Microsegmentation** workflow step, you can define reports for this workflow step. These reports can be generated each time you run the project. For details, see For details, see Chapter 16 Generating Workflow Reports on page 127 .

Chapter 11

Microsegment Representation

Overview of Microsegment Representation

Definition

Microsegment representation involves drawing one or more customers from each microsegment such that the usage and revenue patterns of the customers who are drawn represent the entire microsegment. The process of drawing representative customers requires a parameter setup. Moreover, the algorithm for selecting representative customers differs depending on whether you want to consider the eligibility criteria when you draw the representative customers. For details, see "Eligibility Criteria" on page 141.

Parameter Setup

SAS Offer Optimization for Communications provides a default parameter setup for the **Microsegment Representation** workflow step. You can directly draw representative customers from each microsegment based on this default setup. You can also change the default value, and then draw the representative customers.

For each microsegment, you can set up different parameter values. The parameter setup enables you to provide the following inputs:

- Include or exclude eligibility rules.
- Select the sampling method.
- Fix the number of representative customers that is to be drawn from a microsegment.

Sampling Methods

SAS Offer Optimization for Communications supports two sampling methods for drawing representative customers. Irrespective of the sampling method that is used, the customer that is closest to the cluster centroid is selected as the representative customer. For each sampling method, the algorithm for drawing representative customers differs, depending on whether eligibility rules are considered. For details, see "Eligibility Criteria" on page 141.

Centroid method
: In the centroid method, if the eligibility criteria are not considered, then the centroid sampling method derives only one representative customer from the microsegment. However, if eligibility criteria are considered, then the microsegment is divided into eligibility bands depending on the number of unique combinations of the eligibility rules. The centroid method derives a representative customer from each eligibility band. For example, say that six unique combinations of eligibility rules are applicable for a microsegment. Then six representative customers (one from each eligibility band) that are closest to the cluster centroid are selected from that microsegment.

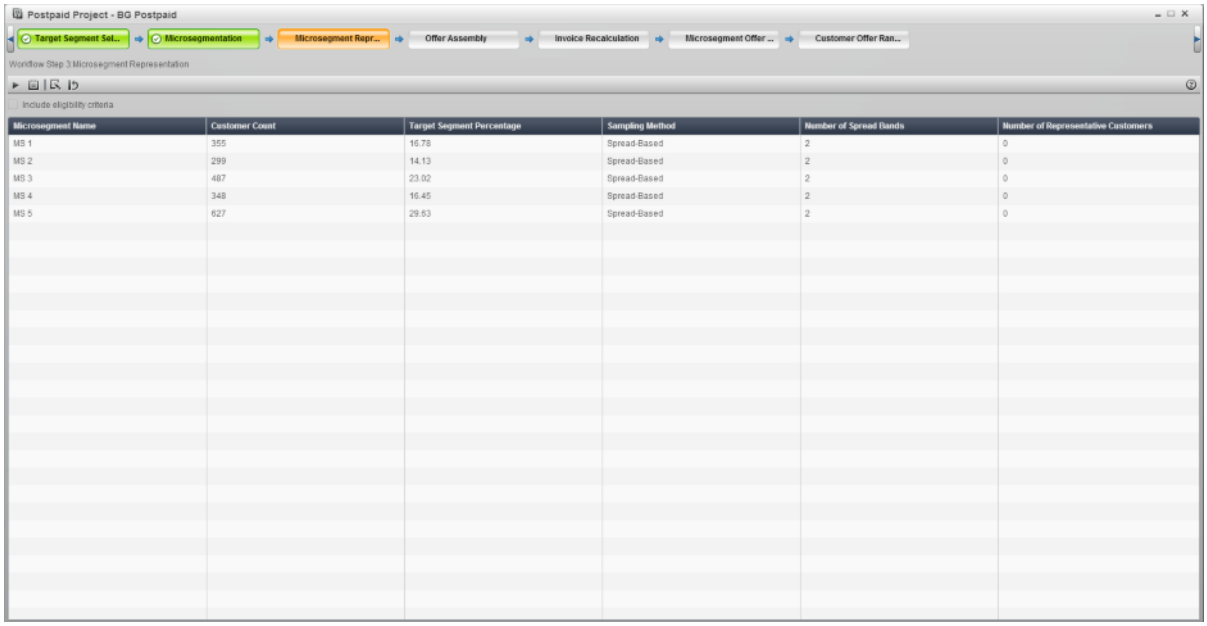
Spread-based method
: In the spread-based method, depending on the number of representative customers that is drawn from the microsegment, the microsegment is divided into a corresponding number of spread bands. If eligibility criteria are not considered, then the customer that is closest to the cluster centroid is selected from each spread band. However, if eligibility criteria are considered, then before creating spread bands, each microsegment is divided into the eligibility bands depending on the number of unique combinations of the eligibility rules. A customer who exists in an eligibility band and in a spread band and is also closest to the cluster centroid is selected. In this case, it might so happen that there are no customers who belong to a particular eligibility band and also to a particular spread band. Therefore, the number of representative customers that is actually drawn from the microsegment can be less than or equal to the value obtained by multiplying the number of eligibility bands with spread bands. For example, if you want to draw three representative customers, then the microsegment would be divided into three spread bands. If six eligibility bands are applicable for the microsegment, then 18 (3 x 6) representative customers should be drawn. However, it might happen that there are no customers in a particular combination of a spread band and an eligibility band. Therefore, the number of customers that is actually drawn can be less than 18.

Draw Representative Customers Based on the Default Parameter Setup

To draw a representative customer from each microsegment using the default parameter setup:

1. In the workflow diagram pane, select **Microsegment Representation**. The default Microsegment Representation details are displayed.

Display 11.1 *Default Microsegment Representation*



2. Review the default setup based on which of the representative customers will be derived for each microsegment.

   Include eligibility criteria
   indicates whether representative customers are drawn based on the eligibility combinations that are defined for the microsegments. For details, see "Eligibility Criteria" on page 141.

   Microsegment Name
   displays the name of the microsegment.

   Customer Count
   displays the number of customers in the microsegment.

   Target Segment Percentage
   displays the percentage that this microsegment forms in the target segment. For example, if this value is 35, then it indicates that this microsegment forms 35% of the target population.

   Sampling Method
   displays the default sampling method that will be used to derive representative customers from the microsegment.

   Number of Spread Bands
   displays the number of spread bands in the microsegment. For the centroid sampling method, this value is 1. Therefore, only one representative customer will be drawn from the microsegment. However, for the spread-based sampling method, a representative customer will be drawn from each spread band of the microsegment.

   Number of Representative Customers
   displays the number of representative customers that will be drawn from the microsegment. For the centroid sampling method, this value is 1. However, for the spread-based sampling method, the number of representative customers that will be drawn depends on the number of the spread bands of the microsegment.

3. On the toolbar, select ▶. Depending on the default parameter setup, representative customers are drawn from each microsegment.

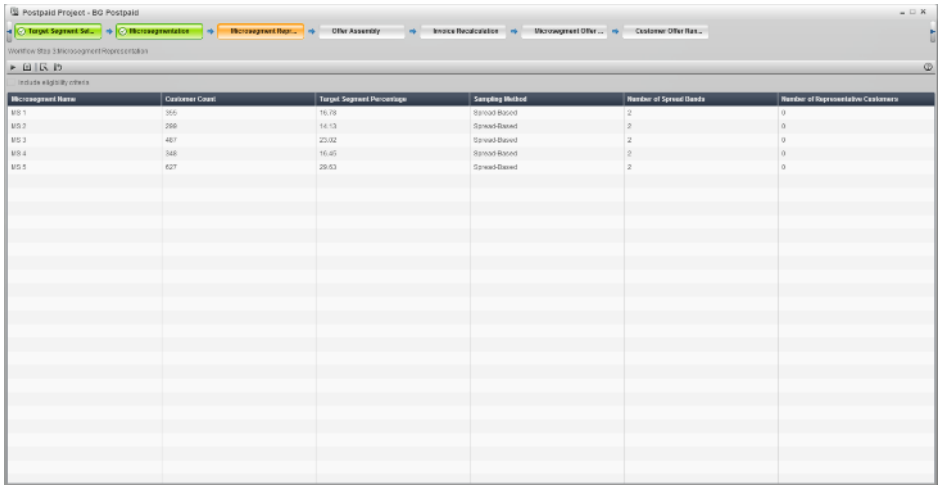
Draw Representative Customers Based on the Customized Parameter Setup

The default parameter setup uses the same parameter values for each microsegment. Therefore, if you want to set up different parameter values for one or more microsegments, you can configure the **Microsegment Representation** workflow step.

To draw representative customers based on customized parameter setup:

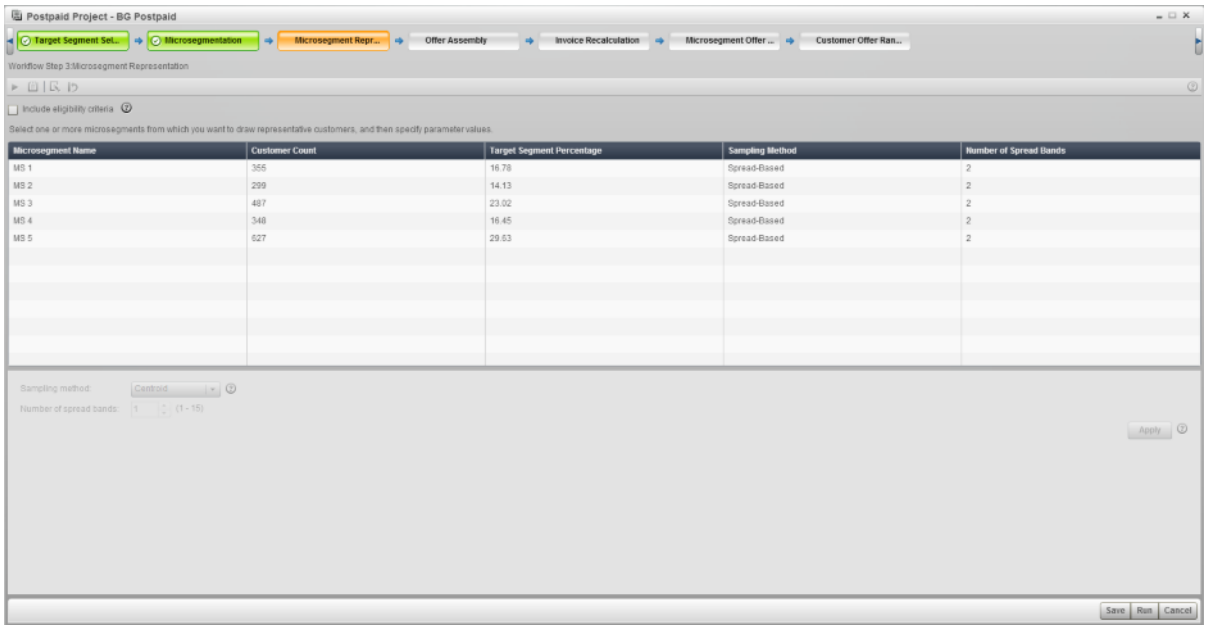
1. In the workflow diagram pane, select **Microsegment Representation**. The Microsegmentation Representation details are displayed.

Display 11.2 *Microsegmentation Representation: View Details*



2. On the toolbar, select . The Microsegment Representation configuration details are displayed.

Display 11.3 *Microsegmentation Representation: Edit Details*



3. To draw representative customers based on the eligibility combinations that are defined for the microsegments, select the **Include eligibility criteria** check box. For details, see "Eligibility Criteria" on page 141.

4. Select the microsegments for which you want to change the parameter setup. The following details are displayed for each microsegment:

   Microsegment Name
   displays the name of the microsegment.

   Customer Count
   displays the number of customers in the microsegment.

   Target Segment Percentage
   indicates the percentage that this microsegment forms in the target population. For example, if this value is 35, then it indicates that this microsegment forms 35% of the target population.

   Sampling Method
   displays the default sampling method that is used to derive representative customers from the microsegment.

   Number of Spread Bands
   displays the number of spread bands in the microsegment. For the centroid sampling method, this value is 1. Therefore, only one representative customer will be drawn from the microsegment. However, for the spread-based sampling method, a representative customer will be drawn from each spread band of the microsegment.

5. Enter the appropriate values for the following parameters:

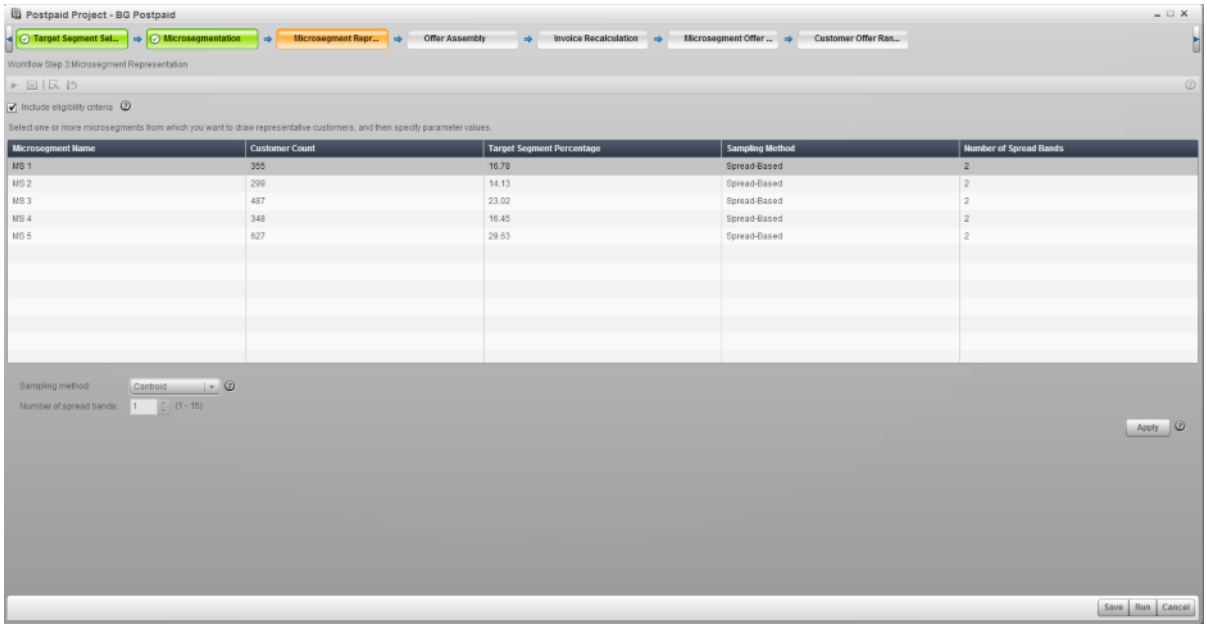
   a. Select the sampling method. The available options are **Centroid** and **Spread-based**.

      Select the **Centroid** method if you want to draw only a single representative customer from the microsegment.

      Select the **Spread-based** method if you want to draw two or more representative customers from the microsegment. This method also ensures that representative customers are selected from across the spread of the cluster.

   b. Enter or select the number of representative customers that you want to draw. If you select the **Centroid** sampling method, then this field defaults to 1 and you cannot change this value. However, if you select the **Spread-based** sampling method, you can enter or select a value that is greater than 2 but less than 15.

Display 11.4 *Microsegment Representation Parameters*

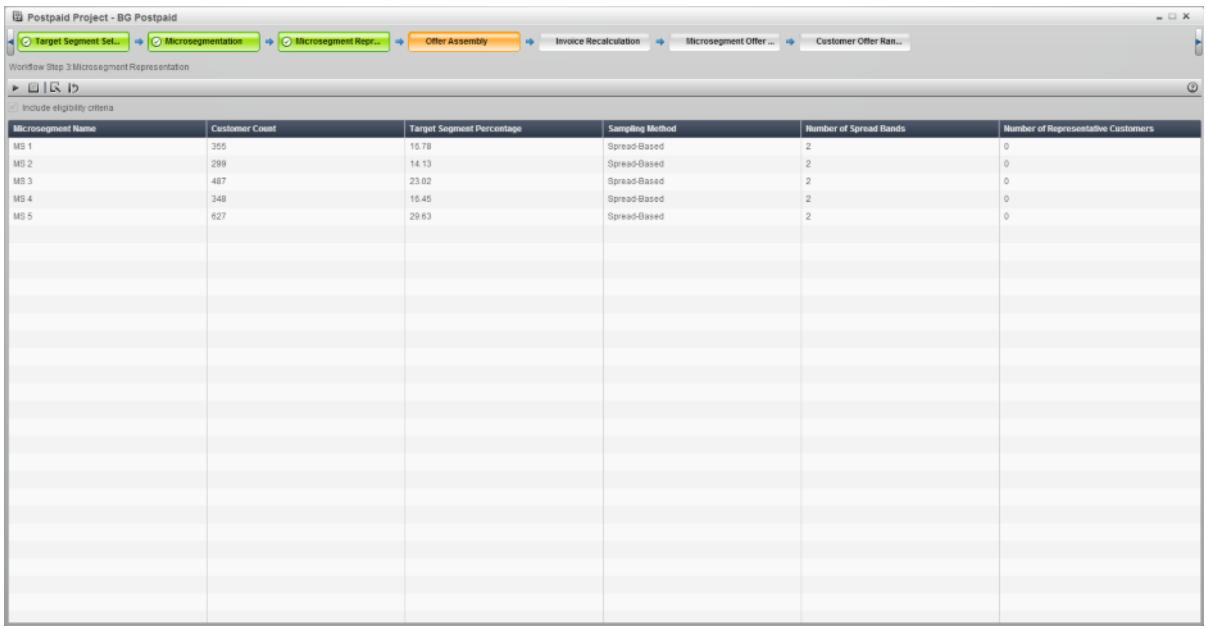


c. Click **Apply**.

> **TIP** Repeat steps from 6a to 6c if you want to set up parameter values for other microsegments.

6. Click **Save**. The summary of the parameter setup is displayed in the **Microsegment Representation** pane.
7. On the toolbar, select ▶. The representative customers are drawn based on the parameter setup.

Display 11.5 *Microsegment Representation Summary*



A report is displayed in **Design Reports** in the Reports workspace. This report gives information about the representative customers who are drawn from each

microsegment. For details, see "Microsegment Representation Reports" on page 95.

Microsegment Representation Reports

Overview

After you run the **Microsegment Representation** workflow step, the following reports are generated in the **Reports** workspace.

- Representative Customer Summary
- Representative Customer Variable Summary

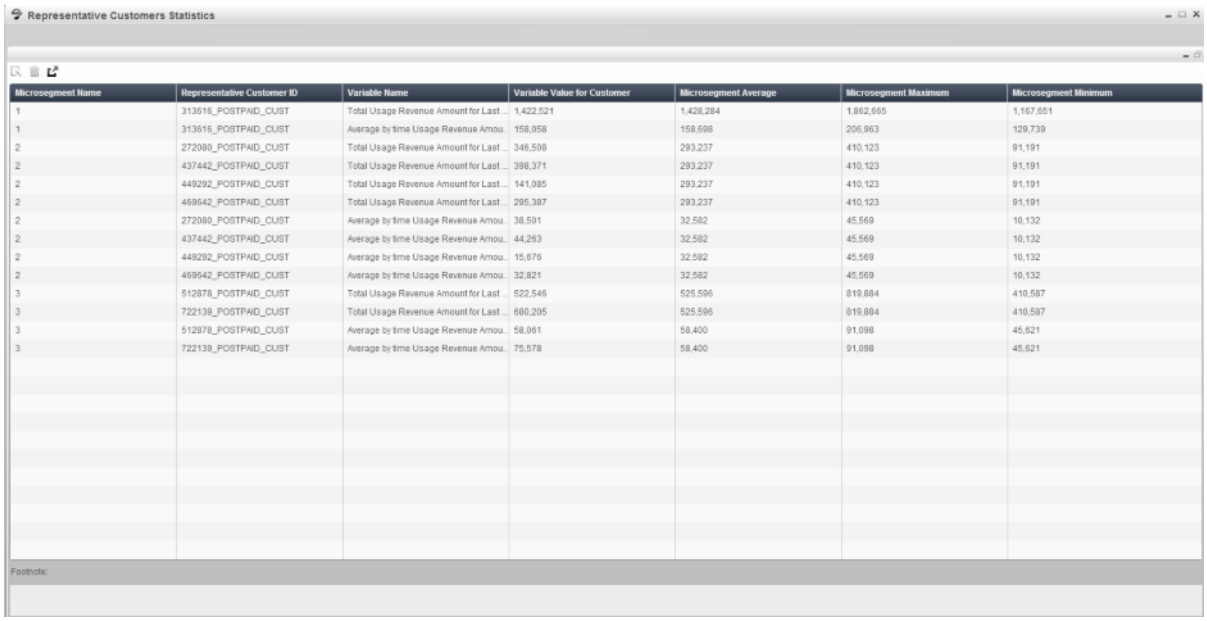
These reports are generated each time you run the microsegment representation workflow step. These reports are also generated in the **Design Reports** or **Batch Reports** panes when you run this workflow step in design or batch mode.

You can also define your own reports for this workflow step. For details, see Chapter 16 Generating Workflow Reports on page 127

Representative Customer Statistics

The Representative Customer Summary report gives information about clustering variables that are selected to create clusters in the target segment. This report indicates how a selected variable is represented in the microsegment. It also indicates the actual value of the variable for a representative customer.

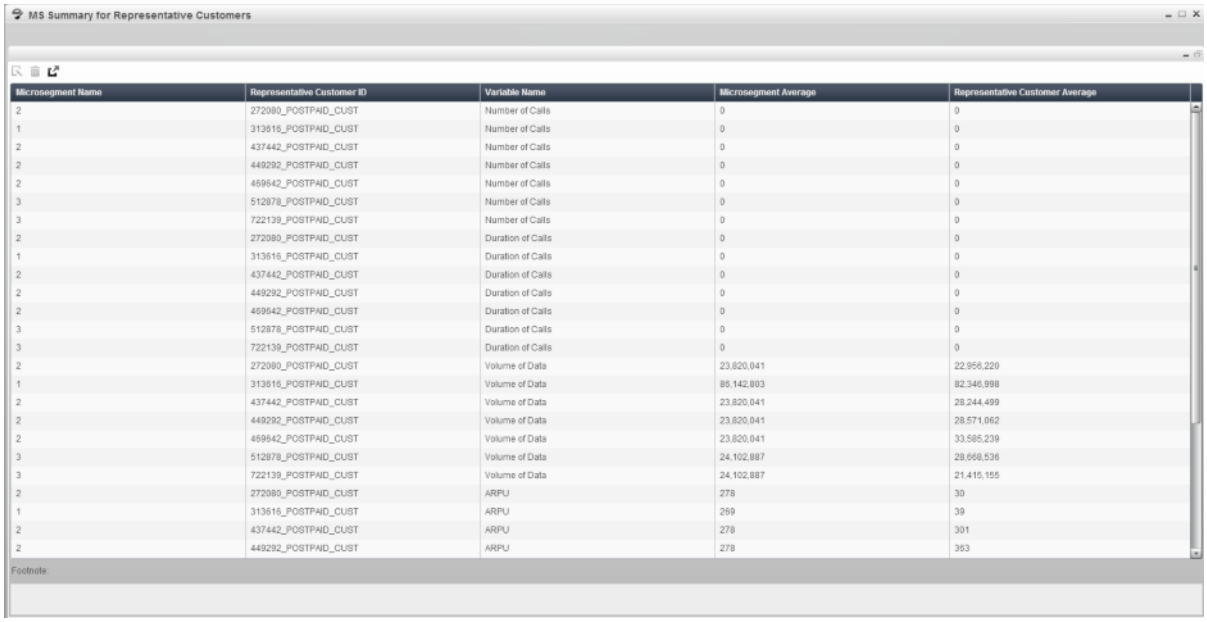
Display 11.6 *Representative Customer Statistics Report*



Microsegment Summary for Representative Customers

The Microsegment Summary for Representative Customers report provides the list of variables that are considered for creating clusters in the target segment. Moreover, this report gives the average value of each variable for the microsegment and the representative customer. This report enables you to compare variable values across representative customers of a microsegment. For example, for the variable that represents the number of calls, this report gives both the average number of calls in the microsegment and the average number of calls for each representative customer of that microsegment.

Display 11.7 *Microsegment Summary for Representative Customers Report*



MS Summary for Representative Customers

Microsegment Name	Representative Customer ID	Variable Name	Microsegment Average	Representative Customer Average
2	272080_POSTPAID_CUST	Number of Calls	0	0
1	313616_POSTPAID_CUST	Number of Calls	0	0
2	437442_POSTPAID_CUST	Number of Calls	0	0
2	449292_POSTPAID_CUST	Number of Calls	0	0
2	469642_POSTPAID_CUST	Number of Calls	0	0
3	512878_POSTPAID_CUST	Number of Calls	0	0
3	722139_POSTPAID_CUST	Number of Calls	0	0
2	272080_POSTPAID_CUST	Duration of Calls	0	0
1	313616_POSTPAID_CUST	Duration of Calls	0	0
2	437442_POSTPAID_CUST	Duration of Calls	0	0
2	449292_POSTPAID_CUST	Duration of Calls	0	0
2	469642_POSTPAID_CUST	Duration of Calls	0	0
3	512878_POSTPAID_CUST	Duration of Calls	0	0
3	722139_POSTPAID_CUST	Duration of Calls	0	0
2	272080_POSTPAID_CUST	Volume of Data	23,820,041	22,956,220
1	313616_POSTPAID_CUST	Volume of Data	86,142,803	82,346,998
2	437442_POSTPAID_CUST	Volume of Data	23,820,041	28,244,499
2	449292_POSTPAID_CUST	Volume of Data	23,820,041	28,571,062
2	469642_POSTPAID_CUST	Volume of Data	23,820,041	33,585,239
3	512878_POSTPAID_CUST	Volume of Data	24,102,887	28,668,536
3	722139_POSTPAID_CUST	Volume of Data	24,102,887	21,415,155
2	272080_POSTPAID_CUST	ARPU	278	30
1	313616_POSTPAID_CUST	ARPU	269	39
2	437442_POSTPAID_CUST	ARPU	278	301
2	449292_POSTPAID_CUST	ARPU	278	363

Footnote

Chapter 12

Offer Assembly and Invoice Recalculation

Assembling Offers for Representative Customers

In the **Offer Assembly** workflow step, offers for which the representative customer are eligible are assembled from the product catalog. SAS Offer Optimization for Communications interfaces with the external system to exchange data. The information about the representative customers is exported to the external system, and the relevant information about the offers is imported into SAS Offer Optimization for Communications.

You can assemble offers based on a set of predefined business rules. The business rules that you define differ depending on whether you are working on a prepaid project or a postpaid project.

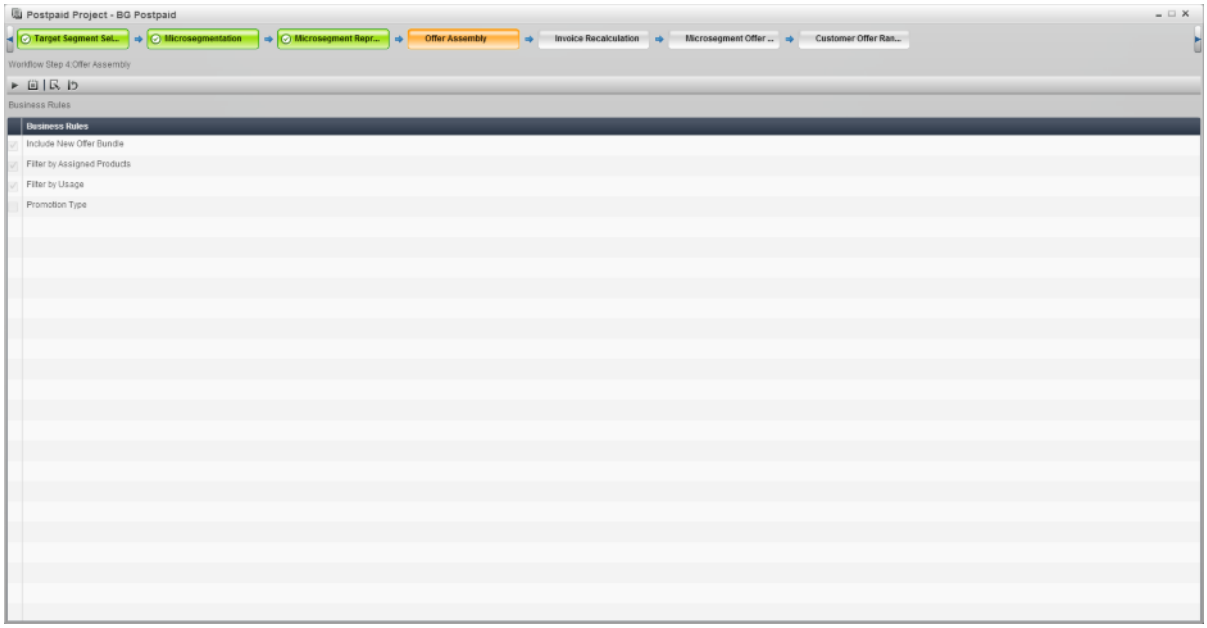
Assemble Offers for Postpaid Customers

For postpaid payment mode, the business rules based on which you assemble offers are predefined. You can view these default business rules when you select the **Offer Assembly** workflow step. After you confirm the default business rules, you can directly run this workflow step. To do so, on the toolbar, select ▶. You can also change the business rules that you want to consider for assembling the offers.

To change the business rules to assemble offers from the external system:

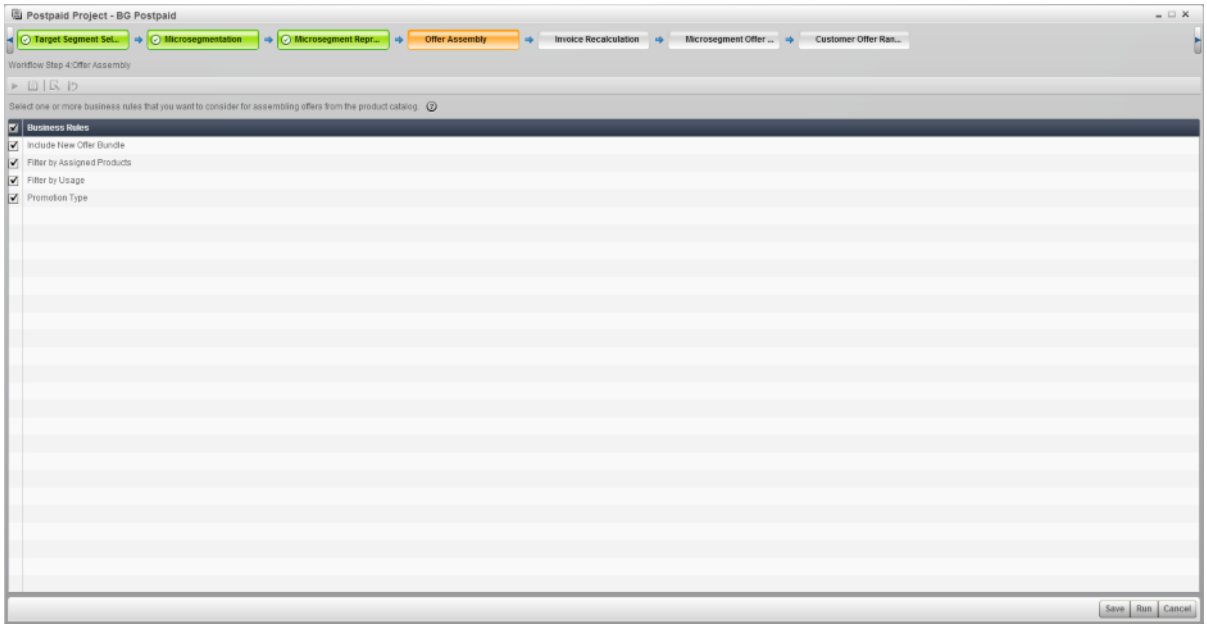
1. In the workflow diagram pane, select **Offer Assembly**. The business rules based on which offers are assembled from the external system are displayed.

Display 12.1 *Offer Assembly Rules*



2. On the toolbar, select . The **Postpaid Offer Assembly** configuration details are displayed.

Display 12.2 *Offer Assembly Window*



3. Select the business rules that you want to consider for retrieving offers.
4. Click **Save**.
5. (Optional) Click **Run**.

Assembling Offers for Prepaid Customers

Overview of Offer Assembly for Prepaid Customers

The Offer Assembly workflow step assembles offers that provide certain rewards to prepaid customers. You can recommend suitable rewards to customers depending on their behavioral profile. Microsegments that you create can help you determine the behavioral profile of the customers. In addition, you have to provide certain business inputs.

After you run the **Offer Assembly** workflow step, the business inputs that you have specified are sent to the external system, and suitable offers are retrieved from the offer library. The Offer Ranking workflow steps recommend the best offers from the offers that are retrieved from the offer library.

SAS Offer Optimization for Communications enables you to define two types of prepaid offers:

Accumulation
This offer type enables you to assemble offers that provide rewards to customers only after they consume an incremental usage of services or an incremental recharge. Moreover, customers have to confirm the incremental usage or recharge within a certain period as compared to their regular behavior. In SAS Offer Optimization for Communications, recharge and services are configured as offer components. For details, about how to configure offer components, see *SAS Offer Optimization for Communications: Administrator's Guide*.

For this offer type, you must provide the following business inputs:

- the minimum and the maximum percentage of increment that you want to define for the service-based usage or recharge.
- the period (in days) within which the customer can accumulate the services or recharge.
- the minimum and the maximum percentage of the target increment that you want to offer as the reward value.

In order to help you provide the business inputs, SAS Offer Optimization for Communications gives you the daily average value of the offer components that you have configured for the accumulation offer.

Based on the business inputs that you provide, suitable offers are retrieved from the offer library when you run the Offer Assembly workflow step.

Example 1: Incremental Usage
Accumulate at least 12 off-net SMS for 3 days and win a reward of free unlimited on-net SMS for a day.

Assume that the daily average number of off-net messages that the customer sends is 2. You specify that in order for customers to avail themselves of rewards, they have to confirm a total usage of at least 12 off-net messages in 3 days.

Example 2: Incremental Recharge
Recharge with 40 in a day and win a reward of free unlimited on-net SMS for a day.

Assume that the daily average recharge for a customer is 30. You specify that in order to for customers to avail themselves of rewards, they have to confirm a recharge of 40 in a day.

Registration

This offer type enables you to assemble offers that provide rewards to customers only after they subscribe for those offers by using a communication medium such as an SMS-based or a web-based interface. Typically, a customer subscribes to an offer by sending an SMS to a specified number. After customers subscribe for an offer, a fixed amount is deducted from their available balance.

For this type of offer type, you must provide the following business inputs:

- the minimum and the maximum percentage of increment that you want to define for the recharge.
- the period in days within which the customer has to consume the rewards that are defined for the offer.
- the minimum and the maximum percentage of the target increment that you want to offer as the reward value.

In order to help you provide the business inputs, SAS Offer Optimization for Communications gives you the daily average value of the offer component that you have configured for registration offers. Typically, this offer component is the recharge.

Based on the business inputs that you provide, suitable offers are retrieved from the offer library when you run the Offer Assembly workflow step.

Example 1: Unlimited Text Offer

With a deduction of a fixed amount of 50, the customer must subscribe to unlimited on-net SMS and 100 on-net minutes with a validity of 7 days.

In order to receive this offer reward, a customer has to first subscribe for this offer. After the customer subscribes, the fixed amount of 50 is deducted from the customer's available balance.

Example 2: Super Unlimited Text Offer

With a deduction of a fixed amount of 90, the customer must subscribe to unlimited on-net messages, 20 off-net messages, and unlimited on-net minutes with a validity of 7 days.

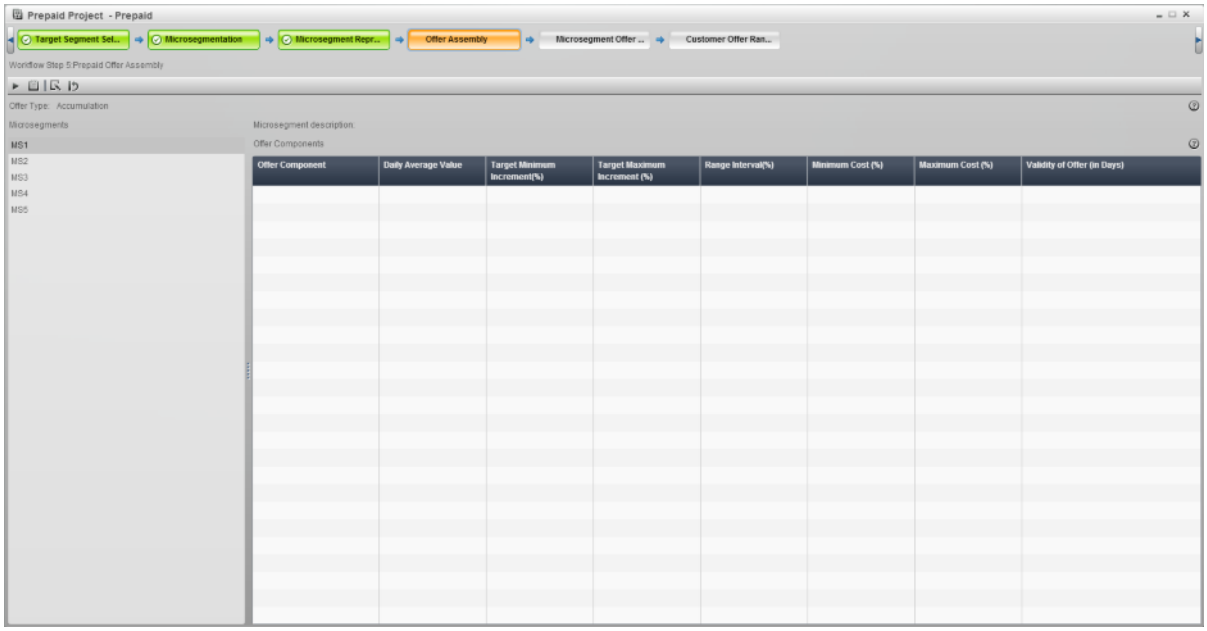
In order to receive this offer reward, a customer has to first subscribe for this offer. After the customer subscribes, the fixed amount of 90 is deducted from the customer's available balance.

Assemble Accumulation Offers

To assemble accumulation offers:

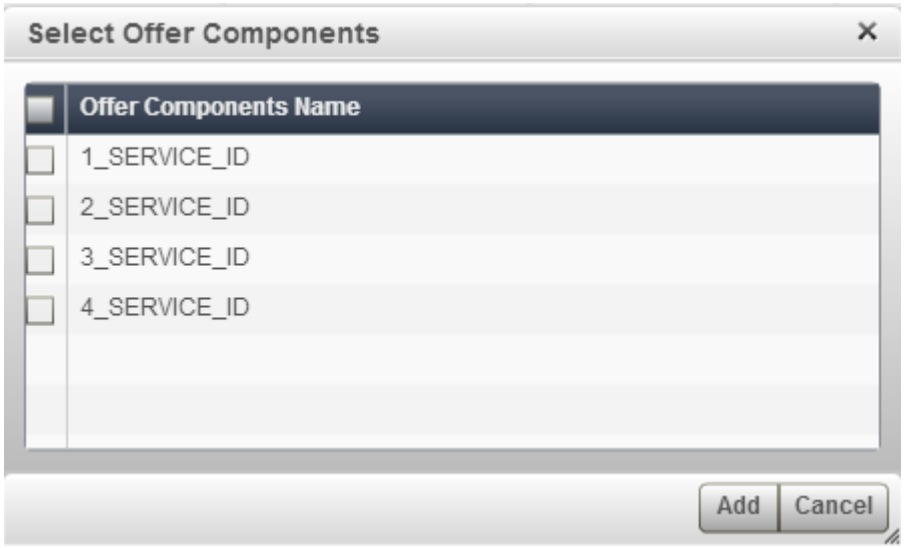
1. In the workflow diagram pane, select **Offer Assembly**. The Prepaid Offer Assembly details are displayed.

Display 12.3 *Prepaid Offer Assembly: Accumulation*



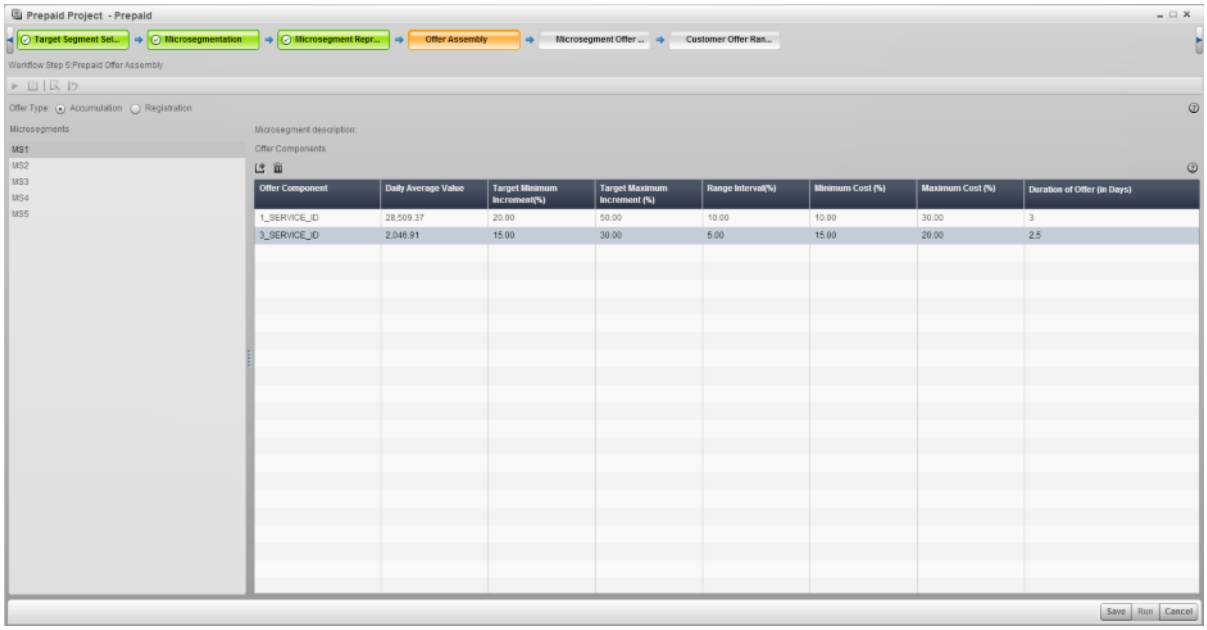
2. On the toolbar, select . The configuration details are displayed.
3. Select the **Accumulation** option for the offer type.
4. From the **Microsegments** list, select the microsegment for which you want to configure the offer components.
5. On the toolbar, select . The Select Offer Components window appears.

Display 12.4 *Select Offer Components Window*



6. Select the offer components that you want to include for the selected microsegment. The list displays the offer components that your administrator has defined. For details, see *SAS Offer Optimization for Communications: Administrator's Guide*.
7. Click **Add**. The window closes and the offer components that you have selected are displayed in the Offer Components table. The columns in the table indicate the business inputs, by which prepaid offers are assembled from the offer library.
8. Select an offer component and specify the following business inputs:

Display 12.5 *Prepaid Offer Assembly: Accumulation*



Daily Average Value

This value displays the customer's daily average usage of certain services such as international voice calls, international messaging, and data download. This value can also indicate the daily average recharge of a customer. You can use this value to decide the base values upon which customers can increase their service-based usage or recharge value. For example, for the on-net SMS offer component, the **Daily Average Value** can be 10. This value indicates that, on average, customers who belong to the selected microsegment send 10 on-net messages in a day.

Target Minimum Increment (%)

Enter the minimum percentage value of the daily average value by which you want customers to increase their service-based usage or recharge value. For example, on average, a customer might send 60 international messages in a day. You would want the customer to increase the usage of the messaging service by at least 10% of this daily average value. In this case, for the international SMS offer component, you want the number of messages to increase from 60 to at least 66.

Target Maximum Increment (%)

Enter the maximum percentage value of the daily average value by which you want the customers to increase their service-based usage or recharge value. For example, on average, a customer might be sending 60 international messages in a day. You would want the customer to increase the usage of the messaging service by at most 30% of this value. In this case, for the international SMS offer component, you want the number of messages to increase from 60 to at most 78.

Range Interval (%)

Specify the fixed interval to create intermediate range values between the minimum and the maximum target incremental value. For example, you enter the minimum increment as 10%, the maximum increment as 30%, and the interval as 5%. In this case, target incremental values are defined as 15, 20, 25, and 30, and suitable offers are assembled for each of these values.

Minimum Cost (%)

Enter the minimum percentage of the incremental, service-based usage cost or recharge value that you want to consider for granting rewards to the customer.

For example, you can decide that you want to offer a benefit of at least 10% of the incremental usage cost. If the incremental usage is 30% and the incremental usage cost is an amount of 20, then the minimum reward benefit is in the amount of 2.

Maximum Cost (%)

Enter the maximum percentage of the incremental service-based usage or recharge value that you want to consider for granting rewards to the customer. For example, you can decide that you want to offer a benefit of at most 20% of the incremental usage cost. If the incremental usage is 30% and the incremental usage cost is an amount of 20, then the maximum reward benefit is in the amount of 4.

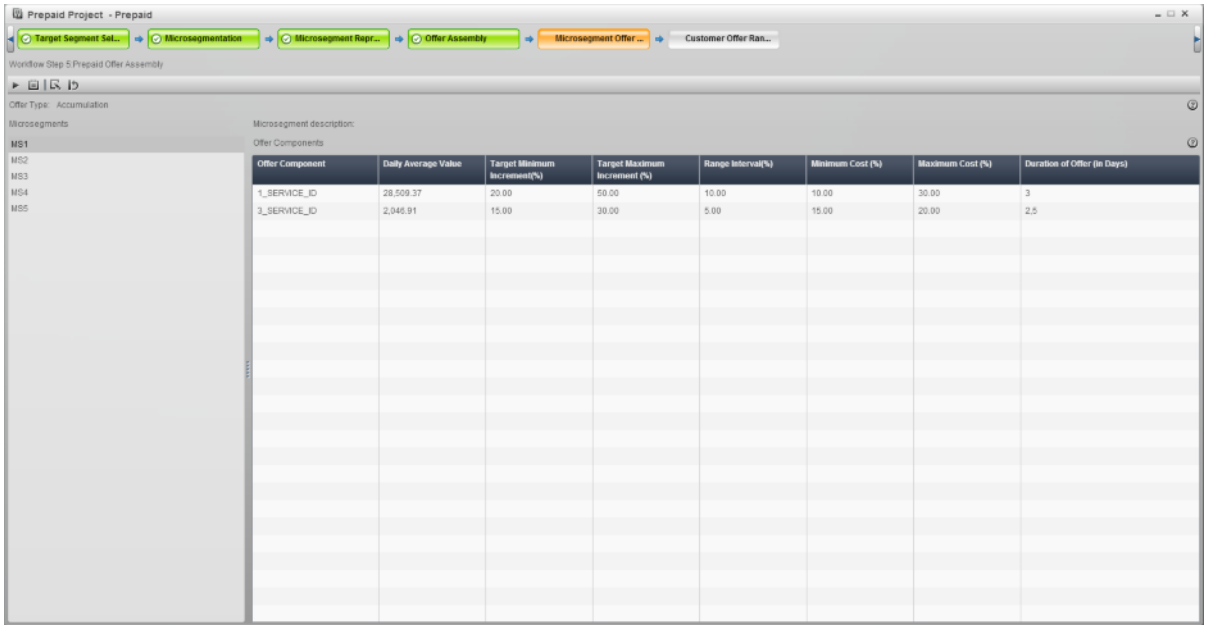
Duration of Offer (in Days)

Enter the number of days within which a customer has to accumulate the service-based usage or purchase a recharge. The rewards would be applicable to a customer only if the customer indicates an incremental usage or recharge within the number of days that you specify in this field. You can enter multiple values in this field. However, make sure that you separate each value with a comma. For example, for the data service that you might want your customers to download a specific size of data within a period of two to three weeks. In this case, you can specify the **Duration of Offer (in Days)** as **14,21**. In this case, the eligible offers that have an offer duration of 14 or 21 days will be assembled from the offer library.

If you want to enter multiple values in this field, then make sure that you separate each value with a comma.

9. Click **Save**. The range values that you have specified are saved for the combination of the microsegment and offer component.
10. Repeat steps 8 and 9 for the other offer components that you have added for the same microsegment.
11. Repeat steps from 4 to 10 for the other microsegments.
12. Click **Run**. Alternatively, on the toolbar, select ▶. The details that you have specified are displayed in the Summary page.

Display 12.6 *Prepaid Offer Assembly: Summary*



Example: Assembling Accumulation Offers

Assume that customers who belong to a microsegment have the following profile: High number of non-promotional international calls, very high duration of non-promotional international calls, and high recharge amounts. The daily average usage and recharge statistics of this microsegment are as follows:

- Daily average number of international SMS is 1.
- Daily average number of international calls is 1.
- Daily average recharge is 30.

Based on the behavioral profile of the customer, you can add the following offer components for this microsegment: international SMS, international calls, and daily recharge.

To assemble prepaid offers of the accumulation type for this microsegment and the international calls offer component, you perform the following steps:

1. Add the **International SMS** offer component for the microsegment.
2. Provide the following business inputs:

Table 12.1 *Sample Input Values for Accumulation Offers*

Field Label	Value
Target Minimum Increment (%)	25
Target Maximum Increment (%)	35
Range Interval (%)	5
Minimum Cost (%)	15

Field Label	Value
Maximum Cost (%)	35
Duration of Offer (in Days)	1,3

3. After you specify the business inputs for each combination of microsegment and offer component, run the workflow step.

Based on the business inputs that you provide, the customer can be eligible for following rewards from the reward library for the microsegment:

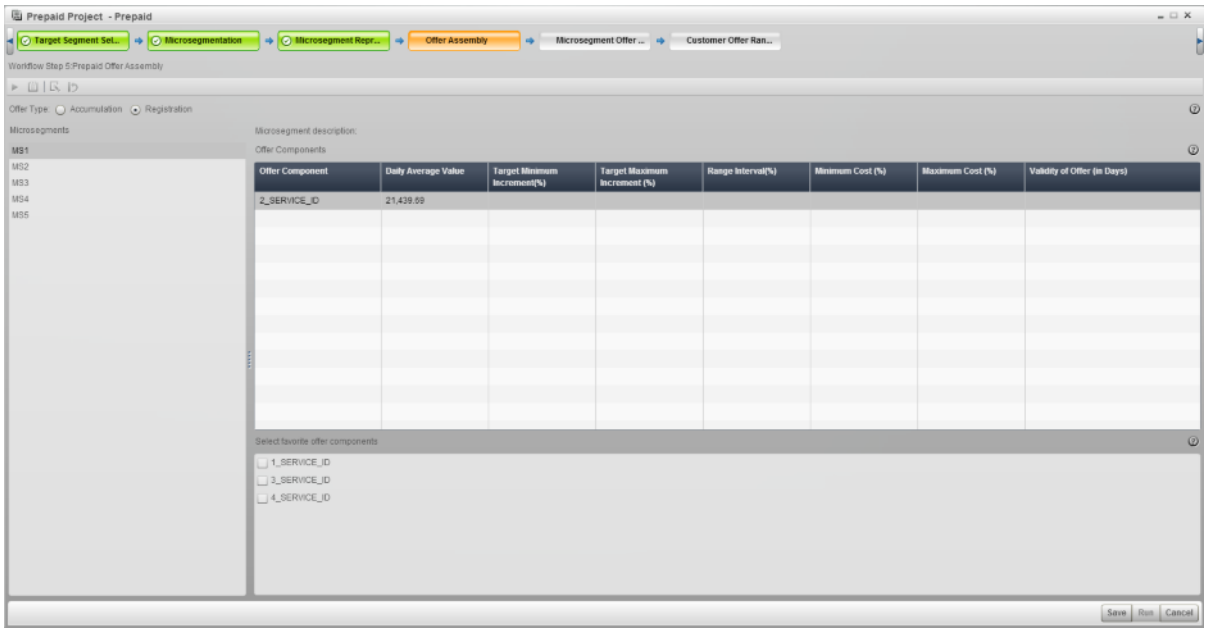
- 30 off-net SMS and 30 on-net minutes valid for 3 days.
- 50 on-net minutes valid for 1 day
- 100 on-net SMS, 10 on-net minutes valid for 1 day.
- 15 off-net minutes valid for 1 day

Assemble Registration Offers

To assemble registration offers:

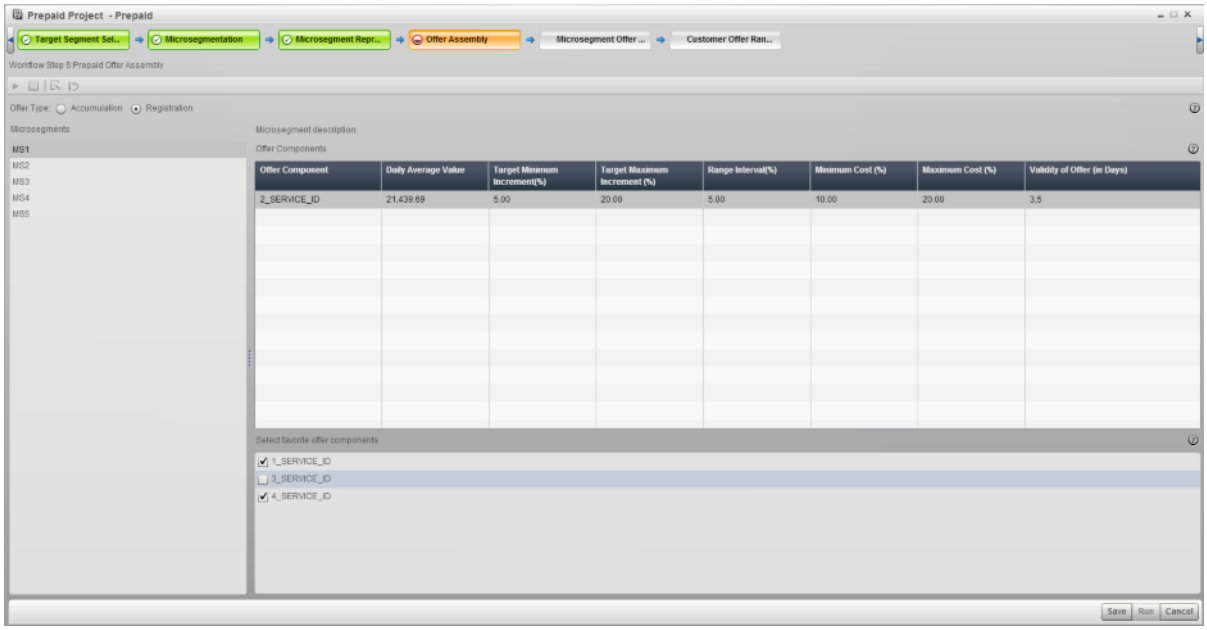
1. In the workflow diagram pane, select **Offer Assembly**.
2. On the toolbar, select . The configuration details are displayed.

Display 12.7 *Prepaid Offer Assembly: Registration*



3. Select the **Registration** option for the offer type. The offer component that your administrator has defined is displayed in the table. For details, see *SAS Customer Analytics for Communications: Administrator's Guide*.

Display 12.8 *Prepaid Offer Assembly: Registration*



4. Select the microsegment for which you want to configure the offer component.
5. Select the offer component that is displayed in the table and specify the following business inputs:

Daily Average Value
This value displays the customer's daily average recharge value. This value can help you decide the base values upon which customers can increase their recharge value. For example, for daily recharge offer component, the **Daily Average Value** can be 30. This value indicates that on average, customers who belong to the selected microsegment recharge with 30 in a day.

Target Minimum Increment (%)
Enter the minimum percentage value of the daily average value by which you want the customers to increase their recharge value. For example, the average daily recharge is 60. You would want that the customers increase the recharge value by at least 20% of this value. In this case, you would want the recharge value to increase from 50 to at least 72.

Target Maximum Increment (%)
Enter the maximum percentage value of the daily average value by which you want the customers to increase their recharge value. For example, the daily average recharge is 60. You would want that the customers increase their recharge by at most 40% of this value. In this case, you would want the recharge value to increase from 60 to at most 84.

Range Interval (%)
Specify the fixed interval to create intermediate range values between the minimum and the maximum target incremental value. For example, you enter the minimum increment as 20%, the maximum increment as 40%, and the interval as 5%. In this case, target incremental values are defined as 20, 25, 30, 35, and 40, and suitable offers are assembled for each of these values.

Minimum Cost (%)
Enter the minimum percentage of the incremental recharge value that you want to consider for granting rewards to the customer. For example, you define a target increment from 30 to 80 for a customer's daily average number of on-net

calls. You can decide that you want to offer a reward of at least 4% of the incremental value. In this case, the incremental value is 50, and the reward is 2.

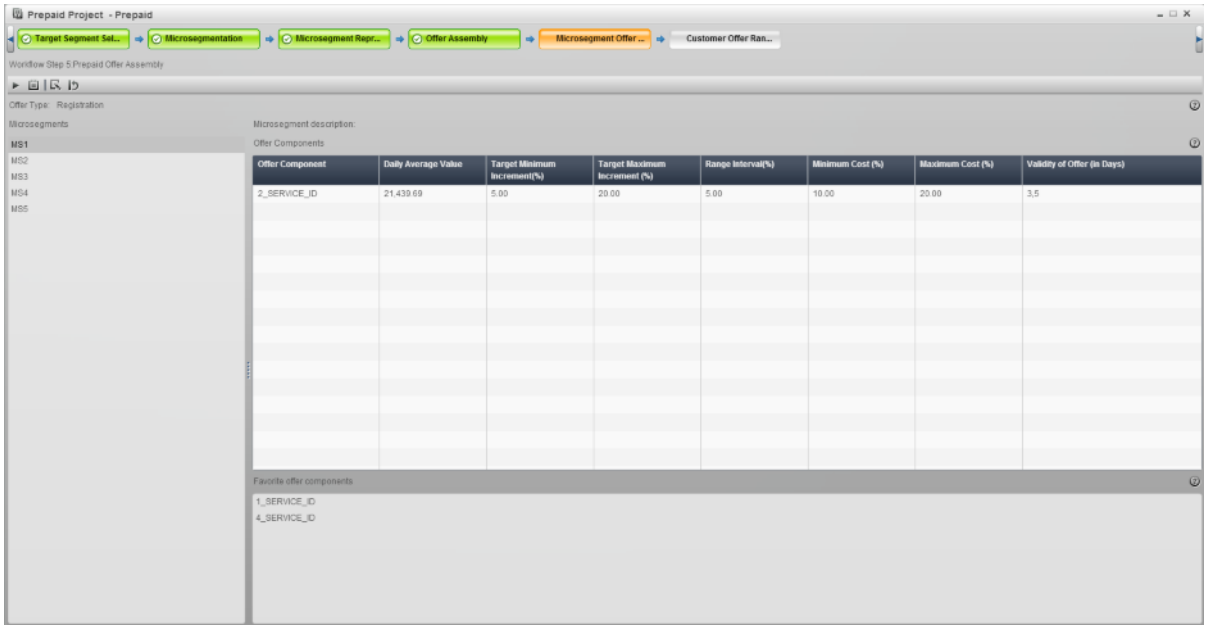
Maximum Cost (%)
Enter the maximum percentage of the incremental recharge value that you want to consider for granting rewards to the customer. For example, for a target incremental value of 50, you define a reward of minimum 2%. For the same incremental value, you can define a reward of maximum 10%. In this case, the reward is 5.

Validity of Offer (in Days)
Enter the number of days for which the reward offer should be valid. Customers must consume the rewards within this validity period. You can enter multiple values in this field. However, make sure that you separate each value with a comma. For example, you might want your customers to consume an incremental recharge within a period of two to three weeks. In this case, you can specify the **Validity of Offer (in Days)** as **14,21**. In this case, the eligible offers that have a validity period of 14 or 21 days will be assembled from the offer library.

6. Click **Save**. The range values that you have specified are saved for the combination of the microsegment and offer component.
7. Repeat steps 8 and 9 for the other offer components that are added for the same microsegment.
8. Repeat steps from 4 to 10 for the other microsegments.
9. Click **Run**. Alternatively, on the toolbar, ▶ .

   The details that you have specified are displayed in the Summary page.

Display 12.9 *Prepaid Offer Assembly: Registration Type*



Example: Assembling Registration Offers

Assume that customers who belong to a microsegment have the following profile: Very high non-promotional on-net SMS, very high duration of non-promotional on-net calls, and high reload amounts. The daily average recharge of this microsegment is 30.

To assemble prepaid registration offers for this microsegment and the daily recharge offer component, perform the following steps:

1. Select the **Daily Recharge** offer component for the microsegment.
2. Provide the following business inputs:

Table 12.2 *Sample Input Values for Registration Offers*

Field Label	Value
Target Minimum Increment (%)	25
Target Maximum Increment (%)	35
Range Interval (%)	5
Minimum Cost (%)	15
Maximum Cost (%)	35
Validity of Offer (in Days)	1,5,7

3. After you specify the business inputs, run the workflow step.

Based on the business inputs that you provide the following rewards can be eligible from the reward library for the microsegment:

- With a recharge amount of 10, 50 on-net SMS and 5 on-net minutes valid for 1 day.
- With a recharge amount of 90, unlimited on-net SMS, 50 off-net SMS, and unlimited on-net minutes valid for 5 days.
- With a recharge amount of 75, unlimited on-net SMS and 150 on-net minutes valid for 7 days.
- With a recharge amount of 45, unlimited on-net SMS, 30 on-net minutes valid for 7 days.

Recalculate Invoices

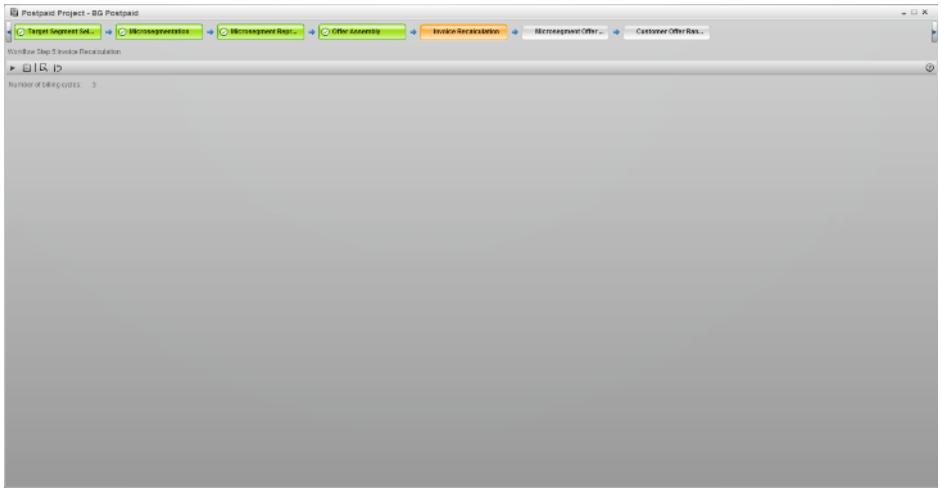
The **Invoice Recalculation** workflow step is applicable for the project that is defined for the postpaid payment mode. In this workflow step, invoice information is gathered for each offer that is retrieved from the product catalog. Based on this information, invoices are computed for each combination of representative customer and offer.

SAS Offer Optimization for Communications enables you to retrieve invoice information for a predefined number of billing cycles. If you want to recalculate invoices for the default number of billing cycles, you can directly run this workflow step. To do so, on the toolbar, select ▶. You can edit this workflow step if you do not want to calculate the invoices for the default number of billing cycles.

To edit the number of billing cycles, complete these steps:

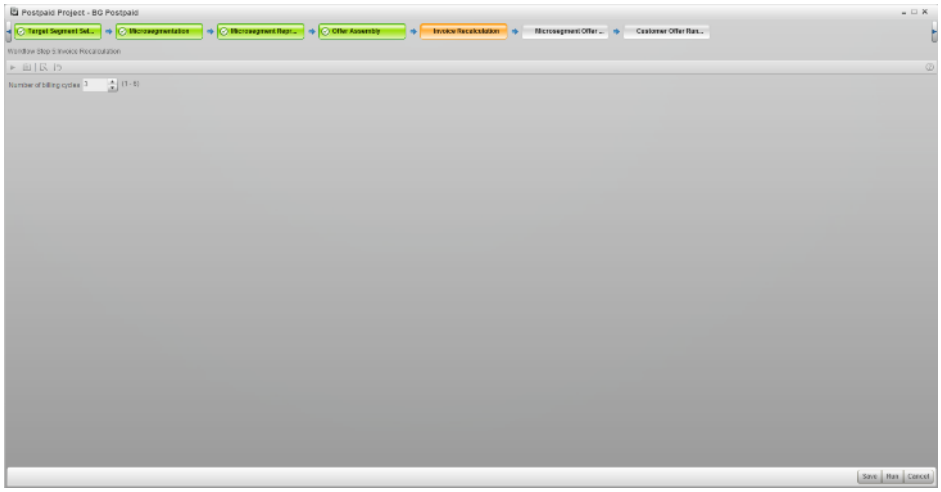
1. In the workflow diagram pane, select **Invoice Recalculation**. The Invoice Recalculation details are displayed.

Display 12.10 *Invoice Recalculation: View Details*

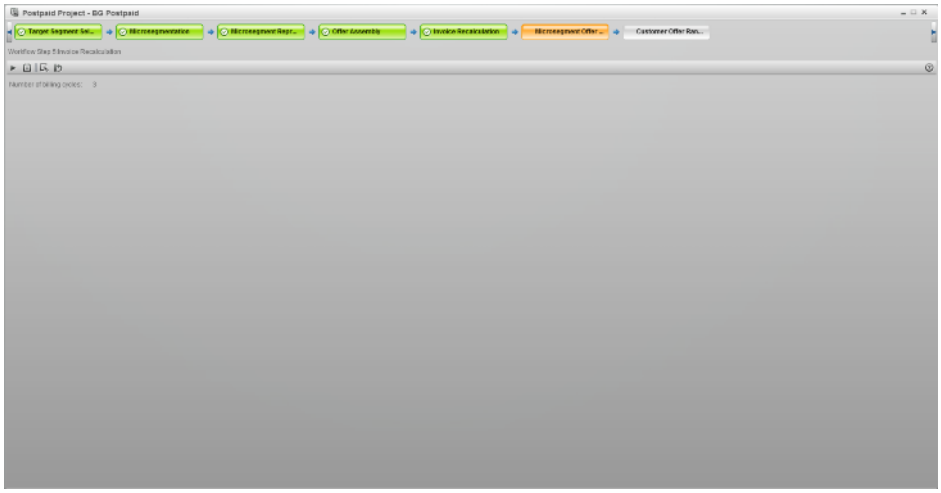


2. On the toolbar, select . The Invoice Recalculation configuration details are displayed.

Display 12.11 *Invoice Recalculation: Edit Details*



3. In the **Number of billing cycles** field, enter or select the number of billing cycles for which you want to extract the billing data.
4. Click **Save**.
5. (Optional) Click **Run**. The Invoice Recalculation details that you have configured are displayed.



TIP Alternatively, on the toolbar, select ▶.

Chapter 13

Offer Ranking

Generating Best Offers in Ranked Order

Overview

From the offers that are assembled for a representative customer, the offer ranking workflow steps produce best offers in ranked order.

The offer ranking workflow steps are available at two levels.

Microsegment level
: In this type of offer ranking, best offers are produced in ranked order for each representative customer of a microsegment.

Customer level

Default customer-level offer ranking

In this type of offer ranking, best offers are produced in ranked order for each customer of a microsegment. Best offers are produced for a customer based on the best offers that are derived for the corresponding representative customer. Therefore, best offers are produced at customer level, depending on how you configure the microsegment representation workflow step. For details, see *Chapter 11 Microsegment Representation*.

Table 13.1 *Rules for Producing Best Offers at Customer Level*

Microsegment Representation Configuration		
Sampling Method	**Eligibility Criterion**	**Best Offers**
Centroid	No	The best offers that are produced for the representative customer of the microsegment are assigned to all customers with that microsegment.
Centroid	Yes	The best offers that are produced for each representative customer of an eligibility band are assigned to all customers with that eligibility band.
Spread-based	No	The best offers that are produced for the representative customer of a spread band are assigned to all customers with that spread.
Spread-based	Yes	The best offers that are produced for the representative customer of the combination of a spread band and an eligibility band. These best offers are then assigned to all customers with that combination of the spread band and the eligibility band.

Customer-level offer ranking based on invoices

In this method, the best offers that are produced at microsegment-level offer ranking can be ranked again for each customer of the microsegment. The ranks are generated based on the ranking setup that you configure in the Customer Offer Ranking window. In addition, invoices are recalculated for each combination of the customer and the best offer that is derived for the corresponding representative customer. Based on the invoice information and the ranking variables that you have set up, the best offers are ranked again for each customer of the target segment.

In this method, the best offers are ranked again based on the actual invoice information. Therefore, the ranks that are derived by using this method can be more accurate.

Ranking Setup

The best offers are derived based on the ranking setup that you configure. The ranking setup includes selection of certain predefined ranking variables such as bill differentials and revenue. The offer ranking workflow steps produce best offers based on the variables that you select. You can also specify the number of best offers that you want to derive for a customer.

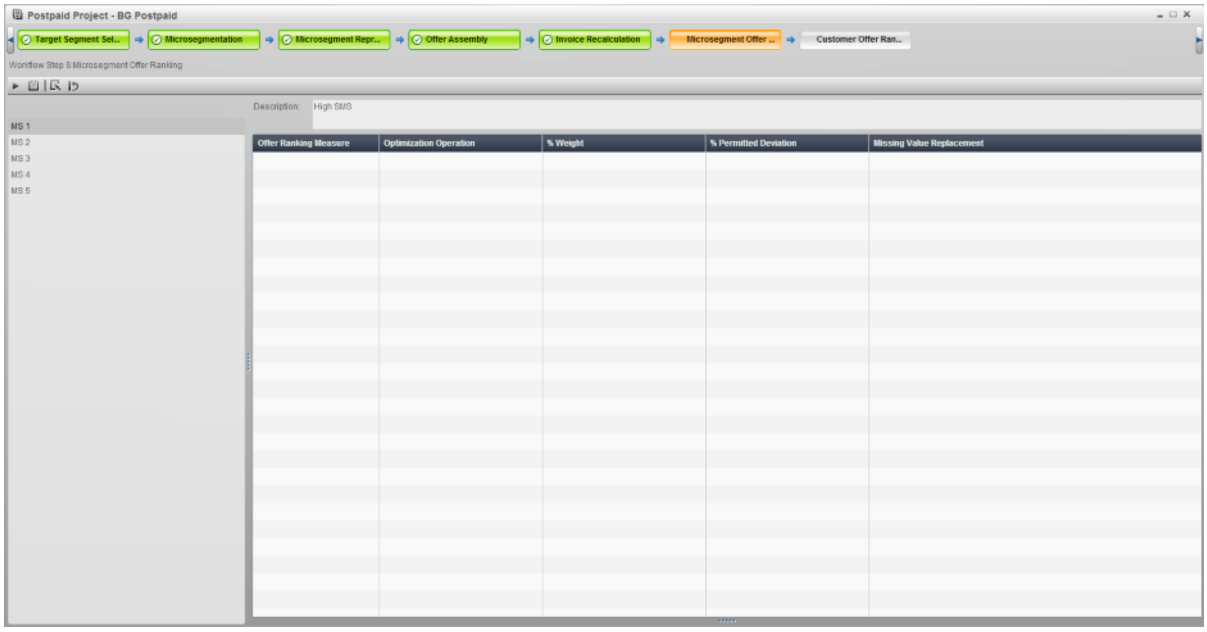
Configure Offer Ranking Setup at Microsegment Level

Offer ranking at microsegment level involves producing best offers for representative customers of all microsegments. The number of best offers that you want to produce for a representative customer is fixed across microsegments. However, you can configure the ranking variables for each microsegment.

To configure offer ranking setup at microsegment level:

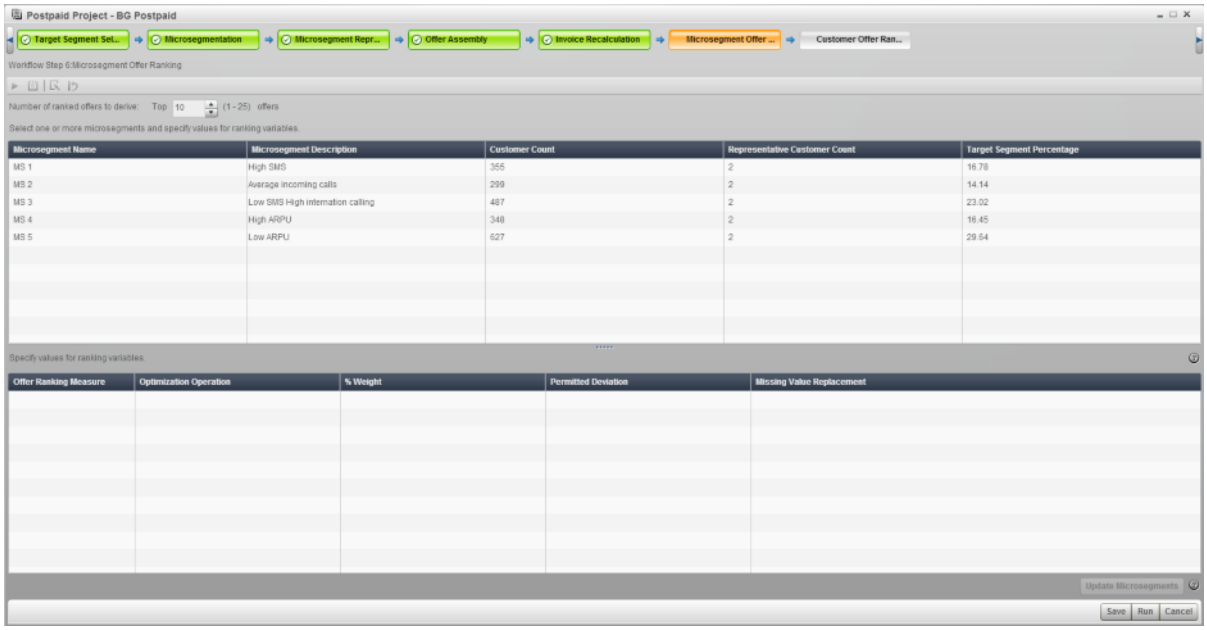
1. In the workflow diagram pane, select **Microsegment Offer Ranking**. The Microsegment Offer Ranking details are displayed.

Display 13.1 *Microsegment Offer Ranking: View Details*



2. On the toolbar, select . The Microsegment Offer Ranking configuration details are displayed.

Display 13.2 *Microsegment Offer Ranking: Edit Details*



3. In the **Number of ranked offers to produce** field, enter or select the number of best offers that you want to produce for each representative customer. The value that you select here is applicable to all microsegments in the target segment.

4. View the details of the microsegments.

   Microsegment Name
   displays the name of the microsegment.

   Microsegment Description
   displays a business-specific description of the microsegment.

   Customer Count
   displays the number of customers in the microsegment.

   Representative Customer Count
   displays the number of representative customers that is derived for the microsegment.

   Target Segment Percentage
   indicates the percentage of population that the microsegment forms in the target segment.

5. Select one or more microsegments from the list for which you want to configure the ranking variables.

   Note: You must configure the ranking variables for all microsegments. Otherwise, you cannot save the offer ranking setup.

6. Select the ranking variable (**Offer Ranking Measure**) that you want to consider for ranking the best offers and specify value for each column.

   Optimization Operation
   The value in this column determines whether you want to increase or decrease the value for this variable. For example, you can choose to maximize the bill differential and minimize the total SMS charges.

   Percentage Weight
   The value in this column specifies the significance of this variable in the ranking process. The higher the percentage value, the greater would be the significance of

this variable. The total of this column for the variables that you have selected should add to 100.

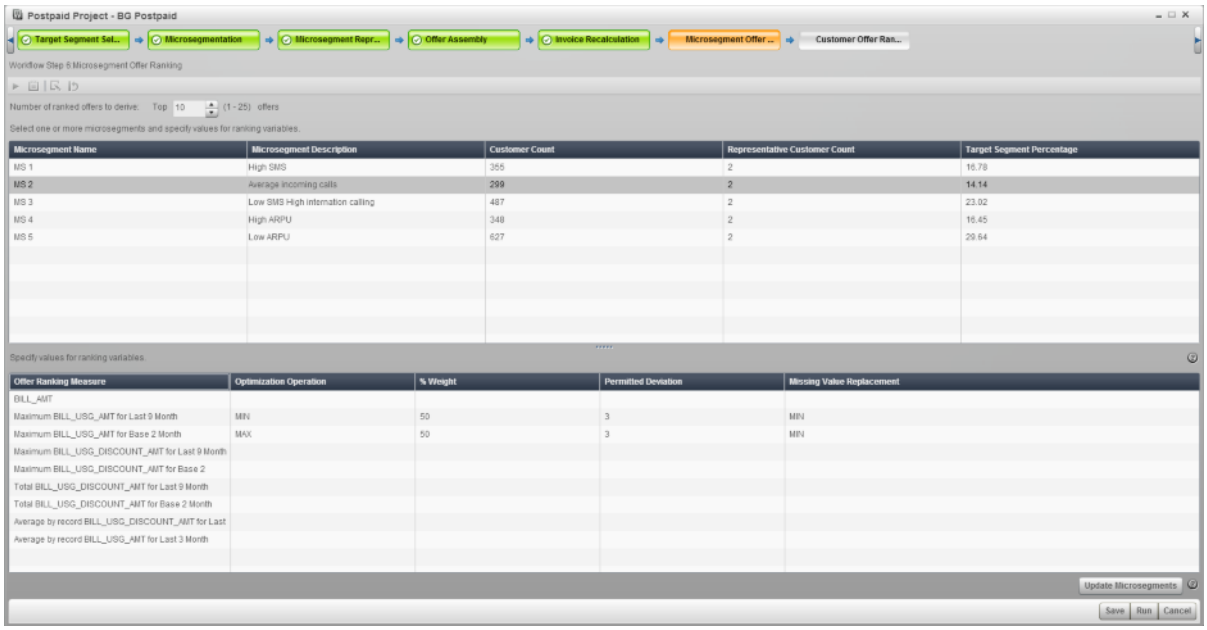
Permitted Deviation

The value in this column determines the lower and upper limits for indicating the significance of the variable. For example, you specify the percentage weight as 30 and permitted deviation as 5. This setup indicates that the significance of the variable can be in the range of 25 to 35.

Missing Value Replacement

The value in this column determines how missing values will be handled for this variable. You can select the respective option to replace the missing value with the maximum value, the minimum value, or the average value.

Display 13.3 *Microsegment Offer Ranking Parameters*



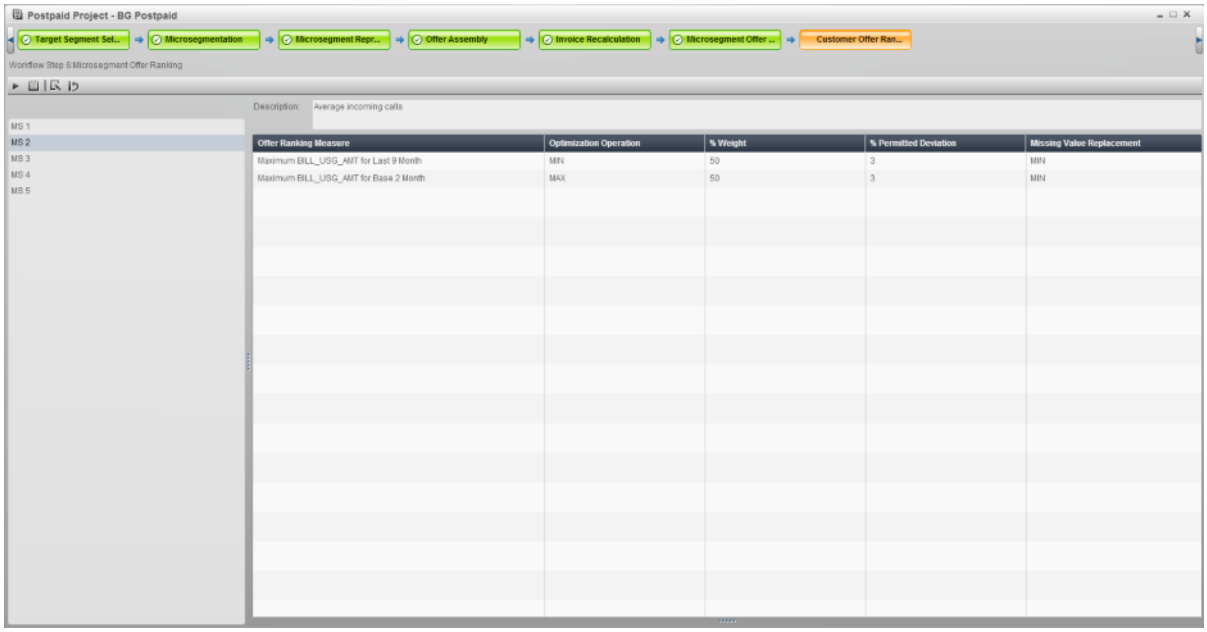
Note: The ranking procedure derives the best offers depending on how you configure the ranking variables. Therefore, make sure that you configure the correct set of variables.

7. Click **Update Microsegments** to assign the setup of the ranking variables to the selected microsegments.

   TIP Repeat steps from 2 to 7 to define ranking variables for other microsegments.

8. Click **Save**. The ranking variables that you configure for each microsegment are displayed in the **Microsegment Offer Ranking** pane.

Display 13.4 *Microsegment Offer Ranking: Summary*



Derive Best Offers in Ranked Order at Microsegment Level

After you configure the setup for ranking the best offers at the microsegment level, run the process that produces the best offers for representative customers of each microsegment.

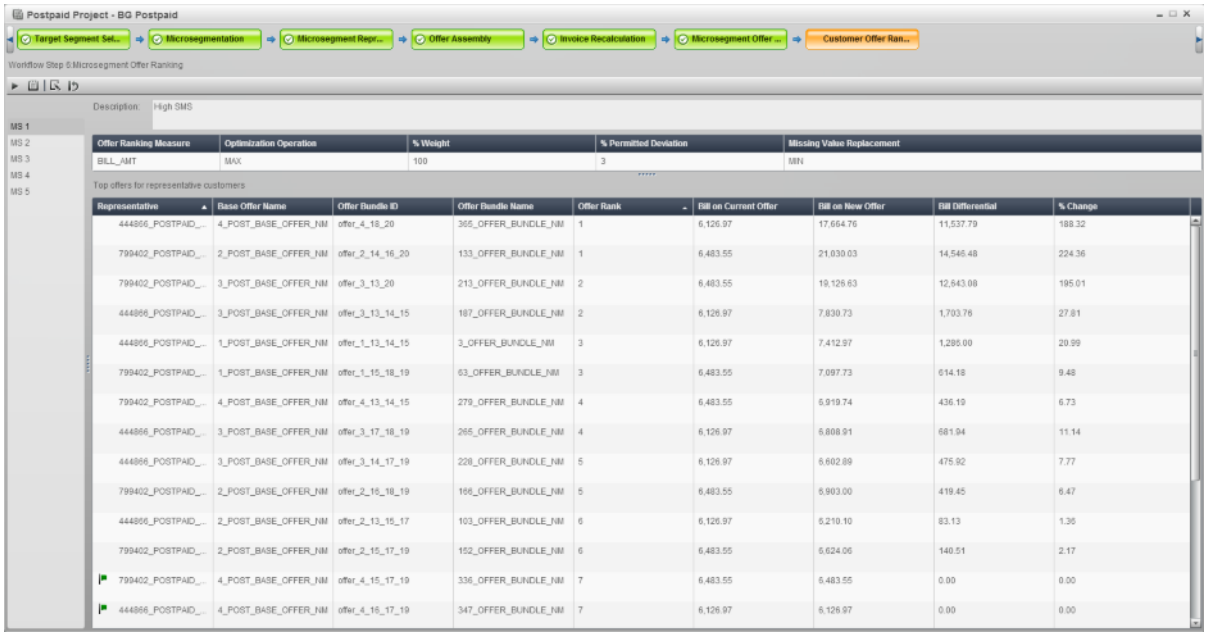
To derive best offers for representative customers of each microsegment:

1. In the workflow diagram pane, select **Microsegment Offer Ranking**.
2. On the toolbar, select ▶.

   After the processing is complete, the best offers that are derived for each representative customer of the microsegment are displayed. For each best offer, information such as the details of the base offer and the offer bundle to which the best offer belongs is displayed. Also, you can compare the billing amount that is generated for the best offer with that of the current offer and also analyze the percentage change in both the amounts.

   TIP If the customer's current offer is derived as one of the best offers, then that offer is marked with the icon beside it.

Display 13.5 *Microsegment Offer Ranking*



After the processing is complete, you can also view the Offer Ranking Variable Summary report in the **Reports** workspace. For details, see "Microsegment Offer Ranking Report" on page 120.

Configuring the Offer Ranking Setup at Customer Level

Overview

The **Customer Offer Ranking** workflow step produces best offers for all customers of each microsegment. In order to produce best offers for each customer of a microsegment, you can use the ranking setup that you have configured at the microsegment level. Alternatively, you can change the ranking setup that you configured at customer level, and then derive the best offers.

Rank Best Offers for a Customer Using the Default Setup

The ranking setup that you have configured at the microsegment level is by default available to you when you rank best offers at customer level. If you want to use the same setup, run the process for computing the ranked offers. To do so, on the **Workflow** tab, select **Customer Offer Ranking**. On the toolbar, select ▶.

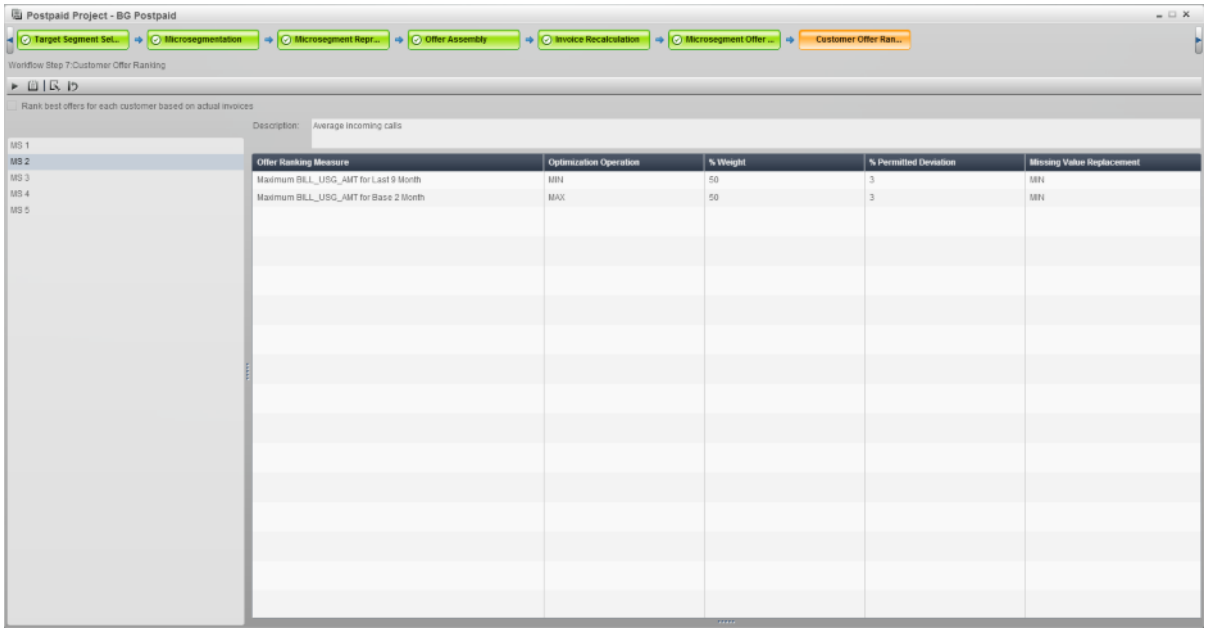
Change the Ranking Setup at Customer Level

When you produce best offers at customer level, you can change the number of best offers that you want to produce for each customer.

To configure the ranking setup at customer level:

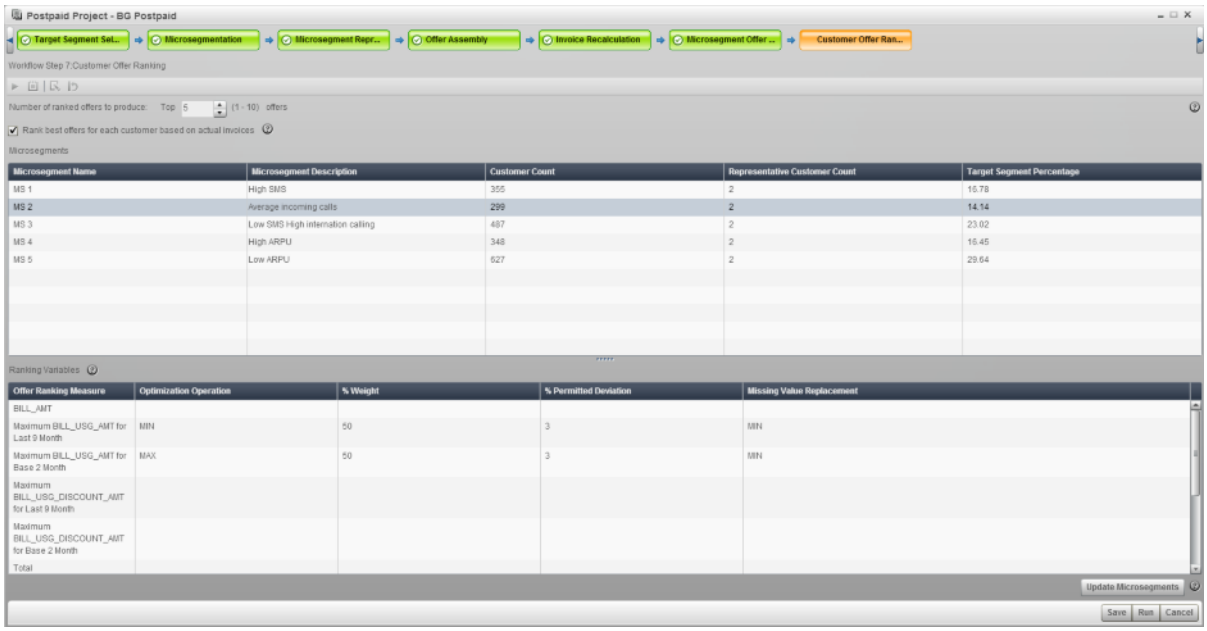
1. In the workflow diagram pane, select **Customer Offer Ranking**. The Customer Offer Ranking details are displayed.

Display 13.6 *Customer Offer Ranking: View Details*



2. On the toolbar, select . The Customer Offer Ranking configuration details are displayed.

Display 13.7 *Customer Offer Ranking: Edit Details*



3. In the **Number of ranked offers to produce** field, enter or select the number of best offers that you want to compute for each customer of a microsegment. The same number of best offers is produced for all customers across all microsegments.

   Note: The number of best offers cannot exceed the number of best offers that you have set up at microsegment level.

4. (Optional) Select the **Rank best offers for each customer based on actual invoices** check box. This option enables you to produce best offers for postpaid customers based on the information about their actual invoices. In addition, you can change the ranking setup that you had configured at microsegment-level offer ranking.

To change the offer ranking setup:

a. From the Microsegments list, select one or more microsegments for which you want to change the ranking variables.

Note: You must configure the ranking variables for all microsegments. Otherwise, you cannot save the offer ranking setup.

b. Select the ranking variable (**Offer Ranking Measure**) that you want to consider for ranking the best offers and specify a value for each column.

Optimization Operation
The value in this column determines whether you want to increase or decrease the value for this variable. For example, you can choose to maximize the bill differential and minimize the total SMS charges.

Percentage Weight
The value in this column specifies the significance of this variable in the ranking process. The higher the percentage value, the greater would be the significance of this variable. The total of this column for the variables that you have selected should add to 100.

Permitted Deviation
The value in this column determines the lower and upper limits for indicating the significance of the variable. For example, you specify the percentage weight as 30 and permitted deviation as 5. This setup indicates that the significance of the variable can be in the range of 25 to 35.

Missing Value Replacement
The value in this column determines how missing values will be handled for this variable. You can select the respective option to replace the missing value with the maximum value, the minimum value, or the average value.

Note: The ranking procedure derives the best offers depending on how you configure the ranking variables. Therefore, make sure that you configure the correct set of variables.

c. Click **Update Microsegments** to assign the setup of the ranking variables to the selected microsegments.

TIP Repeat steps from 5a to 5c to define ranking variables for other microsegments.

5. Click **Save**. The ranking variables that you have configured for each microsegment are displayed.

6. (Optional) If you want to produce the ranked offers, click **Run**. After this workflow step runs successfully, the project completes one run in the design mode.

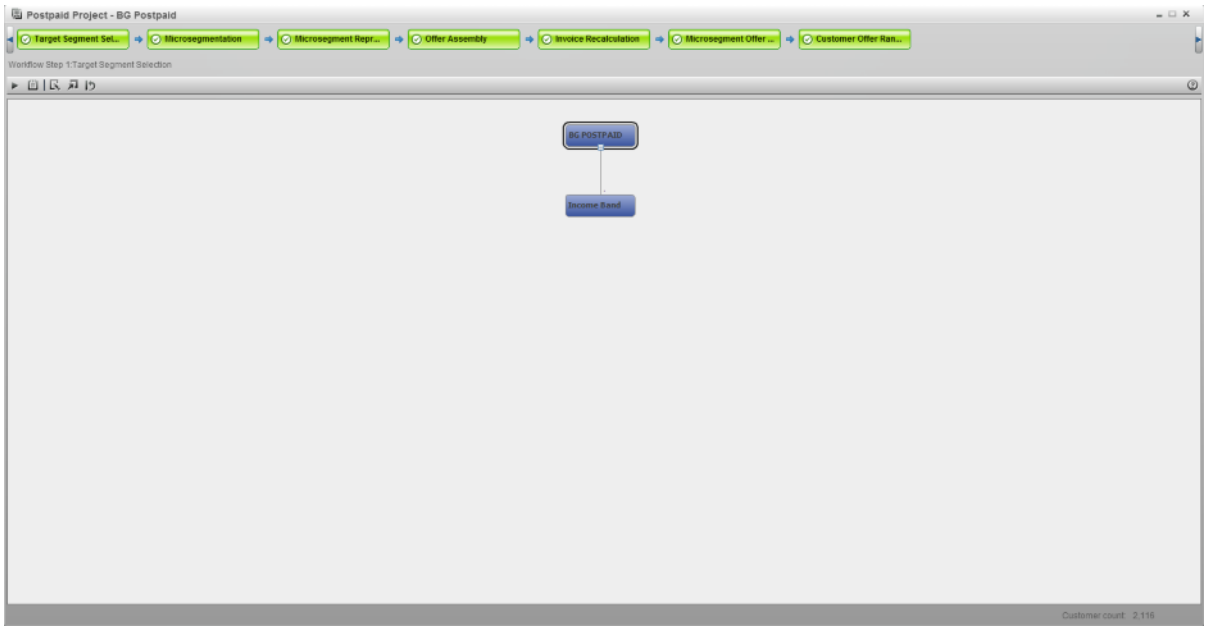
Derive Best Offers in Ranked Order for a Customer

Whether you use the default setup or configure the setup for ranking best offers at customer level, you have to run the process that produces best offers at customer level. In other words, best offers of each customer of the target segment are produced.

To produce best offers at customer level:

1. In the workflow diagram pane, select **Customer Offer Ranking**.
2. On the toolbar, select ▶ .After this workflow step runs successfully, the project completes one run in the design mode.

Display 13.8 *Customer Offer Ranking*



Microsegment Offer Ranking Report

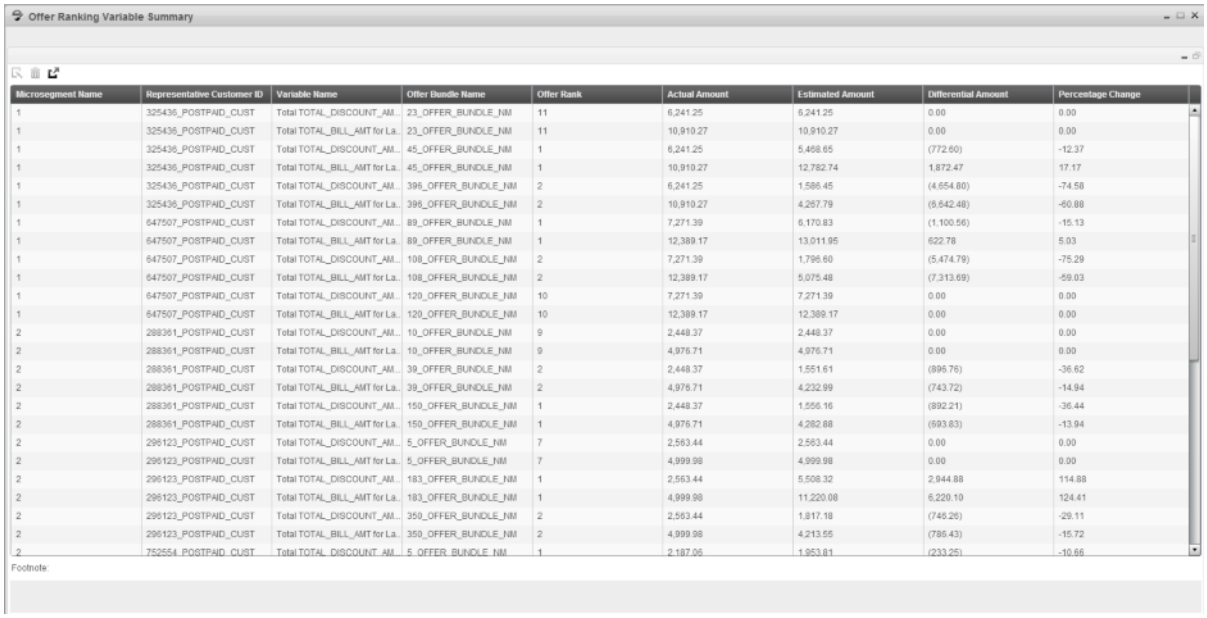
After you run the **Microsegment Offer Ranking** workflow step, the Offer Ranking Variable Summary report is generated on the Reports workspace. This report is also generated on the **Design Reports** or **Batch Reports** pane when you run this workflow step in design or batch mode.

The Offer Ranking Variable Summary report gives the values of the ranking measures that you configure when you define the ranking setup at microsegment level. For each ranking measure, comparative values are generated for the current and the recommended best offer. For example, you configure the TOTAL BILL AMOUNT as the ranking measure. The Offer Ranking Variable summary gives the following information for each representative customer of a microsegment:

- current amount based on the current offer

- calculated amount based on the recommended best offer
- difference amount
- percentage change

Display 13.9 *Offer Ranking Variable Summary Report*



Offer Ranking Variable Summary

Microsegment Name	Representative Customer ID	Variable Name	Offer Bundle Name	Offer Rank	Actual Amount	Estimated Amount	Differential Amount	Percentage Change
1	325436_POSTPAID_CUST	Total TOTAL_DISCOUNT_AM...	23_OFFER_BUNDLE_NM	11	6,241.25	6,241.25	0.00	0.00
1	325436_POSTPAID_CUST	Total TOTAL_BILL_AMT for La...	23_OFFER_BUNDLE_NM	11	10,910.27	10,910.27	0.00	0.00
1	325436_POSTPAID_CUST	Total TOTAL_DISCOUNT_AM...	45_OFFER_BUNDLE_NM	1	6,241.25	5,468.65	(772.60)	-12.37
1	325436_POSTPAID_CUST	Total TOTAL_BILL_AMT for La...	45_OFFER_BUNDLE_NM	1	10,910.27	12,782.74	1,872.47	17.17
1	325436_POSTPAID_CUST	Total TOTAL_DISCOUNT_AM...	396_OFFER_BUNDLE_NM	2	6,241.25	1,586.45	(4,654.80)	-74.58
1	325436_POSTPAID_CUST	Total TOTAL_BILL_AMT for La...	396_OFFER_BUNDLE_NM	2	10,910.27	4,267.79	(6,642.48)	-60.88
1	647507_POSTPAID_CUST	Total TOTAL_DISCOUNT_AM...	89_OFFER_BUNDLE_NM	1	7,271.39	6,170.83	(1,100.56)	-15.13
1	647507_POSTPAID_CUST	Total TOTAL_BILL_AMT for La...	89_OFFER_BUNDLE_NM	1	12,389.17	13,011.95	622.78	5.03
1	647507_POSTPAID_CUST	Total TOTAL_DISCOUNT_AM...	108_OFFER_BUNDLE_NM	2	7,271.39	1,796.60	(5,474.79)	-75.29
1	647507_POSTPAID_CUST	Total TOTAL_BILL_AMT for La...	108_OFFER_BUNDLE_NM	2	12,389.17	5,075.48	(7,313.69)	-59.03
1	647507_POSTPAID_CUST	Total TOTAL_DISCOUNT_AM...	120_OFFER_BUNDLE_NM	10	7,271.39	7,271.39	0.00	0.00
1	647507_POSTPAID_CUST	Total TOTAL_BILL_AMT for La...	120_OFFER_BUNDLE_NM	10	12,389.17	12,389.17	0.00	0.00
2	288361_POSTPAID_CUST	Total TOTAL_DISCOUNT_AM...	10_OFFER_BUNDLE_NM	9	2,448.37	2,448.37	0.00	0.00
2	288361_POSTPAID_CUST	Total TOTAL_BILL_AMT for La...	10_OFFER_BUNDLE_NM	9	4,976.71	4,976.71	0.00	0.00
2	288361_POSTPAID_CUST	Total TOTAL_DISCOUNT_AM...	39_OFFER_BUNDLE_NM	2	2,448.37	1,551.61	(896.76)	-36.62
2	288361_POSTPAID_CUST	Total TOTAL_BILL_AMT for La...	39_OFFER_BUNDLE_NM	2	4,976.71	4,232.99	(743.72)	-14.94
2	288361_POSTPAID_CUST	Total TOTAL_DISCOUNT_AM...	150_OFFER_BUNDLE_NM	1	2,448.37	1,556.16	(892.21)	-36.44
2	288361_POSTPAID_CUST	Total TOTAL_BILL_AMT for La...	150_OFFER_BUNDLE_NM	1	4,976.71	4,282.88	(693.83)	-13.94
2	296123_POSTPAID_CUST	Total TOTAL_DISCOUNT_AM...	5_OFFER_BUNDLE_NM	7	2,563.44	2,563.44	0.00	0.00
2	296123_POSTPAID_CUST	Total TOTAL_BILL_AMT for La...	5_OFFER_BUNDLE_NM	7	4,999.98	4,999.98	0.00	0.00
2	296123_POSTPAID_CUST	Total TOTAL_DISCOUNT_AM...	183_OFFER_BUNDLE_NM	1	2,563.44	5,508.32	2,944.88	114.88
2	296123_POSTPAID_CUST	Total TOTAL_BILL_AMT for La...	183_OFFER_BUNDLE_NM	1	4,999.98	11,220.08	6,220.10	124.41
2	296123_POSTPAID_CUST	Total TOTAL_DISCOUNT_AM...	350_OFFER_BUNDLE_NM	2	2,563.44	1,817.18	(746.26)	-29.11
2	296123_POSTPAID_CUST	Total TOTAL_BILL_AMT for La...	350_OFFER_BUNDLE_NM	2	4,999.98	4,213.55	(786.43)	-15.72
2	752554_POSTPAID_CUST	Total TOTAL_DISCOUNT_AM...	5_OFFER_BUNDLE_NM	1	2,187.06	1,953.81	(233.25)	-10.66

Footnote:

Revenue Impact Analysis Reports

Overview

The Revenue Impact Analysis reports are generated after you run the Customer Offer Ranking workflow step. These reports give the impact on the revenue of the communications service providers if the customers accept the best offers that are recommended to them.

The Revenue Impact Analysis reports are available at three levels.

- project
- microsegment
- representative customer

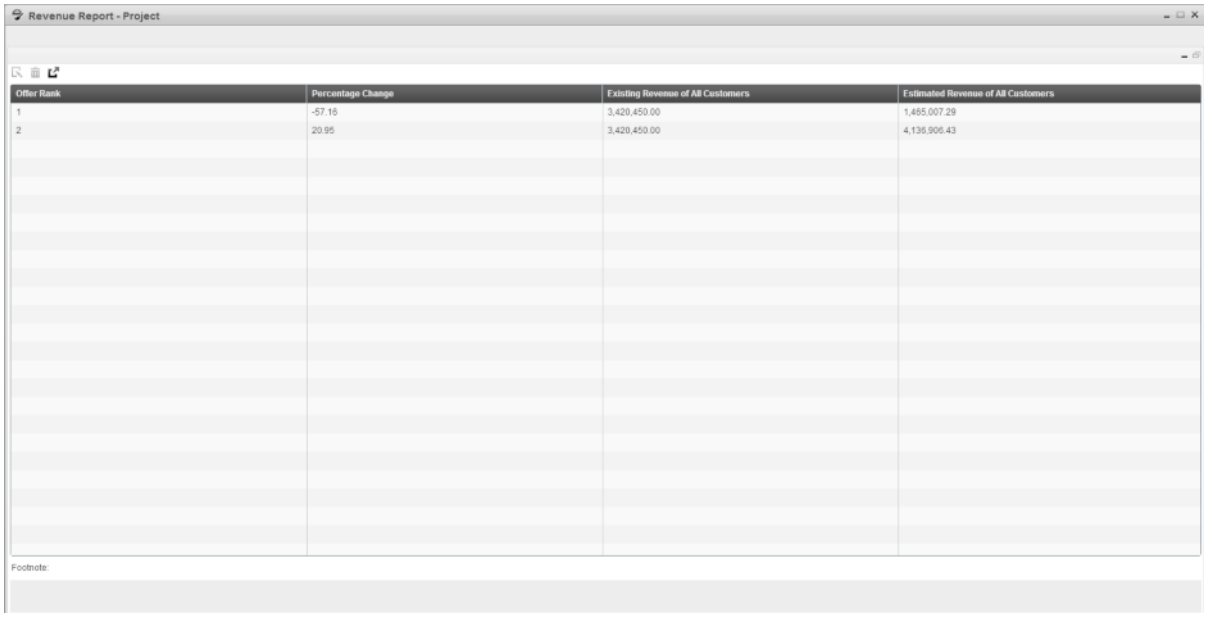
These reports are generated based on the ranking setup that you have configured for the offer ranking workflow steps. Each report gives information about the percentage change in revenue. This value is the difference between the revenue that is earned before customers accept the best offer and the revenue that is earned after customers accept the best offer.

Note: The Revenue Impact Analysis Reports are generated only for projects that you have defined for the postpaid payment mode.

Revenue Report — Project

The Revenue Report – Project report projects the percentage change in revenue for each ranked offer that is derived for all customers of the target segment. The report gives a comparative analysis of the impact on the revenue depending on the ranked offer that all customers of the target segment select.

Display 13.10 *Revenue Report at Project Level*



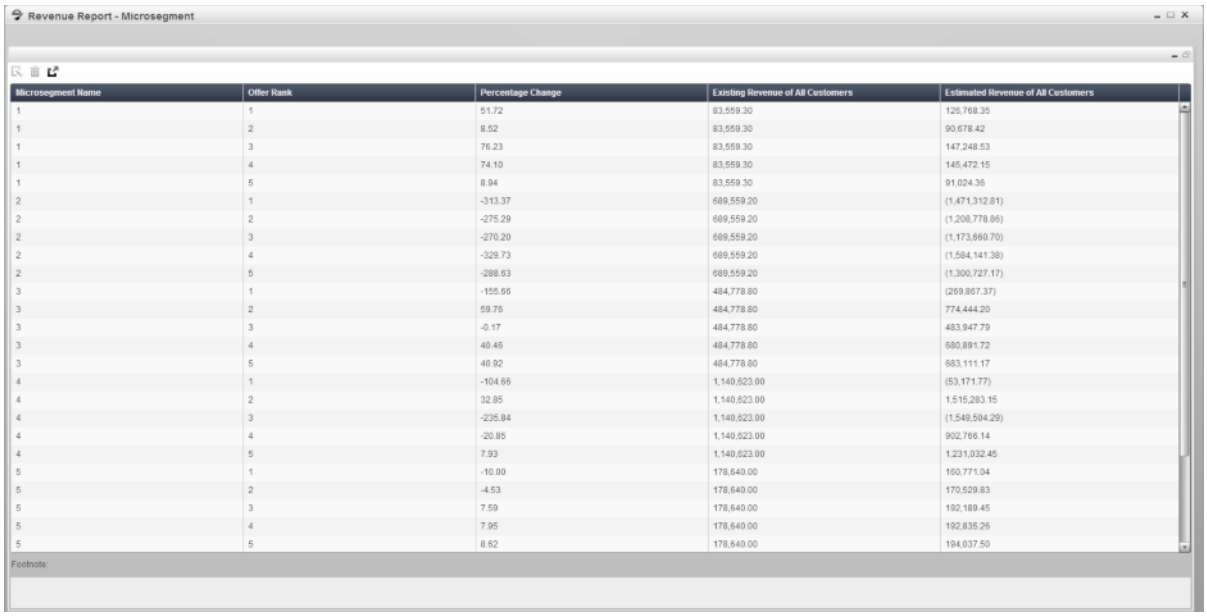
Example of report data

If all customers in the target segment select the best offer that is ranked third, then the percentage change in the revenue can be 12. However, if all the customers in the target segment select the best offer that is ranked first, then the percentage change in the revenue can be 25.

Revenue Report – Microsegment

The Revenue Report – Microsegment report projects the percentage change in revenue for each ranked offer of a microsegment. The report gives comparative analysis of the impact on the revenue depending on the ranked offer that all customers of the microsegment select.

Display 13.11 *Revenue Report at Microsegment Level*



Revenue Report - Microsegment

Microsegment Name	Offer Rank	Percentage Change	Existing Revenue of All Customers	Estimated Revenue of All Customers
1	1	51.72	83,559.30	126,768.35
1	2	8.52	83,559.30	90,678.42
1	3	76.23	83,559.30	147,248.53
1	4	74.10	83,559.30	145,472.15
1	5	8.94	83,559.30	91,024.36
2	1	-313.37	689,559.20	(1,471,312.81)
2	2	-275.29	689,559.20	(1,208,778.86)
2	3	-270.20	689,559.20	(1,173,660.70)
2	4	-329.73	689,559.20	(1,584,141.38)
2	5	-288.63	689,559.20	(1,300,727.17)
3	1	-155.66	484,778.80	(269,867.37)
3	2	59.76	484,778.80	774,444.20
3	3	-0.17	484,778.80	483,947.79
3	4	40.46	484,778.80	680,891.72
3	5	40.92	484,778.80	683,111.17
4	1	-104.66	1,140,523.00	(53,171.77)
4	2	32.85	1,140,523.00	1,515,283.15
4	3	-235.84	1,140,523.00	(1,549,504.29)
4	4	-20.95	1,140,523.00	902,766.14
4	5	7.93	1,140,523.00	1,231,032.45
5	1	-10.00	178,640.00	160,771.04
5	2	-4.53	178,640.00	170,529.83
5	3	7.59	178,640.00	192,189.45
5	4	7.95	178,640.00	192,835.26
5	5	8.62	178,640.00	194,037.50

Footnote:

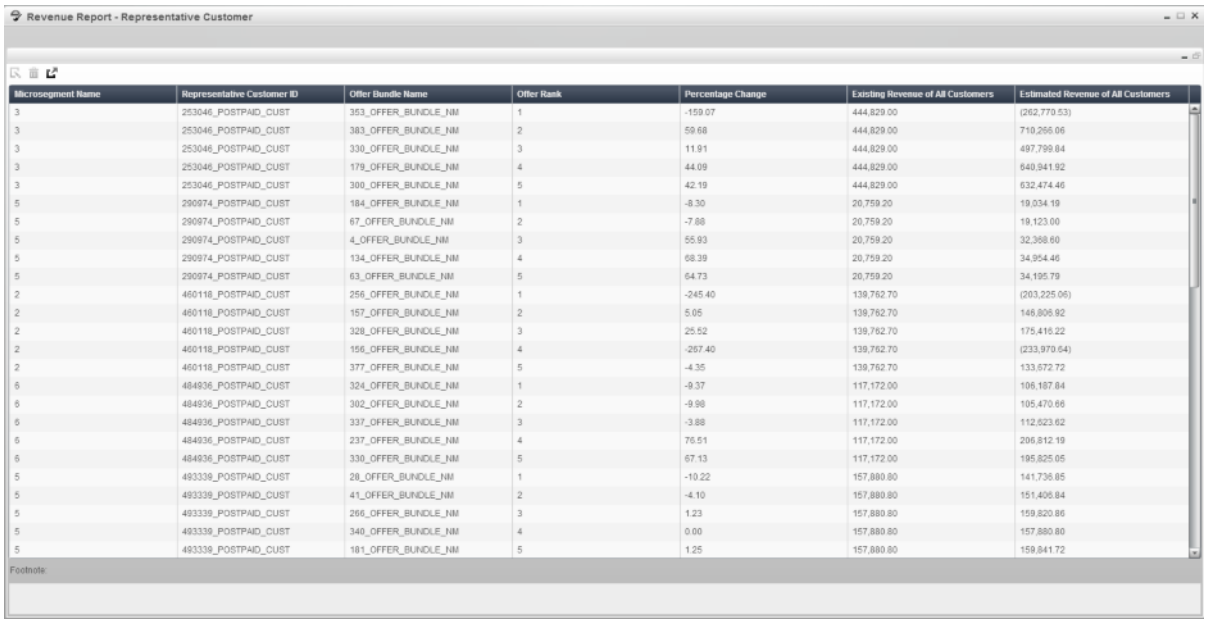
Example of report data

For the microsegment M41, if all customers of this microsegment select the best offer that is ranked second, then the percentage change in the revenue can be 22. However, if all the customers in the microsegment select the best offer that is ranked third, then the percentage change in the revenue can be 12.

Revenue Report — Representative Customer

In the Revenue Report – Representative Customer report, the impact of revenue is projected for each ranked offer that is recommended to a representative customer of a microsegment. The report gives comparative analysis of the impact on the revenue depending on the ranked offer that all customers that are related to the representative customer select.

Display 13.12 *Revenue Report at Representative Customer Level*



Revenue Report - Representative Customer

Microsegment Name	Representative Customer ID	Offer Bundle Name	Offer Rank	Percentage Change	Existing Revenue of All Customers	Estimated Revenue of All Customers
3	253046_POSTPAID_CUST	353_OFFER_BUNDLE_NM	1	-159.07	444,829.00	(262,770.53)
3	253046_POSTPAID_CUST	383_OFFER_BUNDLE_NM	2	59.68	444,829.00	710,266.06
3	253046_POSTPAID_CUST	330_OFFER_BUNDLE_NM	3	11.91	444,829.00	497,799.84
3	253046_POSTPAID_CUST	179_OFFER_BUNDLE_NM	4	44.09	444,829.00	640,941.92
3	253046_POSTPAID_CUST	300_OFFER_BUNDLE_NM	5	42.19	444,829.00	632,474.46
5	290974_POSTPAID_CUST	184_OFFER_BUNDLE_NM	1	-8.30	20,759.20	19,034.19
5	290974_POSTPAID_CUST	67_OFFER_BUNDLE_NM	2	-7.88	20,759.20	19,123.00
5	290974_POSTPAID_CUST	4_OFFER_BUNDLE_NM	3	55.93	20,759.20	32,368.60
5	290974_POSTPAID_CUST	134_OFFER_BUNDLE_NM	4	68.39	20,759.20	34,954.46
5	290974_POSTPAID_CUST	63_OFFER_BUNDLE_NM	5	64.73	20,759.20	34,195.79
2	460118_POSTPAID_CUST	256_OFFER_BUNDLE_NM	1	-245.40	139,762.70	(203,225.06)
2	460118_POSTPAID_CUST	157_OFFER_BUNDLE_NM	2	5.05	139,762.70	146,806.92
2	460118_POSTPAID_CUST	328_OFFER_BUNDLE_NM	3	25.52	139,762.70	175,416.22
2	460118_POSTPAID_CUST	156_OFFER_BUNDLE_NM	4	-267.40	139,762.70	(233,970.64)
2	460118_POSTPAID_CUST	377_OFFER_BUNDLE_NM	5	-4.35	139,762.70	133,672.72
6	484936_POSTPAID_CUST	324_OFFER_BUNDLE_NM	1	-9.37	117,172.00	106,187.84
6	484936_POSTPAID_CUST	302_OFFER_BUNDLE_NM	2	-9.98	117,172.00	105,470.66
6	484936_POSTPAID_CUST	337_OFFER_BUNDLE_NM	3	-3.88	117,172.00	112,623.62
6	484936_POSTPAID_CUST	237_OFFER_BUNDLE_NM	4	76.51	117,172.00	206,812.19
6	484936_POSTPAID_CUST	330_OFFER_BUNDLE_NM	5	67.13	117,172.00	195,825.05
5	493339_POSTPAID_CUST	28_OFFER_BUNDLE_NM	1	-10.22	157,880.80	141,736.85
5	493339_POSTPAID_CUST	41_OFFER_BUNDLE_NM	2	-4.10	157,880.80	151,406.84
5	493339_POSTPAID_CUST	266_OFFER_BUNDLE_NM	3	1.23	157,880.80	159,820.86
5	493339_POSTPAID_CUST	340_OFFER_BUNDLE_NM	4	0.00	157,880.80	157,880.80
5	493339_POSTPAID_CUST	181_OFFER_BUNDLE_NM	5	1.25	157,880.80	159,841.72

Footnote

Example of report data

Consider the 61_POSTPAID_CUST representative customer who belongs to the microsegment M1. If all customers that are related to the 61_POSTPAID_CUST representative customer select the best offer that is ranked fourth, then the percentage change in the revenue can be 11. However, if the customers select the best offer that is ranked fifth, then the percentage change in the revenue can be 10.

Precise Difference Reports

Overview

The Precise Difference reports are generated after you run the **Customer Offer Ranking** workflow step. These reports give a comparative analysis of impact on the revenue of the CSPs based on the two methods of ranking best offers for a customer. For details, see "Generating Best Offers in Ranked Order" on page 111.

The Precise Difference reports are available at two levels.

- project
- microsegment

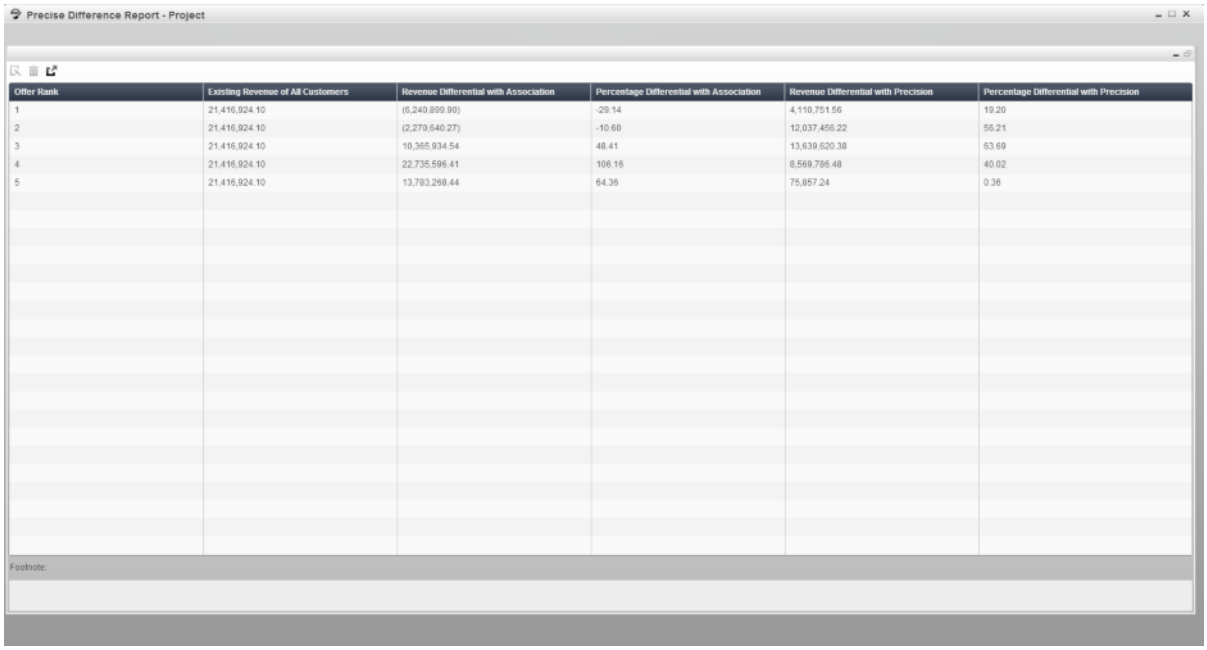
These reports are generated based on the ranking setup that you have configured for the offer ranking workflow steps. Each report gives a comparative analysis of percentage change in revenue for the two methods of ranking best offers. This percentage change is the difference between the revenue that is earned before customers accept the best offer and the revenue that is earned after customers accept the best offer.

Note: The Precise Difference Reports are generated only for projects that you have defined for the postpaid payment mode.

Precise Difference Report — Project

The Precise Difference Report – Project report indicates the percentage change in revenue for each ranked offer that is derived for customers in the target segment. The report gives further comparative values for revenue differential that is computed based on the two methods of deriving best offers for customers. The values in this report are aggregated at a project level.

Display 13.13 *Precise Different Report — Project Level*



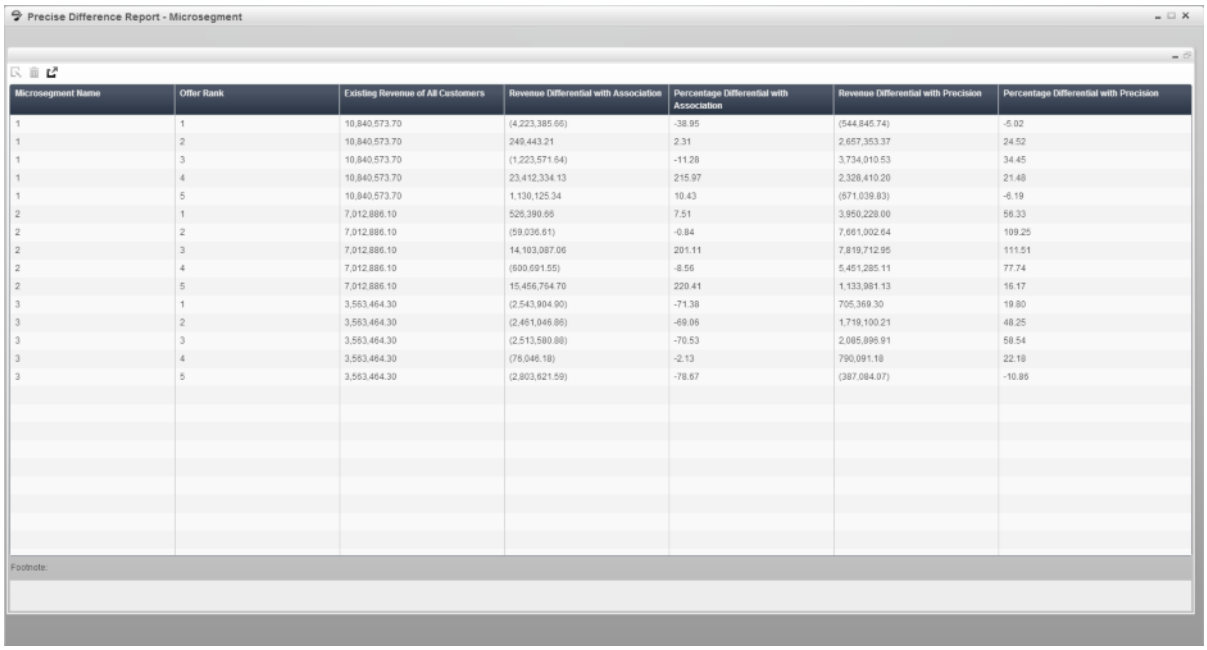
For example, you want to analyze the revenue impact for the project P1. Let us assume that three best offers are derived for the customers in the target segment of this project. The report gives a comparative analysis on the revenue impact for each best offer that is derived in ranked order by using the two methods.

- The Differential with Association columns give the revenue impact for the ranked offers that are derived based on the default method. In this method, best offers of representative customers are associated as the best offers of individual customers in the target segment.
- The Differential with Precision columns give the revenue impact for the ranked offers that are derived based on the actual invoices of the customers in the target segment. In this method of offer ranking, actual invoices of all customers are recalculated for the best offers that are produced for the corresponding representative customers. Based on this information, these best offers are ranked once again.

Precise Difference Report — Microsegment

The Precise Difference Report – Microsegment report projects the percentage change in revenue for each ranked offer that is derived for customers in the microsegment. The report gives further comparative values for revenue differential that is computed based on the two methods of deriving best offers for customers. The values in this report are aggregated at a microsegment level.

Display 13.14 *Precise Difference Report — Microsegment Level*



Precise Difference Report - Microsegment

Microsegment Name	Offer Rank	Existing Revenue of All Customers	Revenue Differential with Association	Percentage Differential with Association	Revenue Differential with Precision	Percentage Differential with Precision
1	1	10,840,573.70	(4,223,385.66)	-38.95	(544,845.74)	-5.02
1	2	10,840,573.70	249,443.21	2.31	2,657,353.37	24.52
1	3	10,840,573.70	(1,223,571.64)	-11.28	3,734,010.53	34.45
1	4	10,840,573.70	23,412,334.13	215.97	2,328,410.20	21.48
1	5	10,840,573.70	1,130,125.34	10.43	(671,039.83)	-6.19
2	1	7,012,886.10	526,390.66	7.51	3,950,228.00	56.33
2	2	7,012,886.10	(59,036.61)	-0.84	7,661,002.64	109.25
2	3	7,012,886.10	14,103,087.06	201.11	7,819,712.95	111.51
2	4	7,012,886.10	(600,691.55)	-8.56	5,451,285.11	77.74
2	5	7,012,886.10	15,456,764.70	220.41	1,133,981.13	16.17
3	1	3,563,464.30	(2,543,904.90)	-71.38	705,369.30	19.80
3	2	3,563,464.30	(2,461,046.86)	-69.06	1,719,100.21	48.25
3	3	3,563,464.30	(2,513,580.88)	-70.53	2,085,895.91	58.54
3	4	3,563,464.30	(76,046.18)	-2.13	790,091.18	22.18
3	5	3,563,464.30	(2,803,621.59)	-78.67	(387,084.07)	-10.86

Footnote:

For example, you want to analyze the revenue impact for the project P1, which has three microsegments, M1, M2, and M3. Let us assume that three best offers are derived for the customers in each microsegment. The Precise Difference Report – Microsegment report gives a comparative analysis on the revenue impact for each combination of a microsegment and the best offer. Further, the analysis is for the best offers that are derived by using the two methods.

- The Differential with Association columns give the revenue impact for the ranked offers that are derived based on the default method. In this method, best offers of representative customers are associated as the best offers of individual customers in the microsegment.
- The Differential with Precision columns give the revenue impact for the ranked offers that are derived based on the actual invoices of the customers in the microsegment. In this method of offer ranking, actual invoices of all customers are recalculated for the best offers that are produced for the corresponding representative customers. Based on this information, these best offers are ranked once again.

Chapter 14

Generating Workflow Reports

Overview of the Reports Workspace

Overview

In order to evaluate the results of a workflow step, SAS Offer Optimization for Communications offers certain predefined reports. In addition, you can also define multiple reports for various workflow steps of your project workflow. Based on these reports, you can also decide whether you should proceed with the next workflow step or configure the current workflow step again.

If you manage and organize your reports for each project in a structured manner, you can easily retrieve the required report. SAS Offer Optimization for Communications enables you to organize your reports by defining report categories and report groups. For each workflow step, report categories are predefined. You can define report groups for a combination of a workflow step and a report category. For example, for the Customer Representation workflow step, the following report categories can be predefined:

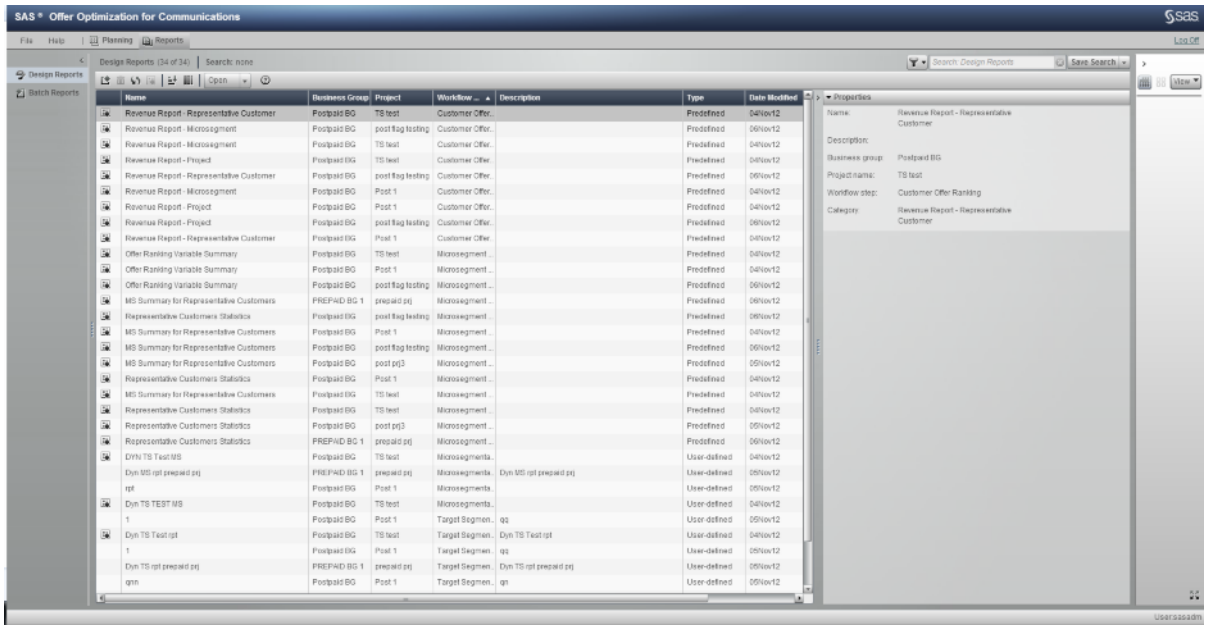
- Analysis reports
- Strategy reports

For the analysis reports category, you can further define a group named cohesiveness of microsegments. For the strategy reports category, you define a group named comparison of representative customers.

Design and Batch Reports

The category pane of the Reports workspace contains the following options:

Display 14.1 *Reports Workspace*



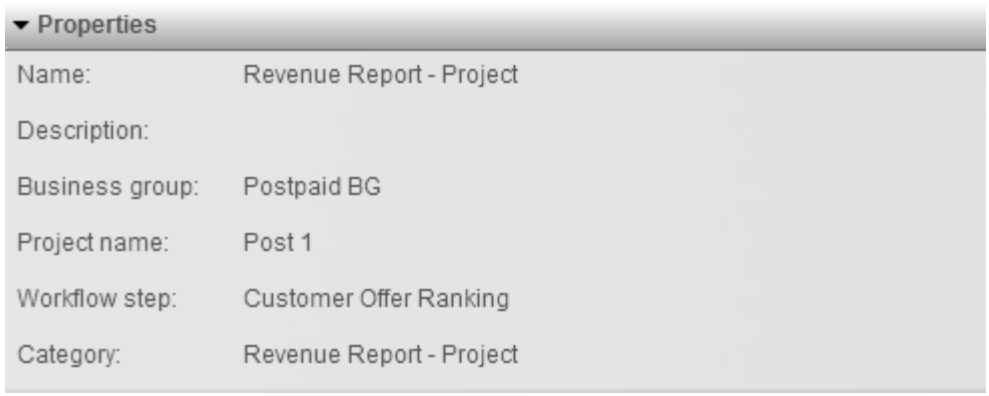
Design Reports
: contains predefined and user-defined reports that are generated in the design run of a project. These reports are generated each time you run the relevant workflow step in the design mode.

Batch Reports
: contains predefined and user-defined reports that belong to the report groups that you have pushed to batch mode. These reports are automatically produced, each time a workflow step is run in the batch mode.

Viewing the Properties of a Report Group

The Properties pane of the Reports workspace displays the details about each report group.

Display 14.2 *Properties Pane*



The following details are displayed:

Name
displays the name of the report group.

Description
displays the description of the report group.

Business group
displays the business group of the project for which the report group is defined.

Project name
displays the project for which the report group is defined.

Workflow step
displays the workflow step of the project for which the report group is defined.

Category
displays the predefined category for which the report group is defined.

Filtering Reports

In order to view only specific reports, you can use the filter option the toolbar. For example, you might want to view user-defined reports that are defined for the Target Segment Selection workflow step of the Postpaid — Customer Churn project. In this case you can select the following filters:

Table 14.1 *Filter Values*

Variable name	Filter Value
Report Type	User-defined
Projects	Postpaid — Customer Churn
Workflow Step	Target Segment Selection

Depending on the filter values that you have selected, the report groups are displayed in the list. You can open the report group and view the reports that are defined for it.

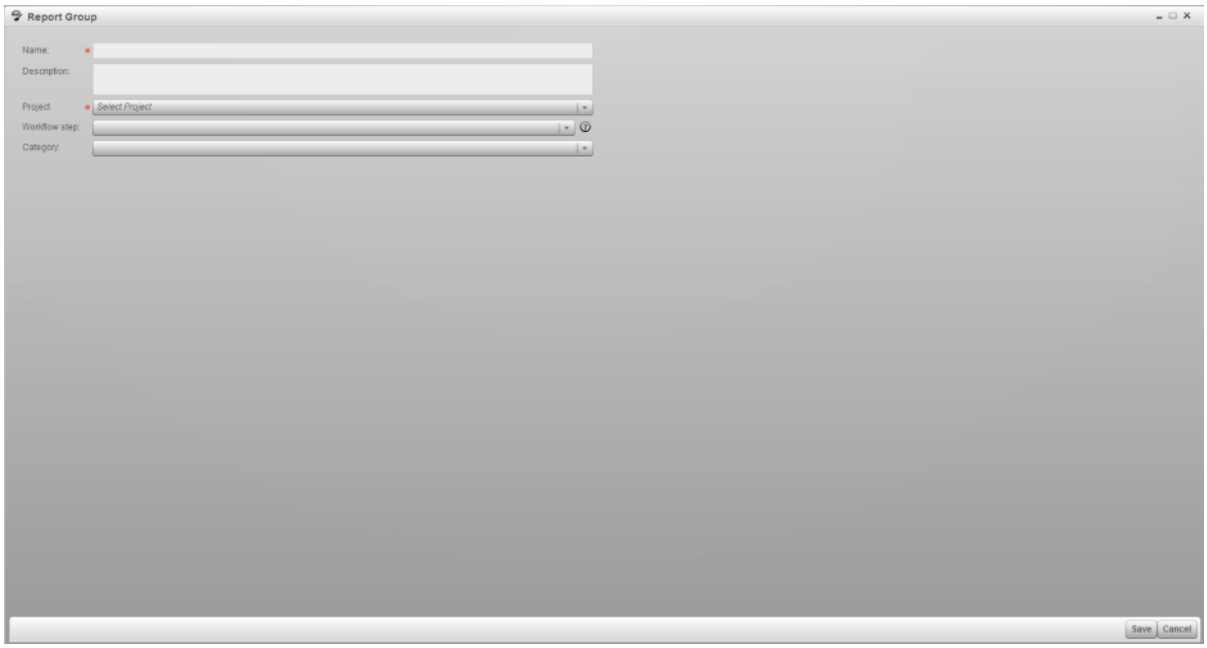
Create a Report Group

You can define multiple report groups for a combination of a project, a workflow step, and a report category. For each report group, you can further define various types of reports.

To create a report group:

1. In the **Reports** workspace, select **Design Reports**.
2. On the toolbar, select . The Report Group window appears.

Display 14.3 *Report Group Window*



3. In the **Name** field, enter the name of the report group. This name helps you to uniquely identify the report group in the **Design Reports** list.
4. In the **Description** field, enter a short description of the reports that will be categorized under this report group.
5. From the **Project** list, select the project for which you are defining the report group.
6. From the **Workflow step** list, select the workflow step for which you are defining the report group.
7. From the **Category** list, select the category for which you want to define the report group.
8. Click **Save**. The report group that you have defined appears in the **Design Reports** list.

Deleting Report Groups

You can delete a report group, if you have not pushed it to batch mode. When you delete a report group, all the reports that you have defined in it are also deleted.

To delete a report group:

1. In the category pane, select **Design Reports**.
2. Sort the Design Reports list in the appropriate order and select the report group that you want to delete.
3. On the toolbar, select  .
4. On the confirmation dialog box that appears, select **Yes**.

Generate Reports in Batch Mode

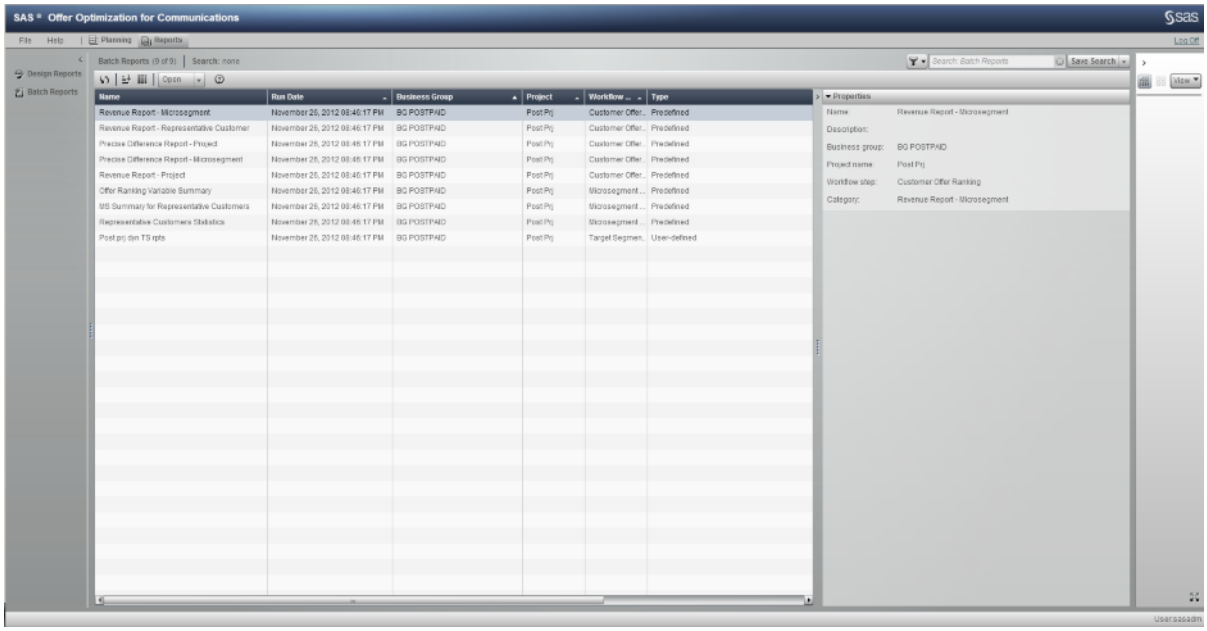
When you push a project to batch mode, you want to generate certain reports automatically when the workflow steps run. Based on these reports, you can analyze the results that are generated when you run the workflow steps on the actual population in the batch mode. Based on the results, you can decide whether you need to pull the project back into design mode to change its configuration. In order to do so, you have to push the report subcategory in batch mode.

After you choose to generate reports in batch mode, you cannot perform any of the following tasks:

- Add a report to the report group.
- Edit a report that belongs to the report group.
- Delete a report that belongs to the report group.

To generate reports in batch mode, from the **Design Reports** list, select the report group, and then on the toolbar select  . The report group that you select is added to the **Batch Reports** list.

Display 14.4 *Push Design Report to Batch Report*



You can view the report results in **Batch Reports** only if you have pushed the underlying project to batch mode.

Generating Workflow Reports

Overview of Report Types

For each report group, you can define multiple reports. You can represent the data in a report either graphically or in the form of a data table. SAS Offer Optimization for Communications enables you to represent data in the following two graphical formats:

- pie chart
- vertical bar chart

These reports show the information about various workflow steps for the current run of the project.

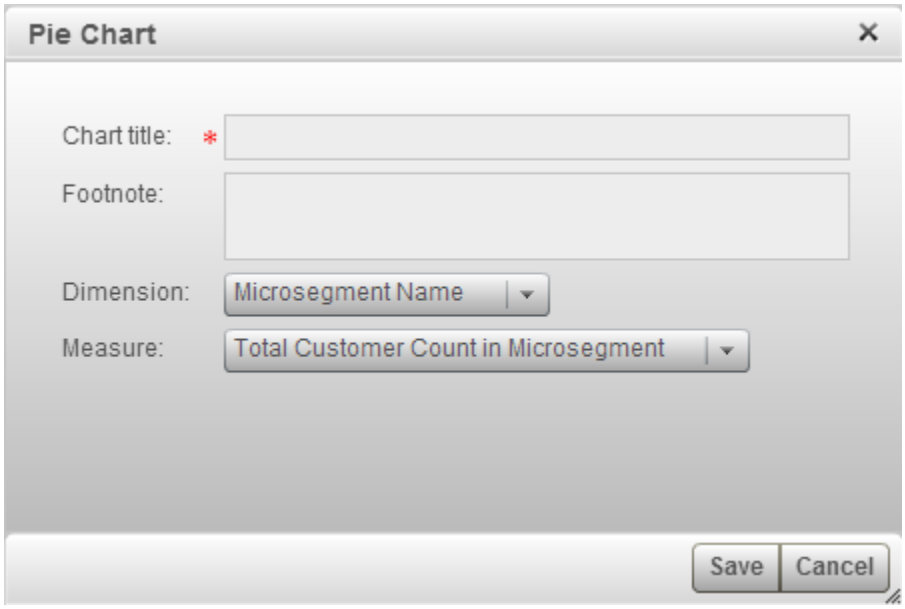
Create a Pie Chart

A pie chart displays your data in the form of a disc that is divided into slices by radial lines. Each slice represents the relative contribution of each part to the whole.

To define a pie chart:

1. In the **Report Groupss** list, double-click the report group for which you want to define a report. Alternatively, you can also select the report group, and then select **Open** on the toolbar. The toolbar displays the type of reports that you can define.
2. Select from the report type list. The Pie Chart window appears.

Display 14.5 *Pie Chart Window*



3. Enter the following details:

   Title
   Enter a title for the report. The title will be displayed at the top of the report.

   Footnote
   Enter notes that you want to appear at the bottom of the report. For example, you can enter information about the currency that is used for representing amounts.

   Dimension
   Select the categorical variable that will be represented using the pie chart. For example, variables such as Time, Geography, Offer Payment mode, and Customer type are dimensions.

   Measure
   Select the value variable that will be represented by each slice of the pie chart. For example, variables such as total usage charges, total voice call charges, and total message charges are measures.

4. Click **Save**.

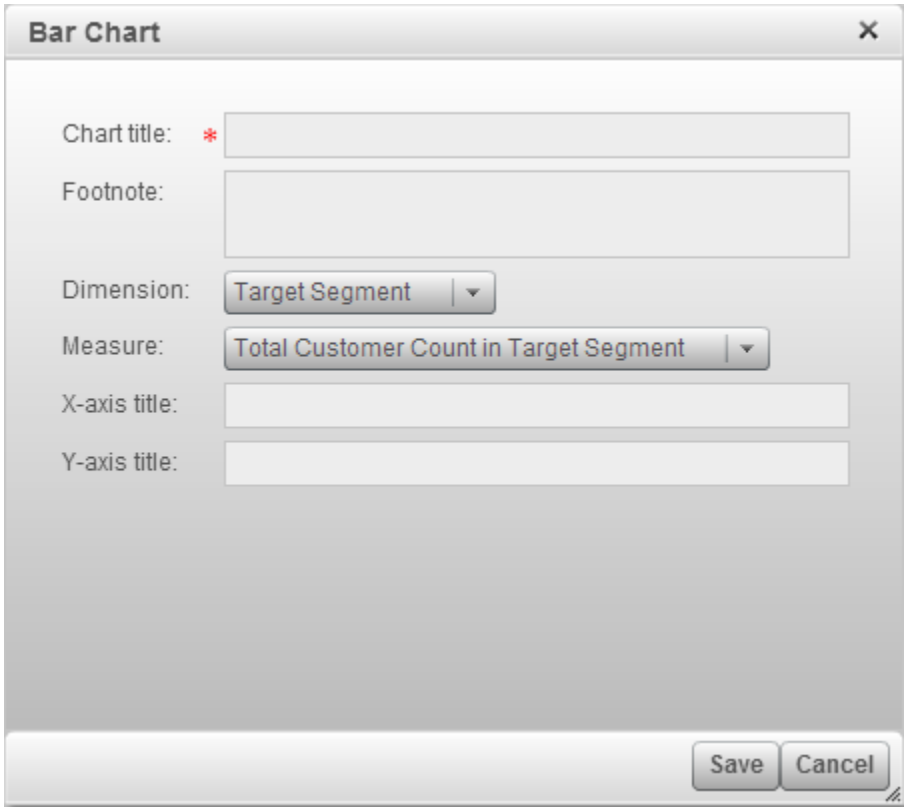
Create a Bar Chart

A bar chart represents data in the form of a grid and some vertical bars. Each column represents quantitative data.

To generate a bar chart:

1. In the **Report Groups** list, double-click the report group for which you want to define a report. Alternatively, you can also select the report group, and then select **Open** on the toolbar. The toolbar displays the type of reports that you can define.
2. Select  from the report type list. The Bar Chart window appears.

Display 14.6 *Bar Chart Window*



3. Enter the following details:

   Title
   Enter a title for the report. The title will be displayed at the top of the report.

   Footnote
   Enter notes that you want to appear at the bottom of the report. For example, you can enter information about the currency that is used for representing amounts.

   Dimension
   Select the variable that will be represented on the horizontal (X-axis) axis. Variables such as Time, Geography, and Customer type are examples of dimensions.

   Measure
   Select the variable that will be represented on the vertical (Y-axis) axis. This variable is the quantitative variable. Variables such as total usage charges, total voice call charges, and total number of churned customers are examples of measures.

   X— axis title
   Enter a title that you want to display for the category axis. This title will be displayed along the horizontal (X) axis.

   Y— axis title
   Enter a title that you want to display for the value axis. This title will be displayed along the vertical (Y) axis.

4. Click **Save**.

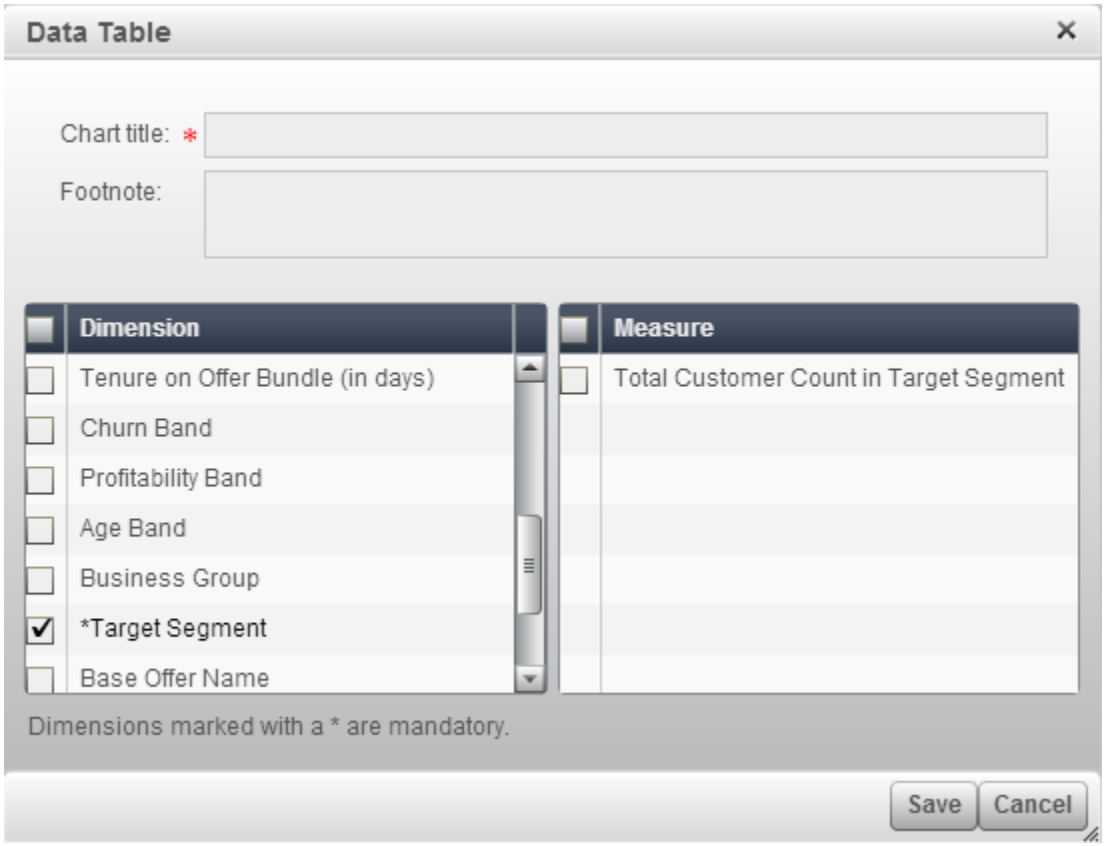
Create a Data Table

A data table displays data in the form of rows and columns.

To generate a data table:

1. In the **Report Groups** list double-click, select the report group for which you want to define a report. Alternatively, you can also select the report group, and then select **Open** on the toolbar. The toolbar displays the type of reports that you can define.
2. Select from the report type list. The Data Table window appears.

Display 14.7 *Data Table Window*



3. Enter the following details:

Title
Enter a title for the report. The title will be displayed at the top of the report.

Footnote
Enter notes that you want to appear at the bottom of the report. For example, you can enter information about the currency that is used for representing amount values.

Dimension
Select the category variables that are to be displayed in the data table. You have to select at least one mandatory variable from the list. Variables such as Time, Geography, and Customer type are examples of dimensions.

Note: When you select more than one dimension, information is displayed for each unique combination of the dimension values. For example, you select the microsegment name and the payment mode as the dimensions. If there are

two microsegments (MS1 and MS2), and two payment modes (Prepaid and Postpaid), then the data table will display information for each of the following combinations.

- MS1 Prepaid
- MS1 Postpaid
- MS2 Prepaid
- MS2 Prepaid

Measure

Select the value variables that are to be displayed in the data table. Variables such as total usage charges, total voice call charges, and total number of churned customers are examples of measures.

4. Click **Save**.

Managing Workflow Reports

Overview

You can edit, delete, or export a report. You can perform these tasks using the respective options that are available for each user-defined report.

Edit a Report

You cannot edit a report if you have pushed the report group to which this report belongs to batch mode.

To edit a report:

1. From the **Design Reports** list, double-click the report group to which the report belongs. Alternatively, select the report group, and then select **Open** on the toolbar.
2. Select the report that you want to edit.
3. On the toolbar, select  . The window for modifying the report attributes appears.
4. Make changes according to your requirements.
5. Click **Save**.

Delete a Report

You cannot delete a report if you have pushed the report group to which this report belongs to batch mode.

To delete a report:

1. From the **Design Reports** list, double-click the report group to which the report belongs. Alternatively, select the report group, and then select **Open** on the toolbar.
2. Select the report that you want to delete.
3. On the toolbar, select  .

Export a Report

You can export the report data to a comma-separated (.csv) file. This feature will enable you to import the report data into other applications such as Microsoft Excel and perform further analysis of the data.

To export a report:

1. From the **Design Reports** list, double-click the report group to which the report belongs. Alternatively, select the report group, and then on the toolbar, select **Open**.
2. Select the report whose data you want to export.
3. On the toolbar, select  .
4. Select the location in which you want to save the .csv file and enter a suitable filename.

Note: Similarly, you can also export data of reports that are available in the **Batch Reports** list.

Changing the Zoom Level for a Report

Reports that belong to a particular group are displayed in tiles. You can minimize, maximize, or reset the zoom level of the tiles.

For each report, the zoom levels are displayed as icons in the right corner of the tile.

Table 14.2 *Zoom Options for Reports*

Icon	Purpose
	minimizes the report tile.
	maximizes the report tile.
	resets the report tile to its original size.

Part 4

Appendixes

Appendix 1

Eligibility Combination Matrix

Overview

Eligibility criteria are the rules that you can enforce on customers for availing themselves of offers that exist in the product catalog. However, you can decide whether you want to configure the eligibility rules. Eligibility criteria are defined based on customer attributes.

Procedure for Defining Eligibility Criteria

The process of defining eligibility criteria includes the following steps:

1. Identify customer attributes that impact eligibility rules.
2. Capture unique values of each attribute.
3. Define a unique combination of attribute values.
4. Assign a unique ID for each combination. This combination is called an eligibility rule.
5. Associate each customer with an eligibility rule and assign the corresponding eligibility ID to a customer.
6. Consider only those customers who have an eligibility combination ID.

Example: Eligibility Combination Matrix

For defining eligibility criteria, you can consider the following customer attributes:

- region
- customer type
- education level

You can then list the possible values that each attribute can have. For example, the region attribute can have four values, namely, East, West, North, and South. The customer type can be individual, corporate, or SME (small and medium size enterprise).

Each unique combination of attribute values is assigned an eligibility ID, and an eligibility combination matrix can be defined.

Each customer is associated with an eligibility ID.

Impact of Eligibility Criteria on Business Groups

The eligibility matrix is defined before you create business groups. Therefore, depending on the selection criteria that are defined, a business group can contain customers with only specific eligibility IDs.

Impact of Eligibility Criteria on Microsegment Representation

You can consider eligibility criteria when you configure the microsegment representation workflow step. If eligibility criteria are considered, then a representative customer is drawn from each eligibility band of a microsegment.

Impact of Eligibility Criteria on Customer Offer Ranking

If eligibility criteria are considered in the microsegment representation workflow step, then it automatically applies to the customer offer ranking workflow step. While deriving offers for each customer of a microsegment, the best offers are produced for the representative customer of a certain eligibility band. These offers are then assigned to the other customers who belong to that eligibility band.

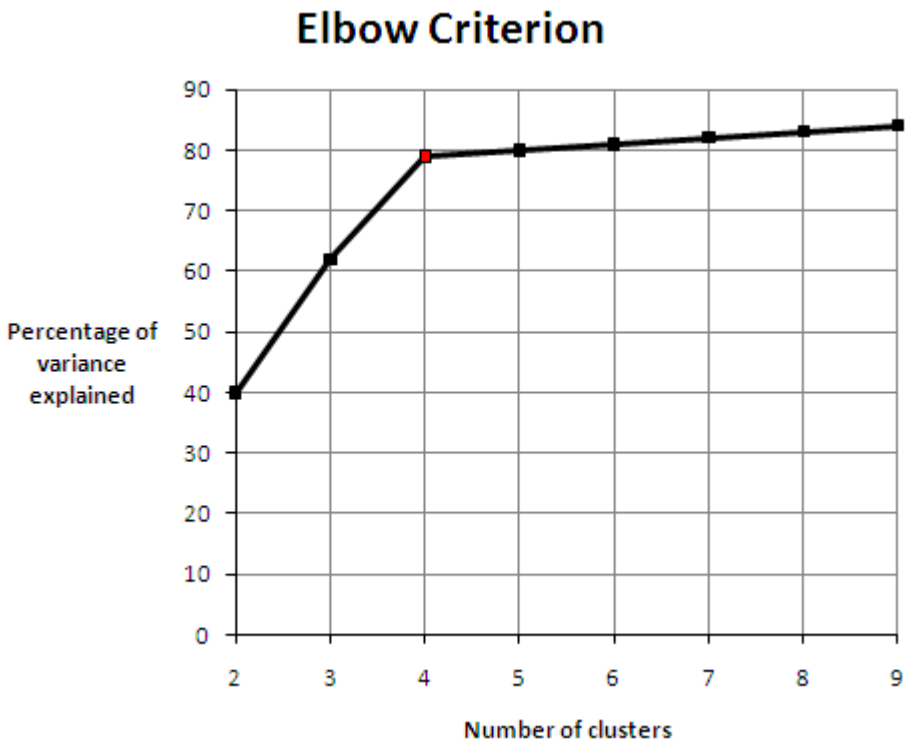
Appendix 2

Clustering Parameters

Elbow Criterion

The elbow criterion states that the number of clusters to be created should be such that adding another cluster does not provide any additional information. To understand this rule further, plot a graph of the percentage of variance that is explained by the clusters against the number of clusters. The graph indicates that the first few clusters add significant information. That is, these clusters explain a lot of variance. However, at a certain point, the marginal gain generated by adding new clusters will drop, producing an angle (an "elbow") on the graph. To establish this angle (point), you need to define some threshold on the marginal gain. In other words, you need to define the elbow criterion threshold.

Figure A2.1 *Elbow Criterion*



Convergence Criterion

The clustering procedure runs in iterations. After each iteration of the clustering procedure, the cluster centroids are updated. Iterations stop when the relative change in the cluster centroids is less than or equal to the convergence criterion. For complete convergence, it is recommended that you should enter the minimum value for this parameter. However, complete convergence also depends on the number of iterations of the clustering procedure. In order to achieve complete convergence, the number of iterations of the clustering procedure should be set to a large value.

Glossary

business group
a subset of the customer base that is derived as a result of high-level business segmentation based on relatively static business attributes such as offer segment (wireless, land-line), offer payment mode (prepaid, postpaid), customer type, and customer's geographical area.

business rule
a statement that defines or constrains some aspect of the business. Business rules describe the operations, definitions, and constraints that apply to an organization in achieving its goals.

category variable
a classification variable with a finite number of distinct (discrete) values. These variables are typically used to split data into subsets. For example, in a bar chart, each unique value is displayed as a bar on a DISCRETE axis. In another example, the variable payment mode can have two values, prepaid and postpaid. Customers can be classified based on this variable as prepaid customers and postpaid customers.

child level
the level of information added below the primary node of a hierarchical list.

child node
a node of a hierarchical list that originates from a single node at a previous level.

cluster
a subset of a target segment that is derived based on certain analytical algorithms in order to ensure homogeneity of usage and revenue patterns within the group.

clustering
a common technique for statistical data analysis. Clustering is the assignment of a set of observations into subsets (called clusters) so that observations in the same cluster are similar in some sense. For example, in the communications domain, customers with high usage and high churn scores can belong to the same cluster.

dimension
a data element that categorizes values in a data set into non-overlapping categories that can be used to group, filter, and label the data in meaningful ways. Hierarchies within a dimension typically represent different groupings of information that pertains to a single concept. For example, a Time dimension might consist of two hierarchies: (1) Year, Month, and Date, and (2) Year, Week, and Day.

eligibility rule
a mechanism that is used for assessing customers who are availing themselves of offers. These rules are applicable only for the offers that are available in the product catalog. Eligibility rules are defined based on customer-level attributes such as age, customer type, region, and educational level. Each such combination of unique attributes is assigned a unique ID.

hierarchical list
a user interface element that helps to select values by organizing variables into parent-child relationships, typically where a parent member represents the consolidation of its children. A hierarchical list progresses from top to bottom.

microsegment
a cluster that is associated with a business description.

parent node
a node of a hierarchical list from which one or more nodes originate.

primary node
the topmost single node of a hierarchical list.

profiling
the process of adding a business description for each cluster in the workflow diagram.

project
the named collection of activities and reports to implement a business strategy for addressing a business pain. For example, a project can be created for reducing churn of highly profitable customers in the North region.

ranking
the process of ordering observations according to values of particular variables.

representative customer
a customer that is derived from each microsegment such that the usage and revenue pattern of this customer represent the entire microsegment. The number of representative customers that is drawn from a microsegment depends on the underlying statistical method.

target segment
a subset of the business group that is derived based on certain variables such as demographics, tenure, and churn score.

workflow
a model for a sequence of activities, declared as work of a person, a group, an organization, or one or more mechanisms. Workflows are generally designed to enable a work process that can be documented and learned.

workflow diagram
a diagram that indicates the order in which activities of a project are to be performed.

workflow step
each individual activity of a project that is depicted in a workflow diagram.

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