Universal Routing 7.6

Routing Solutions Guide

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Preface

Welcome to *Universal Routing 7.6 Routing Solutions Guide*. This guide contains information on some of the types of routing solutions that can be implemented with Genesys Universal Routing. In brief, you will find information about: skilled based routing, business priority routing, cost-based routing, and share agent by service level agreement routing.

This guide is valid only for the 7.6.0 release(s) of this product.

Note: For versions of this document created for other releases of this product, please visit the Genesys Technical Support website, or request the Documentation Library CD, which you can order by e-mail from Genesys Order Management at `orderman@genesyslab.com`.

This preface provides an overview of this document, identifies the primary audience, introduces document conventions, and lists related reference information:

- Customer Interaction Management, page 7
- Intended Audience, page 8
- Chapter Summaries, page 9
- Document Conventions, page 9
- Related Resources, page 11
- Making Comments on This Document, page 13

Customer Interaction Management

Universal Routing enables you to design sophisticated strategies for handling both voice and non-voice interactions and for directing them to an appropriate target. Universal Routing also provides data required to report on interaction handling in your enterprise.

Universal Routing, which comprises Enterprise Routing and Network Routing, is one part of the Genesys Customer Interaction Management (CIM) Platform.

The CIM Platform consists of the following:

- Genesys Universal Routing

- Genesys Reporting (CC Analyzer, CCPulse+)
- Genesys Multimedia
- Genesys Management Framework

Each has its own documentation set.

Multimedia

Genesys Multimedia is the core of a series of components that work together to handle interactions from disparate media-based devices. It allows you to centralize your handling of the various channels that customers use to reach your contact center. The core functionality provided by Multimedia must operate with at least one of the following media channels:

- Genesys E-mail. This channel has an optional enhancement: Genesys Content Analyzer, which uses natural language technology to provide automated classification of incoming e-mail.
- Genesys Web Media (chat).
- Genesys Open Media, which allows you to add customized support for other media. For more information see the documents for the Genesys Developer Program 7.6, particularly those dealing with the Media Interaction SDK.

Note: Universal Routing 7.6 can work in a pure voice environment or with the Multimedia software components, which allow for the additional routing of non-voice interactions based on IRD-designed business processes.

Intended Audience

This guide is primarily intended for users involved in developing and setting up a routing solution, including administrators and strategy designers. This guide assumes that you have a basic understanding of:

- Computer-telephony integration concepts, processes, terminology, and applications.
- Network design and operation.
- Familiarity with your own network configurations.

You should also be familiar with Framework architecture and functions.

Chapter Summaries

In addition to this preface, this guide contains the following chapters and appendix:

- Chapter 1, “Overview,” on page 15, gives a brief introduction to the process of routing, overviews routing solutions and solution elements, and lists Universal Routing 7.6 functionality.
- Chapter 2, “Skills-Based Routing,” on page 27, provides information on developing and creating strategies that route interactions to the most appropriately skilled agent.
- Chapter 3, “Business Priority Routing,” on page 41, describes fine-tuning the criteria used by Universal Routing Server when selecting interactions from queues.
- Chapter 4, “Cost-Based Routing,” on page 57, presents a high level overview of a solution that causes URS to consider cost as an additional selection criteria when routing to targets.
- Chapter 5, “Share Agent By Service Level Agreement Routing,” on page 67, describes a solution where you define the triggering conditions (borrowing and lending) for sharing agents among different business lines.
- Chapter 6, “Proactive Routing,” on page 95, describes a solution that allows you to proactively route preview interactions to the Agent Desktop and completely process Calling List and Do Not Call List records solely from the logic of a routing strategy.
- An appendix, “List of Terms” on page 101, introduces some important new terms for Universal Routing 7.6 and beyond.

Document Conventions

This document uses certain stylistic and typographical conventions—introduced here—that serve as shorthands for particular kinds of information.

Document Version Number

A version number appears at the bottom of the inside front cover of this document. Version numbers change as new information is added to this document. Here is a sample version number:

`76r_sol_11-2006_v7.6.000.03`

You will need this number when you are talking with Genesys Technical Support about routing solution that can be implemented with Universal Routing 7.6.

Type Styles

Italic

In this document, italic is used for emphasis, for documents' titles, for definitions of (or first references to) unfamiliar terms, and for mathematical variables.

Examples:

- Please consult the *Genesys 7 Migration Guide* for more information.
- *A customary and usual practice* is one that is widely accepted and used within a particular industry or profession.
- Do *not* use this value for this option.
- The formula, $x + 1 = 7$ where x stands for . . .

Monospace Font

A monospace font, which looks like `teletype or typewriter text`, is used for all programming identifiers and GUI elements.

This convention includes the *names* of directories, files, folders, configuration objects, paths, scripts, dialog boxes, options, fields, text and list boxes, operational modes, all buttons (including radio buttons), check boxes, commands, tabs, CTI events, and error messages; the values of options; logical arguments and command syntax; and code samples.

Examples:

- Select the `Show variables on screen` check box.
- Click the `Summation` button.
- In the `Properties` dialog box, enter the value for the host server in your environment.
- In the `Operand` text box, enter your formula.
- Click `OK` to exit the `Properties` dialog box.
- The following table presents the complete set of error messages T-Server distributes in `EventError` events.
- If you select `true` for the `inbound-bsns-calls` option, all established inbound calls on a local agent are considered business calls.

Monospace is also used for any text that users must manually enter during a configuration or installation procedure, or on a command line:

Example:

- Enter `exit` on the command line.

Screen Captures Used in This Document

Screen captures from the product GUI (graphical user interface), as used in this document, may sometimes contain a minor spelling, capitalization, or grammatical error. The text accompanying and explaining the screen captures corrects such errors *except* when such a correction would prevent you from installing, configuring, or successfully using the product. For example, if the name of an option contains a usage error, the name would be presented exactly as it appears in the product GUI; the error would not be corrected in any accompanying text.

Square Brackets

Square brackets indicate that a particular parameter or value is optional within a logical argument, a command, or some programming syntax. That is, the parameter's or value's presence is not required to resolve the argument, command, or block of code. The user decides whether to include this optional information. Here is a sample:

```
smcp_server -host [/flags]
```

Angle Brackets

Angle brackets indicate a placeholder for a value that the user must specify. This might be a DN or port number specific to your enterprise. Here is a sample:

```
smcp_server -host <confighost>
```

Related Resources

Consult these additional resources as necessary:

- *Universal Routing 7.6 Deployment Guide.* The first part of the guide provides information you will need to get started: A high-level overview of Universal Routing features and functions, including product architecture, system availability, redundancy information and deployment-planning. The second part of the guide provides instructions for deploying Universal Routing components, and describes how to start and stop these components once you have configured and installed them.
- *Universal Routing 7.6 Reference Manual,* which describes and defines routing strategies, IRD objects that can be used in routing strategies, Universal Routing Server functions that can be used in routing strategies, Universal Routing Server options and other options that affect routing, number translation, pegs, statistics used for routing, and log events.
- *Universal Routing Business 7.6 Process User's Guide*. This guide contains step-by-step instructions for creating interaction workflows (*business processes*), which direct incoming customer interactions through various processing objects. The goal is to generate an appropriate response for the customer.

- *Universal Routing 7.6 Cost-Based Routing Configuration Guide*, which documents a solution where Universal Routing Server considers the cost of routing to a target, comprised of Infrastructure cost and/or Resource cost, as addition selection criteria when choosing the right target.
- *Universal Routing 7.6 Strategy Samples*, which simplifies strategy configuration for first-time users of the strategy development tool, Interaction Routing Designer. To achieve this goal, this document supplies examples of simple voice and e-mail routing strategies that can be used as general guides during the design stage.
- *Universal Routing 7.6 Interaction Routing Designer Help,* which describes how to use Interaction Routing Designer to create routing strategies. It also describes Interaction Workflow view where you create business processes that route incoming interactions through various processing objects with the goal of generating an appropriate response for the customer.
- *Genesys 7 Events and Models Reference Manual*, which provides information on most of the published Genesys events and their attributes, and an extensive collection of models describing core interaction processing in Genesys environments.
- *Genesys 7.6 Resource Capacity Planning Guide* (the last published version of the guide), which provides instructions on using the Genesys Agent Capacity Wizard to set up agent capacity rules, which affect the routing of interactions to agents.
- *Framework 7.6 Stat Server User's Guide*, which introduces you to the concepts, terminology, and procedures relevant to Genesys Stat Server.
- *Framework 7.6 Combined Log Events Help*, which provides details about error and informational messages generated by server components, including Universal Routing Server.
- *Reporting Technical Reference Guide for the Genesys 7.2 Release,* which describes the statistics the CC Analyzer and CCPulse+ applications gather about overall contact center performance and the reporting templates and reporting layouts you can use to present that data.
- *Genesys 7 Interoperability Guide*, which identifies which Genesys components can successfully work together, and which versions are not compatible.
- *Genesys 7 Hardware Sizing Guide*, which provides hardware and CPU guidelines for Genesys products.
- The *Genesys Technical Publications Glossary,* which ships on the Genesys Documentation Library CD and which provides a comprehensive list of the Genesys and CTI terminology and acronyms used in this document.
- The *Genesys 7 Migration Guide*, also on the Genesys Documentation Library CD, which provides a documented migration strategy from Genesys product releases 5.1 and later to all Genesys 7.x releases. Contact Genesys Technical Support for additional information.

- The Release Notes and Product Advisories for this product, which are available on the Genesys Technical Support website at `http://genesyslab.com/support`.

Information on supported hardware and third-party software is available on the Genesys Technical Support website in the following documents:

- *Genesys 7 Supported Operating Systems and Databases*
- *Genesys 7 Supported Media Interfaces*

Genesys product documentation is available on the:

- Genesys Technical Support website at `http://genesyslab.com/support`.
- Genesys Documentation Library CD, which you can order by e-mail from Genesys Order Management at `orderman@genesyslab.com`.

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You can comment on what you regard as specific errors or omissions, and on the accuracy, organization, subject matter, or completeness of this document. Please limit your comments to the information in this document only and to the way in which the information is presented. Speak to Genesys Technical Support if you have suggestions about the product itself.

When you send us comments, you grant Genesys a nonexclusive right to use or distribute your comments in any way it believes appropriate, without incurring any obligation to you.

Chapter

1 Overview

This guide familiarizes you with the following types of routing solutions provided by Genesys Universal Routing 7.6:

1. "Skills-Based Routing" on page 27
2. "Business Priority Routing" on page 41
3. "Cost-Based Routing" on page 57
4. "Share Agent By Service Level Agreement Routing" on page 67
5. "Proactive Routing" on page 95

Note: Universal Routing 7.6 is not limited to the types of routing presented in this document. For information on Universal Routing capabilities, see the overview in the *Universal Routing 7.6 Deployment Guide*.

This chapter presents a high level overview of routing for new users. It contains the following topics:

- Routing Defined, page 15
- Routing Strategies, page 16
- Routing Solutions, page 17
- Solution Elements, page 18
- Universal Routing Functionality, page 24

Routing Defined

In the context of Genesys Universal Routing, *routing* is the process of sending an interaction to a target; for example, sending an incoming telephone call or an incoming e-mail to an agent.

In practice, many steps must be taken between the arrival of an interaction and the selection and use of a target. Not all interactions should go to the same target; choices must be made in order to determine the best target for each interaction. Each *choice-point* is an opportunity to make a decision based on the current situation—with the goal of getting the interaction delivered to the right target.

Routing Strategies

You specify choice-points by creating *routing strategies*, which are an integral part of the solutions covered in this guide. Figure 1 shows an example routing strategy where the first choice point (Day of Week Segmentation object) segments incoming interactions to take different paths in the strategy.

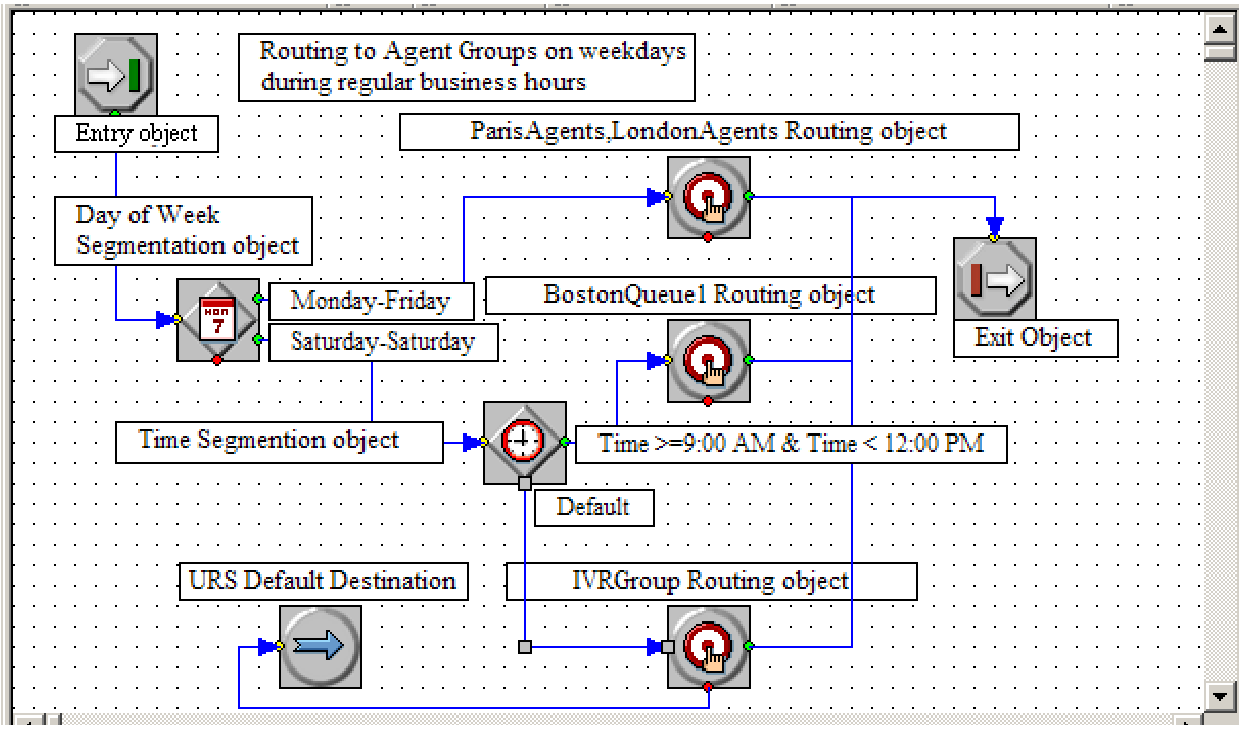

Routing to Agent Groups on weekdays during regular business hours
Entry object
ParisAgents,LondonAgents Routing object
Day of Week Segmentation object
Monday-Friday
Saturday-Saturday
BostonQueue1 Routing object
Exit Object
Time Segmention object
Time >=9:00 AM & Time < 12:00 PM
Default
URS Default Destination
IVRGroup Routing object

Figure 1: Sample Routing Strategy

Note: For cost-based routing or share agent by service level agreement solutions, Universal Routing supplies sample routing strategies that you can use as guides when creating your own strategies. Genesys also supplies sample strategies through its Interaction Workflow Samples component.

When creating routing strategies, you work in a graphical user interface (GUI) application called Interaction Routing Designer (IRD).

- IRD enables you to create, test, modify, and load routing strategies on routing points.

- Universal Routing Server (URS or "Router") executes the routing strategy instructions.

For more information on IRD and Universal Routing Server, start with the *Universal Routing 7.6 Deployment Guide*. For step-by-step instructions on using IRD to create strategies, see the *Universal Routing 7.6 Interaction Routing Designer Help* or the *Universal Routing 7.5 Business Process User's Guide*.

Routing Solutions

As used in this guide, the term *routing solution* refers to the method and configuration elements for solving the problem of getting a customer interaction to the right target in the shortest amount of time. The "right target" depends on the type of routing solution you choose to implement.

- In some cases, the right target can be an available agent with the skills that most closely match the customer's needs.
- In other cases, the right target may be the least expensive agent based on contract cost, contact center infrastructure cost, or both.
- In still other cases, the right target can be the most appropriately skilled agent borrowed from another business unit because all agents serving the called business line are busy.
- Again, the right target depends on the type of routing solution you choose to implement.
- A business priority routing solution enables you to fine-tune the criteria used by Universal Routing Server when selecting interactions from queues. Business priority routing selection criteria can include:

  Highest priority interaction

  Longest current wait time

  Interaction with oldest age

  "What-if" wait time

  Highest risk factor in service objective based on current wait time

  Highest risk factor in service objective based on age of interaction

  Highest risk factor in service objective based on predicted wait time

Solution Elements

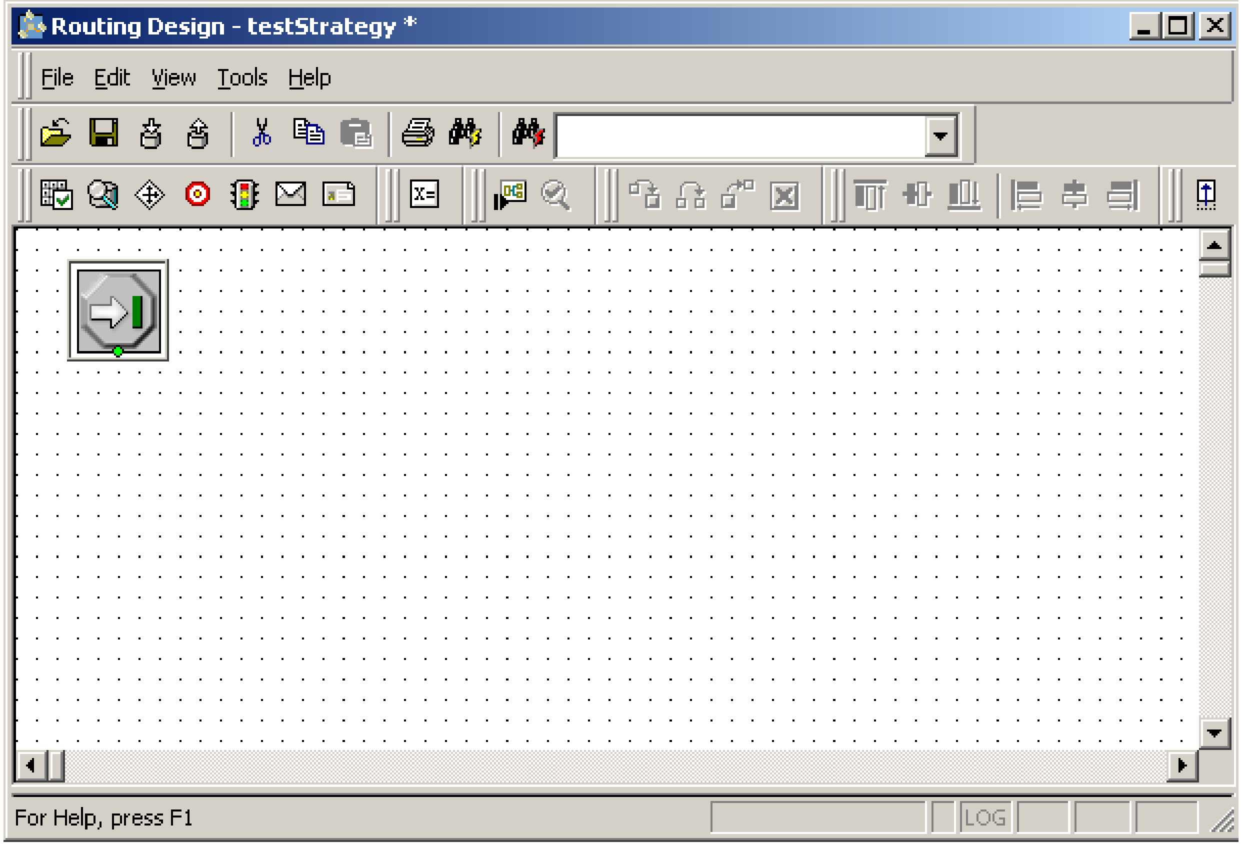
To create the routing solutions discussed in this guide, Genesys supplies following elements:

- "User Interfaces" on page 18
- "Data Storage" on page 20
- "Functions" on page 20
- "Options" on page 21
- "Reporting" on page 22

The pages ahead discuss each element.

User Interfaces

You create routing strategies in the `Routing Design` window of Interaction Routing Designer (see Figure 2).


Routing Design - testStrategy *
File Edit View Tools Help
LOG

For Help, press F1

Figure 2: Routing Design Window For Creating Strategies

You create certain objects used by strategies in Configuration Manager and Knowledge Manager. For example, when implementing a skills-based routing solution, you define `Skill` objects in Configuration Manager (see Figure 3) and then assign those `Skill` objects to agents (`Person` objects).

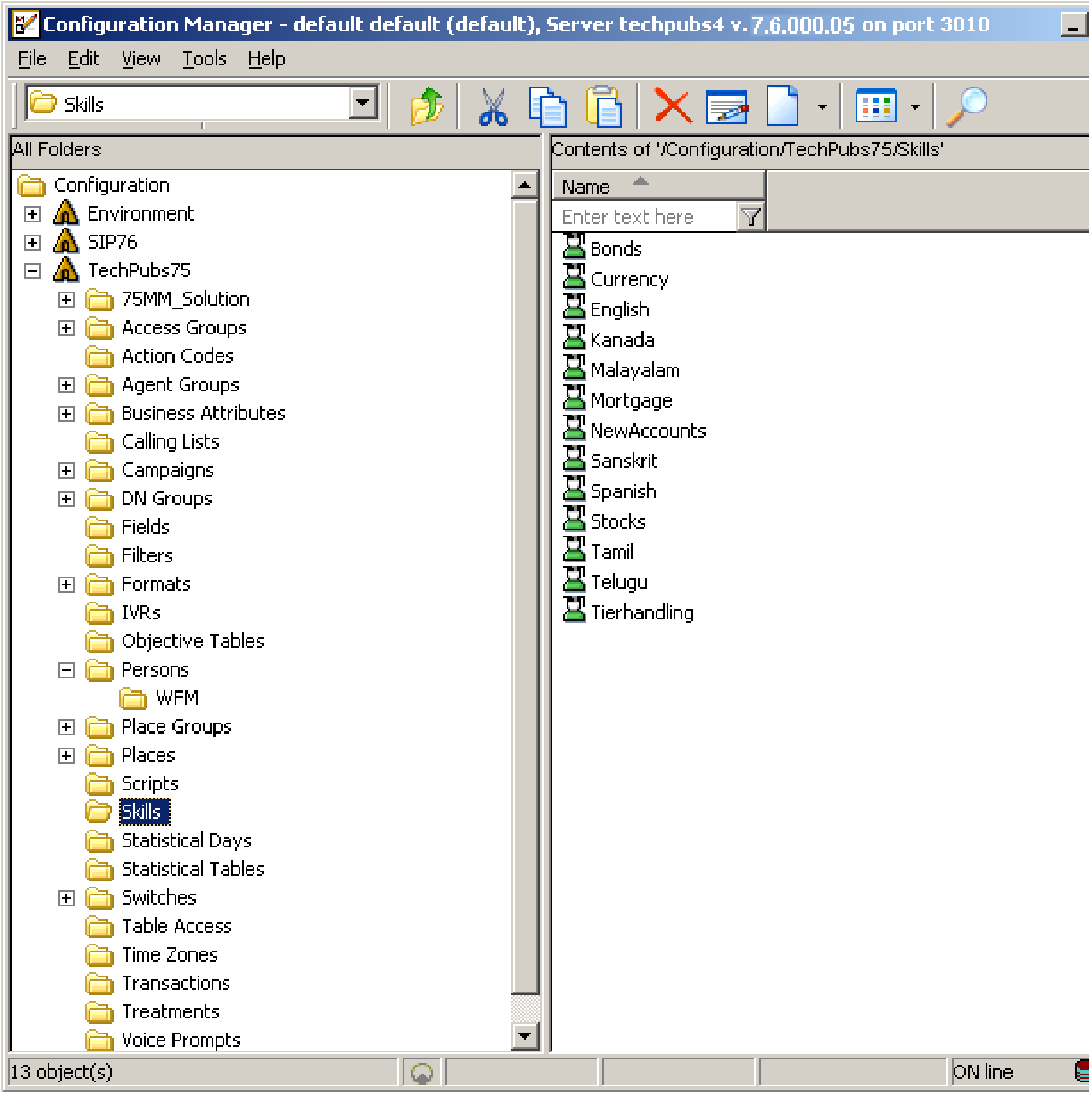
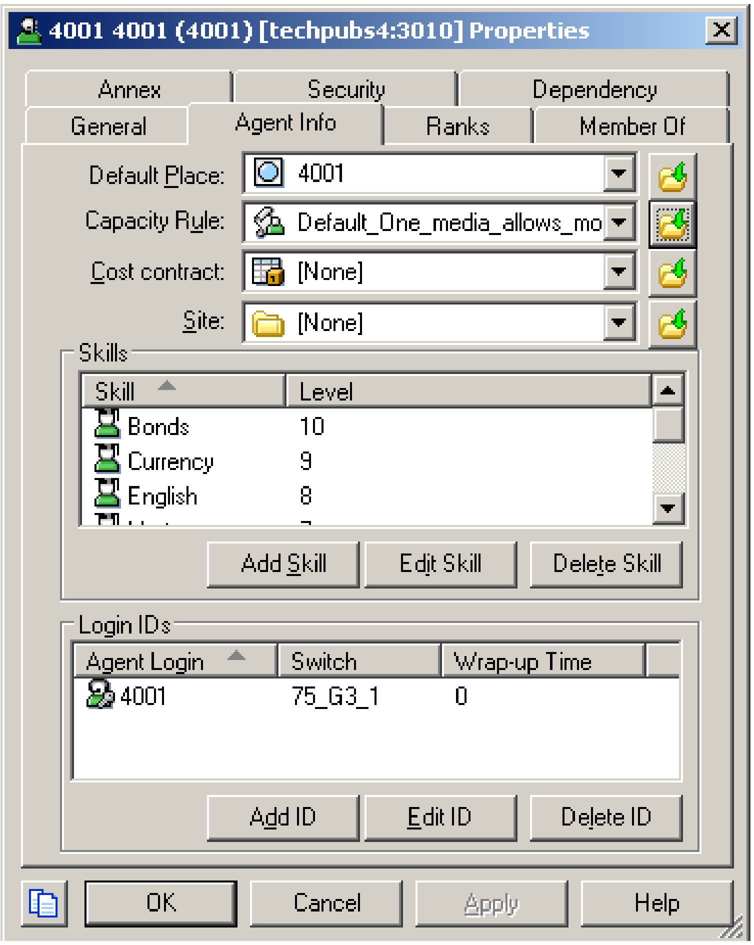

Configuration Manager - default default (default), Server techpubs4 v. 7.6.000.05 on port 3010
File
Edit
View
Tools
Help
Skills
All Folders
Configuration
Environment
SIP76
TechPubs75
75MM_Solution
Access Groups
Action Codes
Agent Groups
Business Attributes
Calling Lists
Campaigns
DN Groups
Fields
Filters
Formats
IVRs
Objective Tables
Persons
WFM
Place Groups
Places
Scripts
Skills
Statistical Days
Statistical Tables
Switches
Table Access
Time Zones
Transactions
Treatments
Voice Prompts
Contents of '/Configuration/TechPubs75/Skills'
Name
Enter text here
Bonds
Currency
English
Kanada
Malayalam
Mortgage
NewAccounts
Sanskrit
Spanish
Stocks
Tamil
Telugu
Tierhandling
13 object(s)
ON line

Figure 3: Configuration Manager, Skill Objects

Figure 4 shows the `Agent Info` tab of the `Person Properties` dialog box where you assign `Skill` objects and Skill Levels to `Person` objects.


Annex
Security
Dependency
General
Agent Info
Ranks
Member Of
Skills
Add Skill
Edit Skill
Delete Skill
Login IDs
Add ID
Edit ID
Delete ID
OK
Cancel
Apply
Help

4001 4001 (4001) [techpubs4:3010] Properties

Default Place: 4001
Capacity Rule: Default_One_media_allows_mo
Cost contract: [None]
Site: [None]

Skill	Level
Bonds	10
Currency	9
English	8

Agent Login	Switch	Wrap-up Time
4001	75_G3_1	0

Figure 4: **Person Properties Dialog Box**

You use the Genesys Knowledge Manager GUI to define standard responses, fields for standard responses, classification categories, and screening rules. Chapter 5, “Share Agent By Service Level Agreement Routing” on page 67, includes many GUI examples.

Data Storage

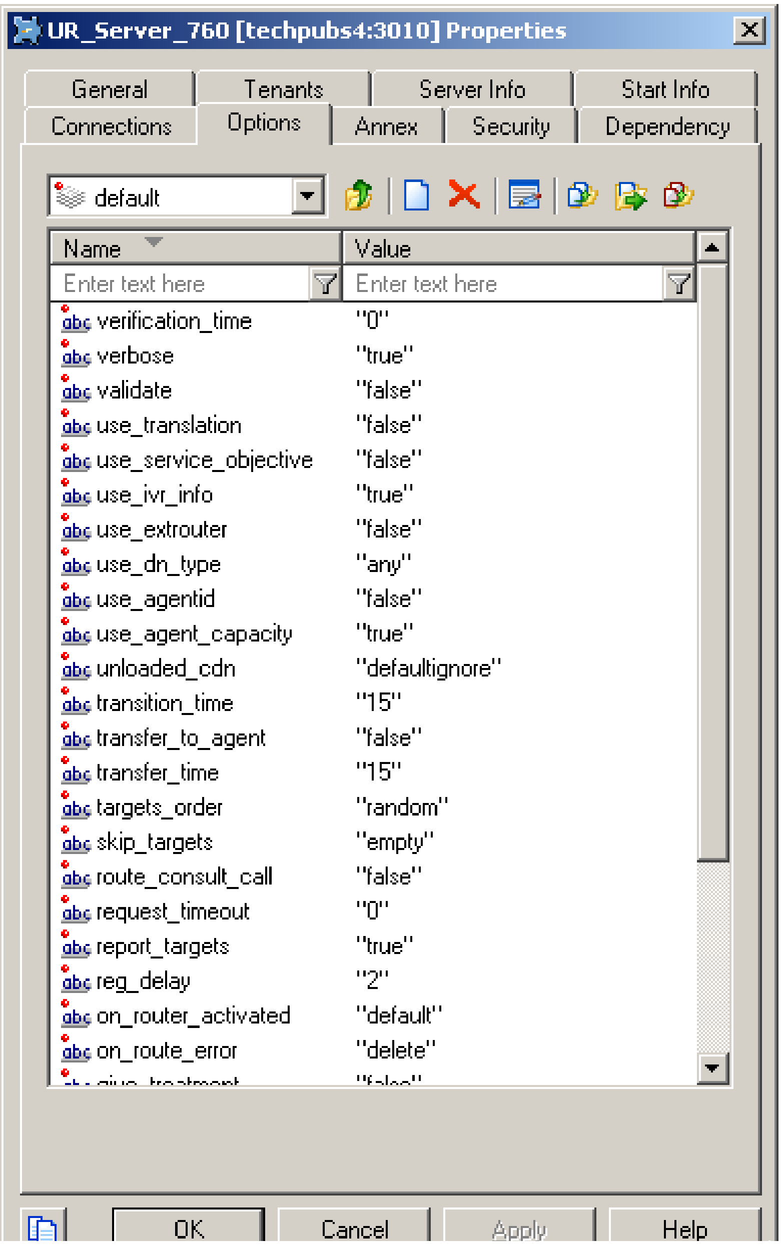
You can save the graphical portion of strategies (strategy `.rbn` files) to a network drive or to the Configuration Database used by Configuration Manager. Configuration Manager object information, routing strategy bytecode, and scripts for routing objects are stored in the Configuration Database.

Functions

When creating a routing strategy, you have the option of using functions described in the *Universal Routing 7.6 Reference Manual*. For example, if implementing a share agent by service level agareement routing solution, you can use the Function object to specify target parameters (see Figure 36 on page 79).

Options

Options control how interactions are handled and communications with other servers. For example, a business-priority routing solution uses the options described in Table 1 on page 49. Options, described in the *Universal Routing 7.6 Reference Manual,* are configured in the Configuration Manager URS Application object (see Figure 5).


UR_Server_760 [techpubs4:3010] Properties
General
Tenants
Server Info
Start Info
Connections
Options
Annex
Security
Dependency
default
Enter text here
Enter text here
OK
Cancel
Apply
Help

Name	Value
verification_time	"0"
verbose	"true"
validate	"false"
use_translation	"false"
use_service_objective	"false"
use_ivr_info	"true"
use_extrouter	"false"
use_dn_type	"any"
use_agentid	"false"
use_agent_capacity	"true"
unloaded_cdn	"defaultignore"
transition_time	"15"
transfer_to_agent	"false"
transfer_time	"15"
targets_order	"random"
skip_targets	"empty"
route_consult_call	"false"
request_timeout	"0"
report_targets	"true"
reg_delay	"2"
on_router_activated	"default"
on_route_error	"delete"

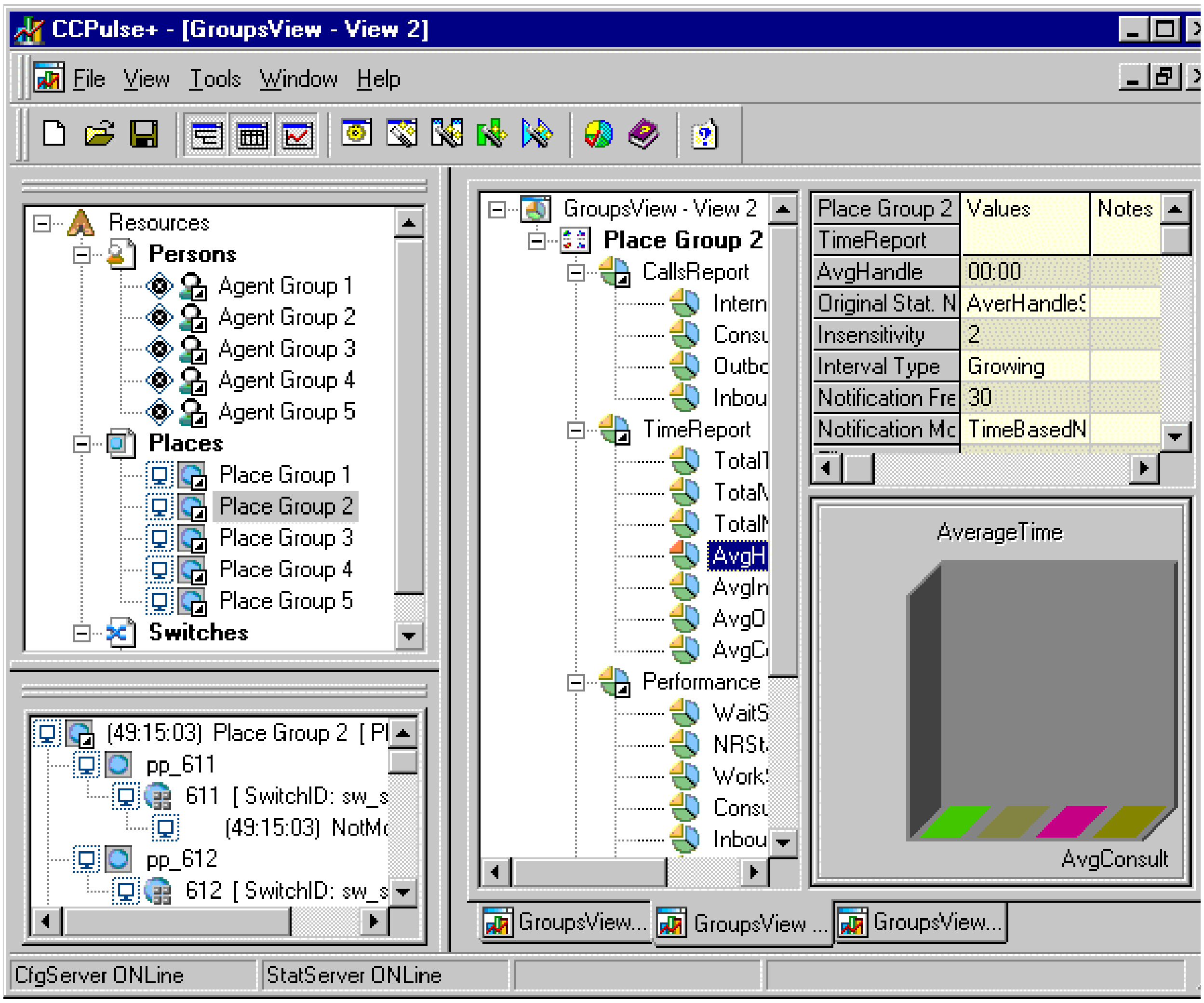
Figure 5: URS Application Object, Options Tab

Reporting

Genesys Stat Server provides URS with information in the form of statistics about contact center operations, incuding agent availability (see *Universal Routing 7.6 Reference Manual,* Chapter 7). In addition to the statistics being used for routing decisions, the statistics are also used for solution-specific reporting. The ERS and NRS reporting templates also use statistics to create reports in CC Analyzer and CC Pulse+.

CCPulse+

CCPulse+ is a desktop-level reporting application that provides both real-time and historical views of contact center operations via a graphical user interface. Figure 6 shows an example view.

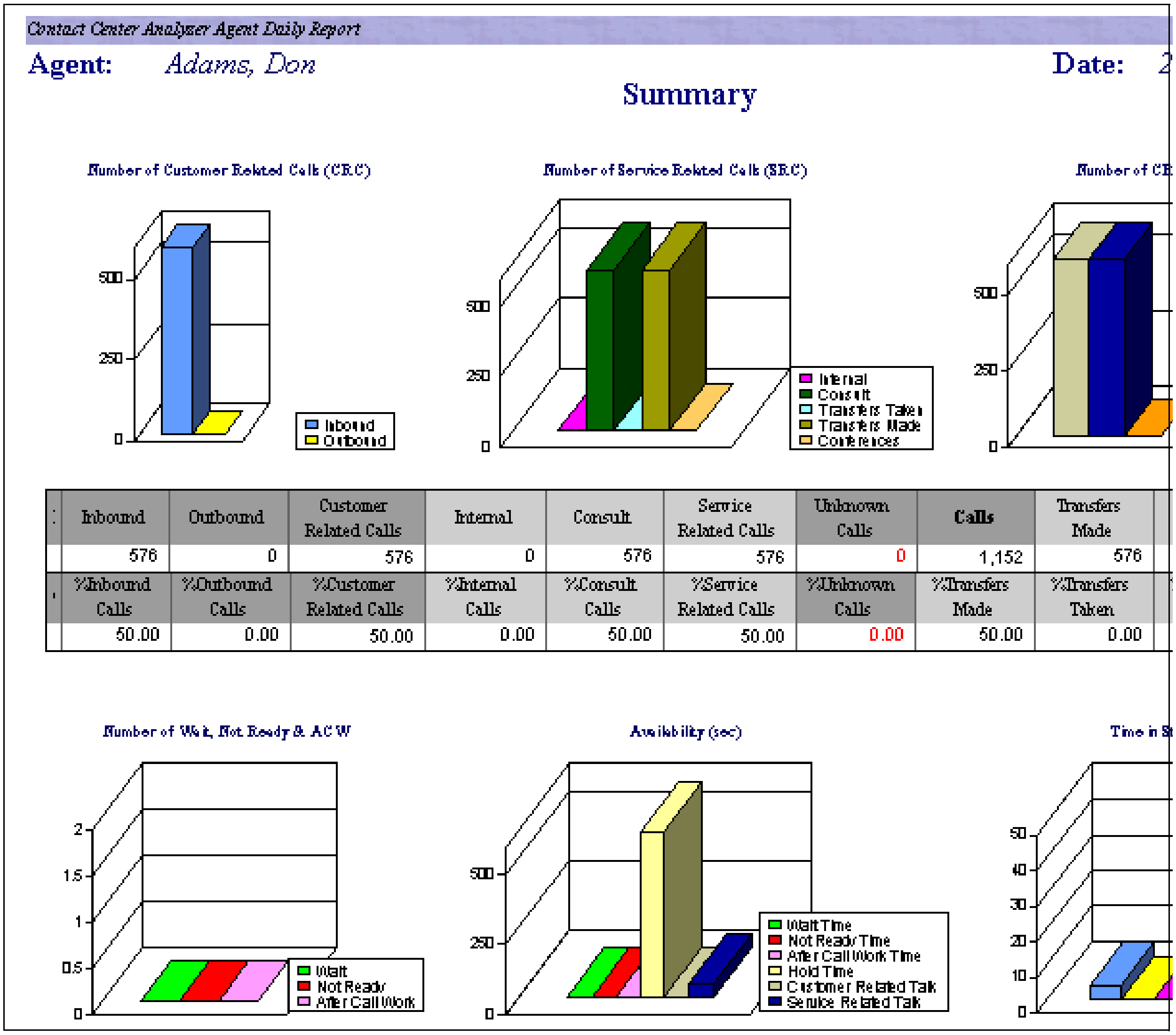

CCPulse+ - [GroupsView - View 2]
File
View
Tools
Window
Help
Resources
Persons
Agent Group 1
Agent Group 2
Agent Group 3
Agent Group 4
Agent Group 5
Places
Place Group 1
Place Group 2
Place Group 3
Place Group 4
Place Group 5
Switches
(49:15:03) Place Group 2 [Pl
pp_611
611 [SwitchID: sw_s
(49:15:03) NotMo
pp_612
612 [SwitchID: sw_s
GroupsView - View 2
Place Group 2
CallsReport
Intern
Consu
Outbo
Inbou
TimeReport
TotalT
TotalN
TotalN
AvgH
AvgIn
AvgO
AvgC
Performance
WaitS
NRSt
Work
Consu
Inbou
AverageTime
AvgConsult
GroupsView...
GroupsView ...
GroupsView...
CfgServer ONLine
StatServer ONLine

Place Group 2	Values	Notes
TimeReport		
AvgHandle	00:00	
Original Stat. N	AverHandle	
Insensitivity	2	
Interval Type	Growing	
Notification Fre	30	
Notification Mc	TimeBasedN	

Figure 6: CCPulse+ View

CC Analyzer

The CC Analyzer application is an historical reporting application that collects and aggregates data over specified periods of time. Figure 7 shows an example historical report.



Contact Center Analyzer Agent Daily Report

Agent: *Adams, Don* **Date:** 2

Summary

Number of Customer Related Calls (CRC)
500
250
0
Inbound
Outbound
Number of Service Related Calls (SRC)
500
250
0
Internal
Consult
Transfers Taken
Transfers Made
Conferences
Number of CR
500
250
0

Inbound	Outbound	Customer Related Calls	Internal	Consult	Service Related Calls	Unknown Calls	Calls	Transfers Made
576	0	576	0	576	576	0	1,152	576

%Inbound Calls	%Outbound Calls	%Customer Related Calls	%Internal Calls	%Consult Calls	%Service Related Calls	%Unknown Calls	%Transfers Made	%Transfers Taken
50.00	0.00	50.00	0.00	50.00	50.00	0.00	50.00	0.00

Number of Wait, Not Ready & ACW
2
1.5
1
0.5
0
Wait
Not Ready
After Call Work
Availability (sec)
500
250
0
Wait Time
Not Ready Time
After Call Work Time
Hold Time
Customer Related Talk
Service Related Talk
Time in St
50
40
30
20
10
0

Figure 7: Sample CC Analyzer Historical Report

Interaction Concentrator

Interaction Concentrator (ICON) tracks historical data for your contact center as it relates to calls. ICON is a data collection application that works with T-Server and DB Server to collect and record calls and agent states. As a client of T-Server, ICON collects information about user data and telephony events related to all telephony objects.

Note: ICON currently tracks only voice interactions.

Reporting on the Data

For reporting from ICON, Genesys provides the Genesys Info Mart, which produces a data mart containing several star schemas you can use for contact center historical reporting. Genesys Info Mart includes a software platform and a set of predefined jobs. You configure these jobs to extract and transform data from several Genesys relational databases. The transformed data is loaded into Dimension and Fact database tables in Genesys Info Mart. You can query the data in these tables using SQL. These queries enable you to display detailed data, reveal patterns, and predict trends.

Universal Routing Functionality

Genesys Universal Routing functionality is not limited to the solutions discussed in this guide. Other important functionality is listed below.

- Database-driven routing.
- Agent-level routing, including routing based on agent schedules (workforce routing).
- Skills-based routing.
- Virtual agent groups with priority routing across virtual queues.
- Service-level routing.
- Multi-site routing.
- Statistical routing.
- Routing voice interactions across tenants.
- Priority tuning for voice interactions.
- Business Attribute assignment.
- Strategy debugging.
- Sharing strategies between environments.
- High availability of Enterprise Routing and Network Routing solutions.
- Support for interaction workflows (business processes) that route interactions in and out of various processing objects, such as queues and routing strategies.
- Specialized interaction processing objects, such as objects for communicating with Web Services outside of Genesys and using that information in a strategy. Interaction Routing Designer contains over 148 specialized strategy-building objects for use in strategies.
- Open media support.

- Routing using agent capacity information.
- Strategy support for ring-no-answer situations.
- Routing to and setting thresholds for non-configured DNs.
- Service level agreement routing.
- Cost-based routing.
- Genesys Outbound Contact support, including support for proactive routing and for agents participating in multiple outbound campaigns.
- Load balancing.

For more information on these functional areas, start with the *Universal Routing 7.6 Deployment Guide*.

Chapter

2 Skills-Based Routing

This chapter describes skills-based routing and presents an example strategy. It contains the following topics:

- About Skills-Based Routing, page 27
- Virtual Agent Groups, page 28
- Configuration Manager Preparation, page 29
- Assigning Skills to Agents, page 30
- Example Skills-Based Routing Strategy, page 31
- Routing Based On a Skill Expression, page 37
- Functions for Skills-Based Routing, page 38
- IRD Objects for Skills-Based Routing, page 39

About Skills-Based Routing

To determine the best agent to handle an interaction, URS evaluates:

- Customer information stored in a database.
- What service the customer requests.
- The profiles of the available agents.

  Agent profiles include such things as skill types and skill levels. *Skill types* refer to the skills or knowledge an agent has in a particular area and may include language, customer service, and other skills needed for the contact center. *Skill levels* refer to an agent's level of proficiency for a particular skill. You specify agent skill types and skill levels in Configuration Manager.

Using IRD, you can design strategies that segment interactions based on selected criteria such as customer value, data collected from a database, and/or IVR-collected digits related to the service requested. You can then route these interactions to the agent with the best skill profile, which can be a combination of agent skills and skill levels to specifically meet a customer's needs.

Use Case

For example, a customer may be a premier-level client from France who wants to make a basic stock trade. This customer requires an experienced agent who is fluent in French and has knowledge of stock trading. You can create a strategy that segments based on skill and skill levels for account level, language, and stock trading. The interaction could then be routed to an agent who has a high-level skill in French and a medium-level skill in stocks.

You do not have to group agents together according to skill type or levels, by switch location, or ACD queue. URS stores the agent profiles and creates a list of agents available for each interaction based on the skills needed for handling the interaction. URS uses Stat Server to determine the most available agent who has these skills.

Enterprise Routing and Network Routing solutions handle agents from virtual contact centers (multi-site contact centers) as dynamic work groups formed according to the agent skill profile requested. These dynamic work groups are transparent to geographical location and PBXs.

Virtual Agent Groups

Virtual agent groups combine agents with similar skills or responsibilities regardless of their work location. Stated another way, a group of agents is considered to be *virtual* if agents do not permanently belong to the group. Instead, Stat Server assigns an agent to the group when an agent meets the criteria specified by the virtual group's definition. Stat Server adds agents to, or removes them from, the group if agent parameters that affect eligibility change or if the specified criteria are modified.

Stat Server currently supports virtual group functionality with three types of agent parameters:

- A skill configured for an agent
- An ACD queue to which an agent is logged in
- A switch into which an agent is logged in

You can simultaneously specify these types of parameters in an expression for a single virtual group.

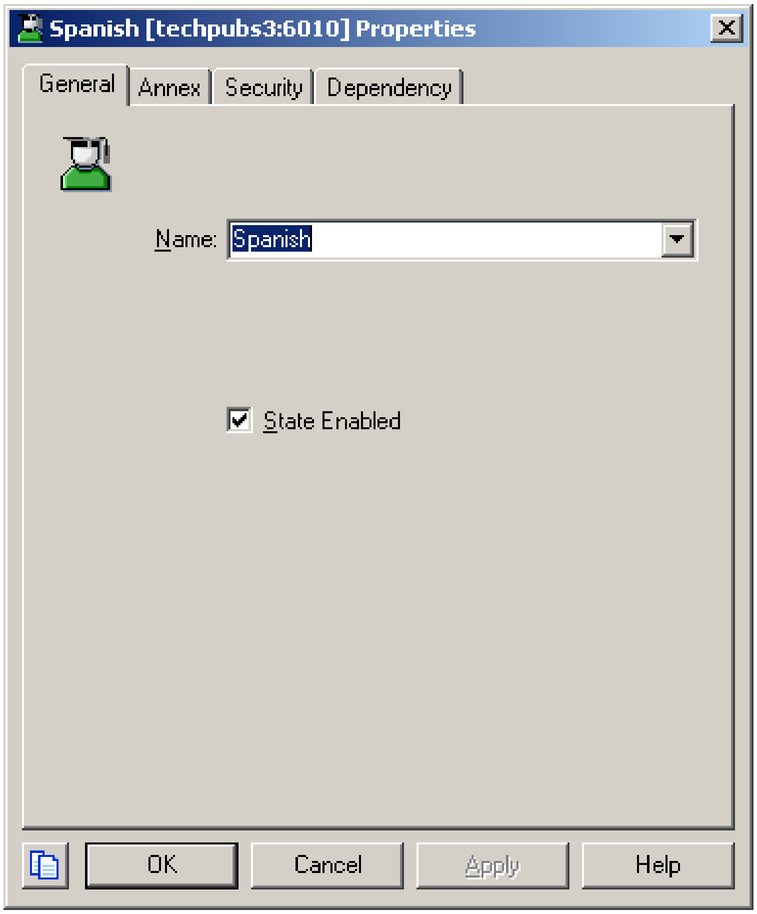
Note: For more information on the skill, ACD queue, and switch agent parameters as well as configuring virtual agent groups in the `Annex` tab of the `Agent Group` object, see the *Framework 7.6 Stat Server User's Guide*, specifically the chapter on Virtual Agent Groups.

Agents can be in more than one group and URS can determine the availability of an agent across all agent groups using Stat Server. You can add or remove agents from agent groups as needed. URS and Genesys reporting applications are immediately notified of the changes.

Configuration Manager Preparation

If you plan to route based on agent skills or skill levels (see page 28), you must first create `Skill` objects. You do this in a user interface called Configuration Manager (see Figure 3 on page 19).

Under the desired `Tenant`, right-click the `Skills` folder shown in Figure 3 on page 19 and select `New > Skill` from the shortcut menu. The `New Skill Properties` dialog box opens where you define the skill. Figure 8 shows the `General` tab of an example completed properties dialog box.



Name: Spanish

☑ State Enabled

Figure 8: Skill Properties Dialog Box

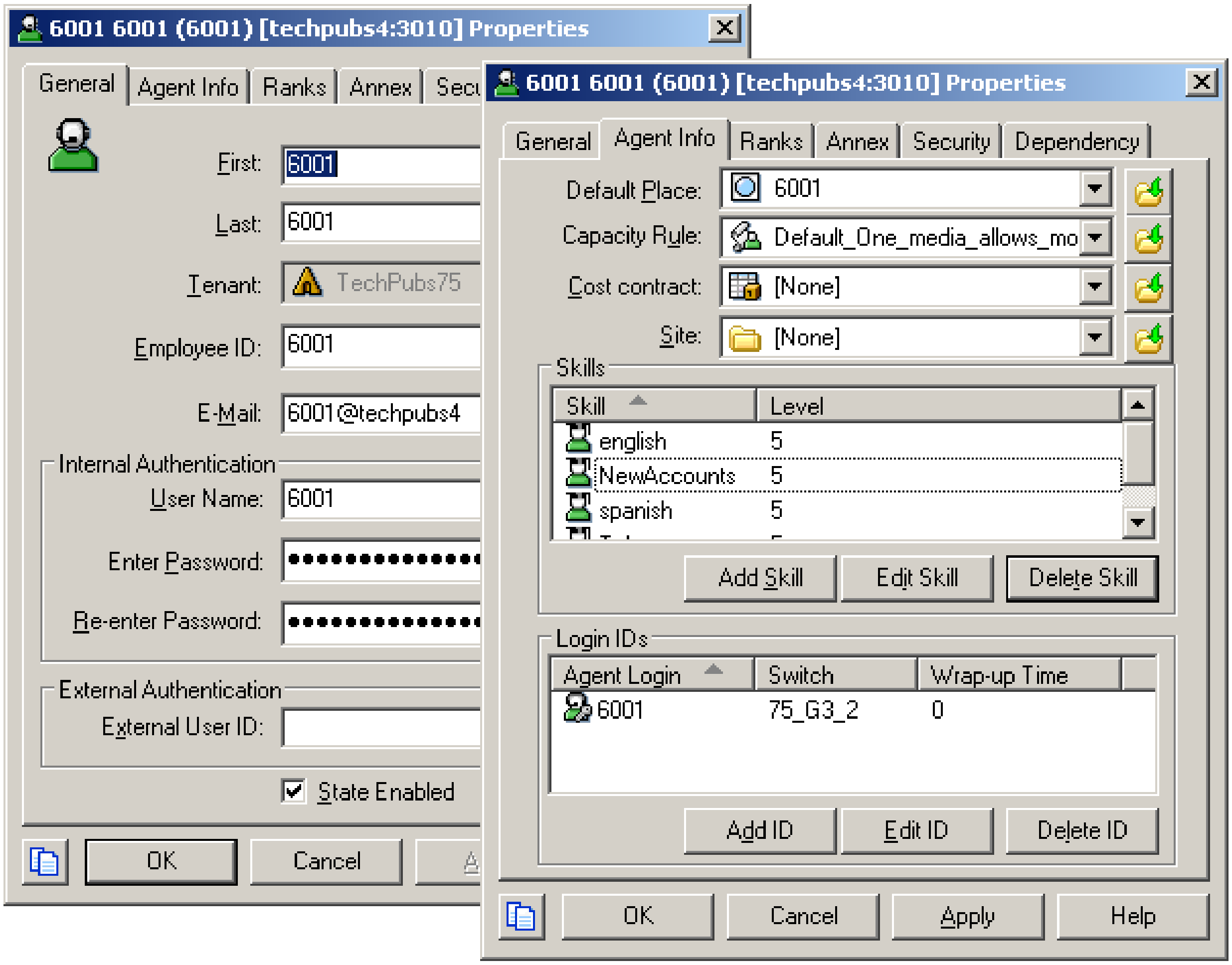
Note: The name of skills, if used in a skill expression, cannot exceed 126 bytes.

Assigning Skills to Agents

Once you have defined all the necessary skills, you can assign those skills to existing agent (`Person`) and `Agent Group` objects or create new objects to assign those skills to. The example below describes how to define new `Person` objects.

Note: The example given here represents one way to configure skills-based routing. You can also configure skills-based routing in the `Annex` tab of `Agent Group` objects as described in the *Framework 7.6 Stat Server User's Guide*, specifically the section on configuring virtual agent groups in the Virtual Agent Groups chapter.

Right-click the `Persons` folder shown in Figure 3 on page 19 and select `New > Person` from the shortcut menu. The `New Person Properties` dialog box opens for defining `Person` objects, such as, such as agents, quality assurance personnel, managers, and supervisors. Figure 9 shows example completed `General` and `Agent Info` tabs.


6001 6001 (6001) [techpubs4:3010] Properties
General
Agent Info
Ranks
Annex
Secu

First: 6001
Last: 6001
Tenant: TechPubs75
Employee ID: 6001
E-Mail: 6001@techpubs4

Internal Authentication
User Name: 6001
Enter Password: ••••••••••••••
Re-enter Password: ••••••••••••••

External Authentication
External User ID:

☑ State Enabled

OK
Cancel
6001 6001 (6001) [techpubs4:3010] Properties
General
Agent Info
Ranks
Annex
Security
Dependency

Default Place: 6001
Capacity Rule: Default_One_media_allows_mo
Cost contract: [None]
Site: [None]

Skills

Skill	Level
english	5
NewAccounts	5
spanish	5

Add Skill
Edit Skill
Delete Skill

Login IDs

Agent Login	Switch	Wrap-up Time
6001	75_G3_2	0

Add ID
Edit ID
Delete ID
OK
Cancel
Apply
Help

Figure 9: New Persons Dialog Box, General and Agent Info Tabs

Note that each skill can be assigned a `Skill Level`.

Note: If applicable, you can also assign a `Capacity Rule` to the agent, which defines the agent's ability to handle multiple interactions. For more information, see the *Genesys 7.1 Resource Capacity Planning Guide*.

Once you have defined all necessary skills and assigned them to agents, you have done the necessary preparation for skills-based routing strategies.

Example Skills-Based Routing Strategy

This section presents a skills-based routing strategy for routing voice interactions.

Scenario

A cable provider would like to send calls from potential customers to representatives responsible for new accounts. The cable company sets up an IVR to prompt callers for:

The language they prefer to speak:

- `1` for English
- `2` for Spanish

Their account type:

- `1` for new accounts
- `2` for existing accounts

Based on the customer's response, the routing strategy routes the call to an agent that speaks the customer language and handles the customer's account needs. The agent gets a screen pop indicating the customer's preferred language.

The calls will wait for 10 seconds (see `Timeout` in Figure 17 on page 37) for an agent with a skill level of 5 or above. If no such agent is found, URS sends the call to the `Default Destination`.

Interaction Data

Interactive Voice Response (IVR) interfaces can request T-Server to attach data to calls. This enables responses in the IVR to be passed to the Genesys software. URS can then receive this attached data from T-Server messaging, such as in an `EventRouteRequest` message.

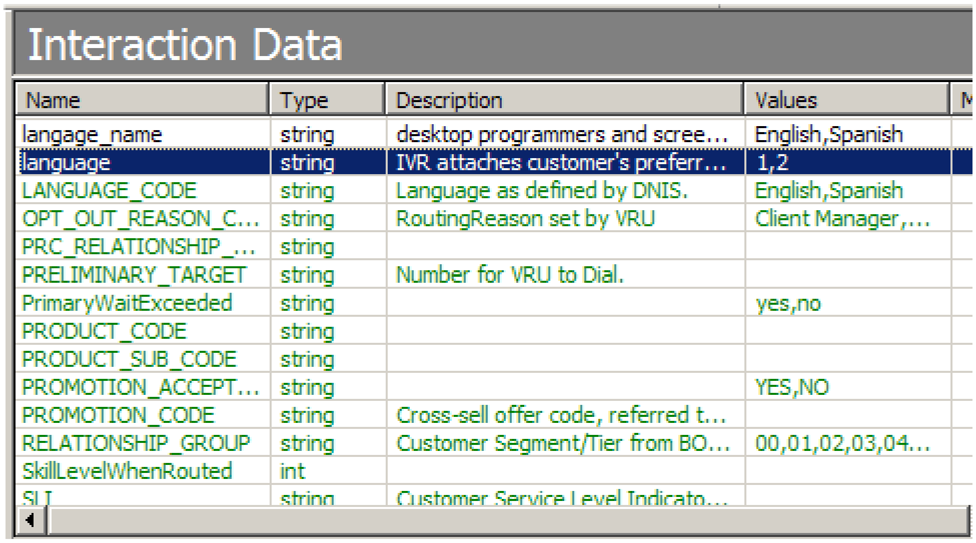
This example strategy uses `Interaction Data`, which:

- Defines the attached data keys used in strategy.
- Allows strategies to gather attached data from event messaging.
- Enables strategies to attach data for screen pops.

Note: Interaction data names must match the names of keys used in the IVR interface, the agent desktop application for screen pops, or any other applications that will use the attached data.

The example strategy assumes that the IVR attaches the account type with the key `acct_type` and the customer's preferred language with the key `language`. The desktop programmer used the key `language` for the agent screen pop to indicate the customer's preferred language.

Figure 10 shows the language `Interaction Data` configured in IRD for the example skills routing strategy.



Interaction Data

Name	Type	Description	Values
langage_name	string	desktop programmers and scree…	English,Spanish
language	string	IVR attaches customer's preferr…	1,2
LANGUAGE_CODE	string	Language as defined by DNIS.	English,Spanish
OPT_OUT_REASON_C…	string	RoutingReason set by VRU	Client Manager,…
PRC_RELATIONSHIP_…	string		
PRELIMINARY_TARGET	string	Number for VRU to Dial.	
PrimaryWaitExceeded	string		yes,no
PRODUCT_CODE	string		
PRODUCT_SUB_CODE	string		
PROMOTION_ACCEPT…	string		YES,NO
PROMOTION_CODE	string	Cross-sell offer code, referred t…	
RELATIONSHIP_GROUP	string	Customer Segment/Tier from BO…	00,01,02,03,04…
SkillLevelWhenRouted	int		
SLI	string	Customer Service Level Indicato…	

Figure 10: Interaction Data Configured for Skills Routing Strategy

Note: For detailed information on configuring Interaction Data, see the *Universal Routing 7.6 Interaction Routing Designer help*.

Strategy in Design View

Figure 11 shows the example skills routing strategy in the IRD `Routing Design` window.

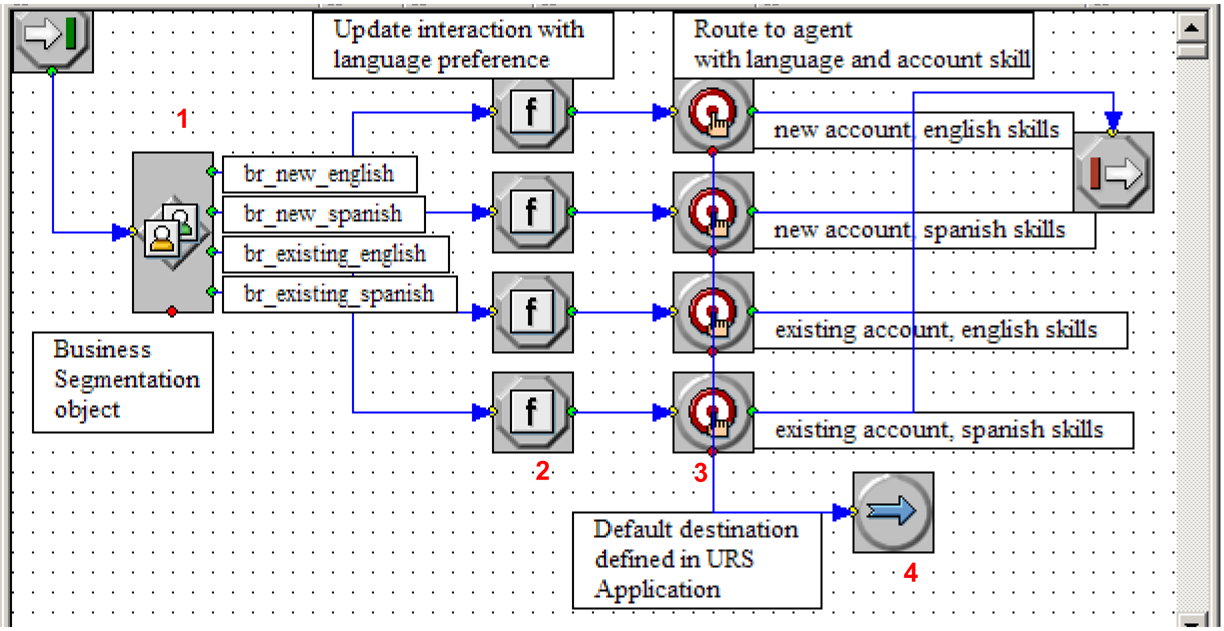
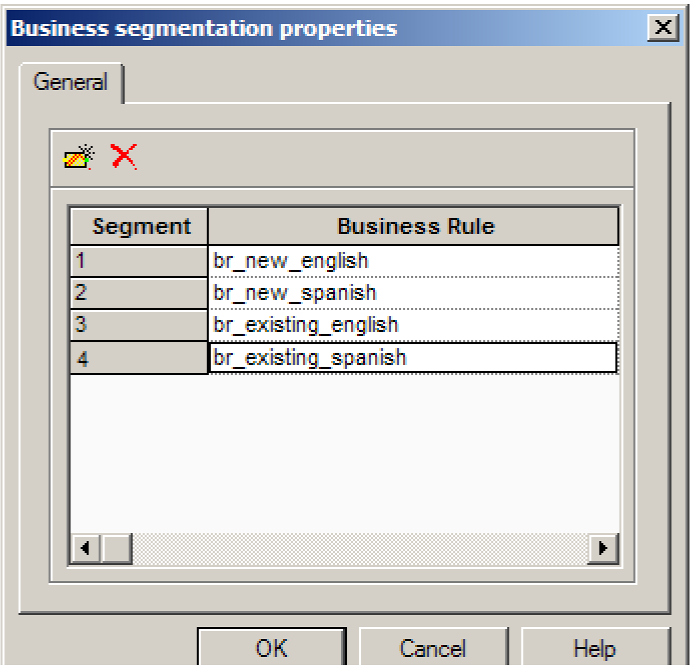

Update interaction with language preference
Route to agent with language and account skill
1
br_new_english
br_new_spanish
br_existing_english
br_existing_spanish
Business Segmentation object
new account, english skills
new account, spanish skills
existing account, english skills
existing account, spanish skills
2
3
Default destination defined in URS Application
4

Figure 11: Example Skills-Based Routing Strategy

Summary of Flow

The IRD objects described in this section are keyed to the numbers in Figure 11.

1. A Business Segmentation object causes interactions to take different paths based on `Business Rules` (see Figure 12).

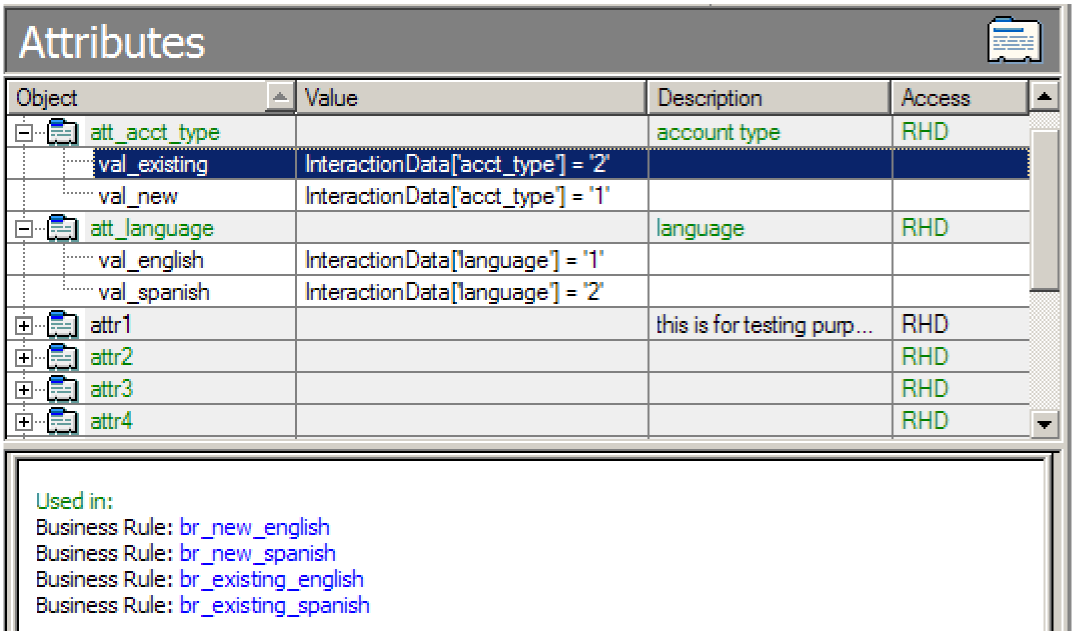

Business segmentation properties
General
OK
Cancel
Help

Segment	Business Rule
1	br_new_english
2	br_new_spanish
3	br_existing_english
4	br_existing_spanish

Figure 12: Business Segmentation Object

Attributes and Business Rules

The `Business Rules` in Figure 12 on page 33 are created from `Attributes`, as described in the *Universal Routing 7.6 Interaction Routing Designer Help*. `Attributes` and `Business Rules` are one way to create logical expressions used for segmentation (see “Routing Based On a Skill Expression” on page 37 for another way). Figure 13 shows the `Attributes` configured for the `Business Rules` in Figure 12 on page 33.

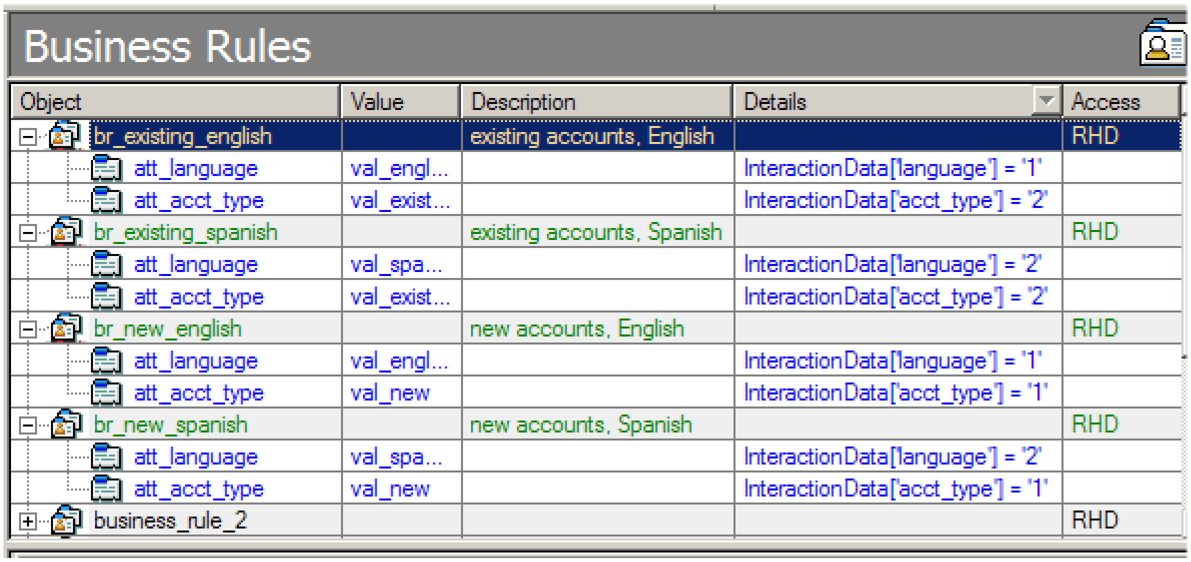


Object	Value	Description	Access
att_acct_type		account type	RHD
val_existing	InteractionData['acct_type'] = '2'		
val_new	InteractionData['acct_type'] = '1'		
att_language		language	RHD
val_english	InteractionData['language'] = '1'		
val_spanish	InteractionData['language'] = '2'		
attr1		this is for testing purp...	RHD
attr2			RHD
attr3			RHD
attr4			RHD

Used in:
Business Rule: br_new_english
Business Rule: br_new_spanish
Business Rule: br_existing_english
Business Rule: br_existing_spanish

Figure 13: Example Attributes

Figure 14 shows the `Business Rules` used in Figure 12 on page 33 as they appear in the IRD main window:



Object	Value	Description	Details	Access
br_existing_english		existing accounts, English		RHD
att_language	val_engl...		InteractionData['language'] = '1'	
att_acct_type	val_exist...		InteractionData['acct_type'] = '2'	
br_existing_spanish		existing accounts, Spanish		RHD
att_language	val_spa...		InteractionData['language'] = '2'	
att_acct_type	val_exist...		InteractionData['acct_type'] = '2'	
br_new_english		new accounts, English		RHD
att_language	val_engl...		InteractionData['language'] = '1'	
att_acct_type	val_new		InteractionData['acct_type'] = '1'	
br_new_spanish		new accounts, Spanish		RHD
att_language	val_spa...		InteractionData['language'] = '2'	
att_acct_type	val_new		InteractionData['acct_type'] = '1'	
business_rule_2				RHD

Figure 14: Example Business Rules

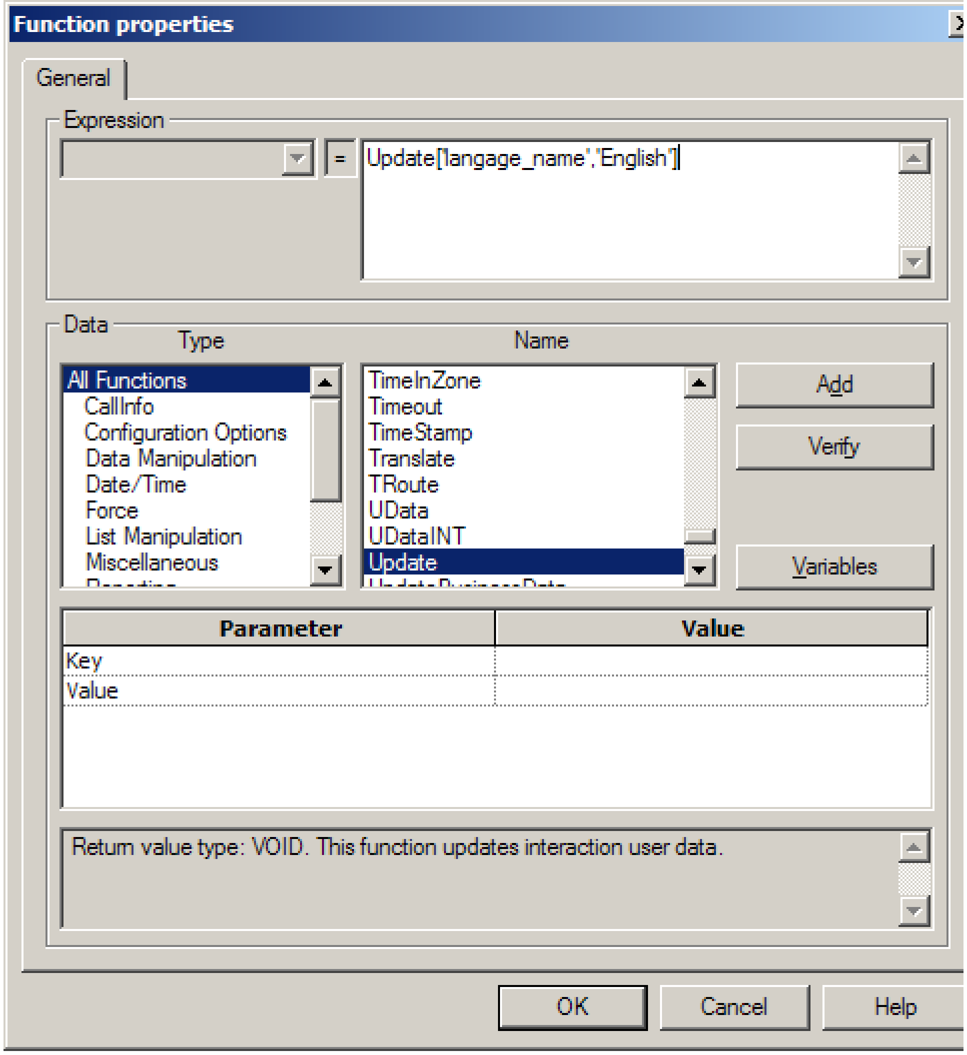
2. If the call matches the `Business Rule` shown in Figure 12 on page 33, it is routed to the corresponding Function object.

   For each branch of the Business Segmentation object in Figure 11 on page 33:

   English, new accounts (`br_new_english`)
   Spanish, new accounts (`br_new_spanish`)
   English, existing accounts (`br_existing_english`)
   Spanish, existing accounts (`br_existing_spanish`)

   a Function object updates the interaction with the customer’s preferred language previously entered via the IVR.

   Figure 15 shows the Function object used for updating the new accounts english segment (top segment in Figure 11 on page 33).


Function properties
General
Expression
=
Data
Type
All Functions
CallInfo
Configuration Options
Data Manipulation
Date/Time
Force
List Manipulation
Miscellaneous
Name
TimeInZone
Timeout
TimeStamp
Translate
TRoute
UData
UDataINT
Update
Add
Verify
Variables
OK
Cancel
Help

Expression: `Update['langage_name','English']`

Parameter	Value
Key	
Value	

Return value type: VOID. This function updates interaction user data.

Figure 15: Function Object for Updating Interaction (English)

3. For each branch of the Business Segmentation object:

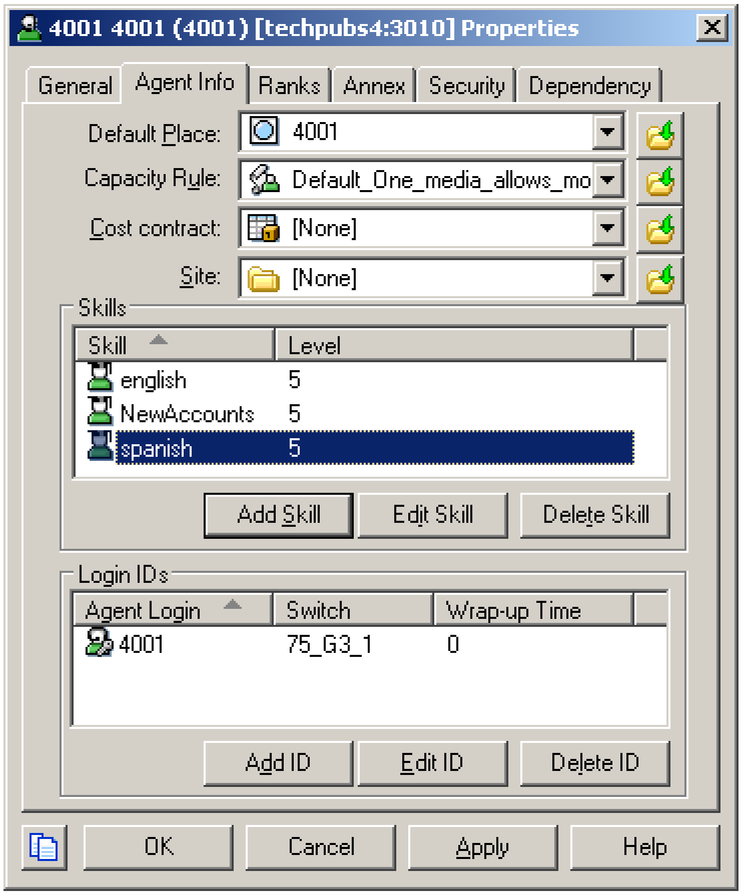
English, new accounts (`br_new_english`)

Spanish, new accounts (`br_new_spanish`)

English, existing accounts (`br_existing_english`)

Spanish, existing accounts (`br_existing_spanish`)

a corresponding Routing Selection object targets an agent group with the required language/account skill. Figure 16 shows how a `Person` (agent) object with `english`, `spanish`, and `NewAccounts` skills might appear in the Configuration Manager `Person` properties dialog box.



4001 4001 (4001) [techpubs4:3010] Properties

Default Place: 4001

Capacity Rule: Default_One_media_allows_mo

Cost contract: [None]

Site: [None]

Skills

Skill	Level
english	5
NewAccounts	5
spanish	5

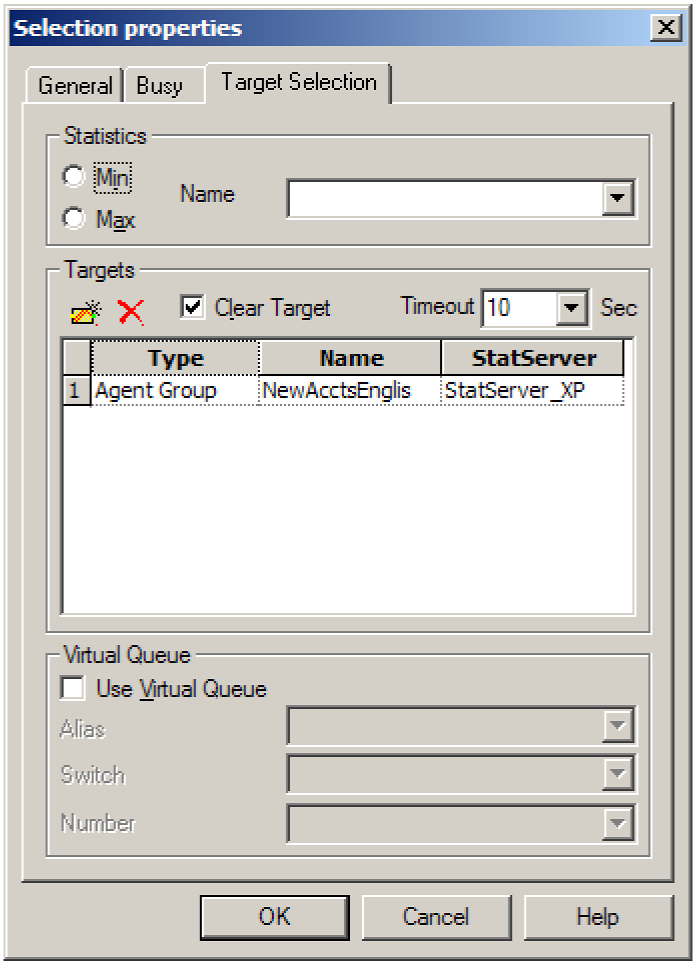
Login IDs

Agent Login	Switch	Wrap-up Time
4001	75_G3_1	0

General
Agent Info
Ranks
Annex
Security
Dependency
Add Skill
Edit Skill
Delete Skill
Add ID
Edit ID
Delete ID
OK
Cancel
Apply
Help

Figure 16: Agent Object in Configuration Manager, Agent Info Tab

Figure 17 shows the properties dialog box for the Routing Selection object shown in the strategy in Figure 11 on page 33.


Selection properties
General
Busy
Target Selection
Statistics
Min
Max
Name
Targets
Virtual Queue
Alias
Switch
Number
OK
Cancel
Help

☑ Clear Target Timeout 10 Sec

	Type	Name	StatServer
1	Agent Group	NewAcctsEnglis	StatServer_XP

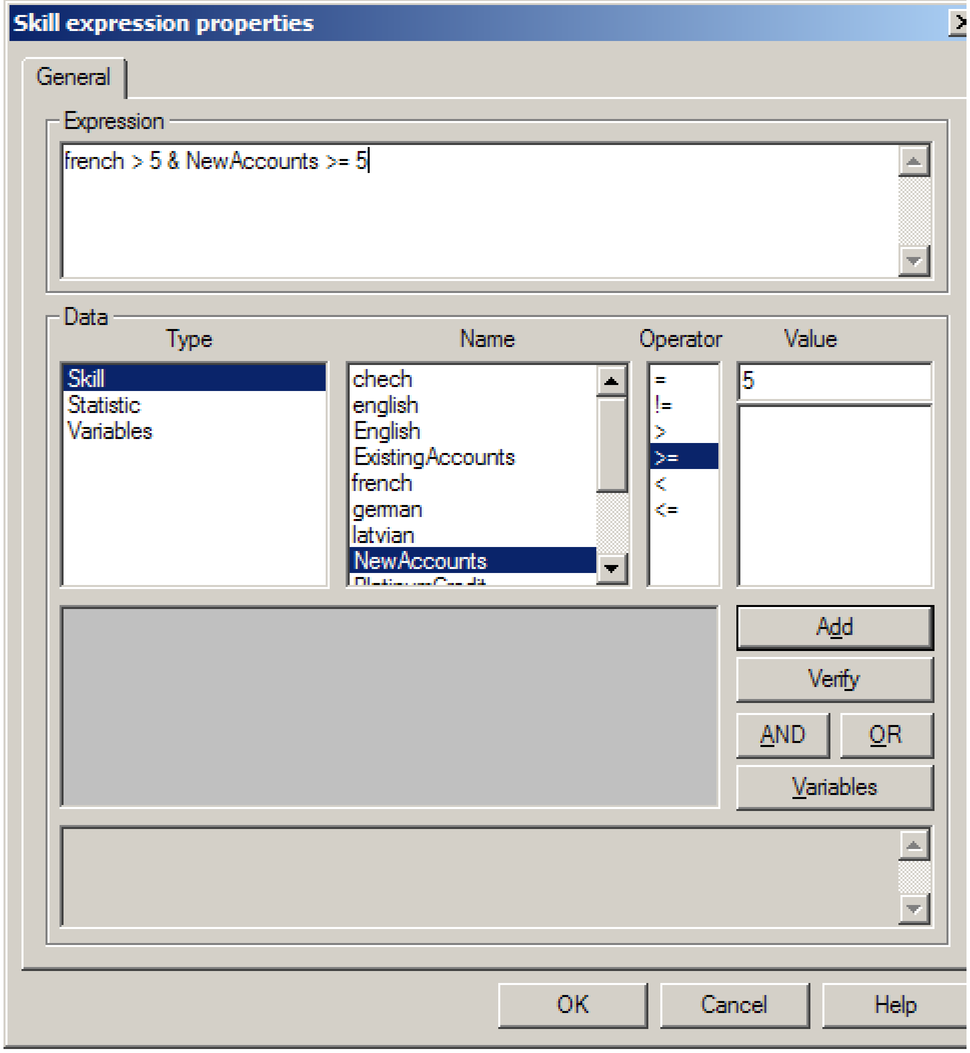
☐ Use Virtual Queue

Figure 17: Routing Selection Properties Dialog Box

4. If an agent is not available within 10 seconds, the interaction goes through the red port to the `Default Destination`, as specified in Universal Routing Server options.

Routing Based On a Skill Expression

You can also route interactions to the most appropriately skilled agent using a skill expression created in IRD’s Expression Builder. Figure 18 shows the `Skill Expression Properties` dialog box after constructing a skill expression.


Skill expression properties
General
Expression
Data
Type
Name
Operator
Value
Skill
Statistic
Variables
chech
english
English
ExistingAccounts
french
german
latvian
NewAccounts
=
!=
>
>=
<
<=
Add
Verify
AND
OR
Variables
OK
Cancel
Help

Expression: french > 5 & NewAccounts >= 5

Value: 5

Figure 18: Skill Expression Properties Dialog Box

For information on using skill expressions as routing targets and building expressions, see *Universal Routing 7.6 Reference Manual*

Functions for Skills-Based Routing

As described in the *Universal Routing 7.6 Reference Manual*, IRD functions selected in the Function object (see Figure 15 on page 35) that support skill expressions include:

- CountSkillInGroup
- GetSkillInGroup
- CreateSkillGroup
- Multiskill

IRD Objects for Skills-Based Routing

As described in the *Universal Routing 7.6 Reference Manual*, the following IRD strategy-building objects allow the `Skill` routing target:

- Selection
- Statistics
- Service Level
- Route Interaction
- Workbin

Note: The name of skills, if used in a skill expression, cannot exceed 126 bytes.

Chapter

3 Business Priority Routing

Business-priority routing encompasses specialized selection criteria that URS can consider when routing, including *priority*, *interaction age*, *what-if wait time*, and *service objective risk factor*.

Note: Business priority routing is supported for multimedia interactions only when using Genesys Internet Contact Solution 6.5.

These selection criteria are in addition the types of routing described in the section on Universal Routing Capabilities in the *Universal Routing 7.6 Deployment Guide*.

This chapter contains the following topics:

- Use Case, page 41
- Available Selection Criteria, page 42
- Recommended Settings, page 48

Use Case

In contact centers, it is common for an agent to be a member of multiple agent groups (real or virtual). It is also common for an agent to be able to receive interactions from multiple virtual queues. When such an agent becomes available, there can be multiple interactions waiting to be handled at the head of different virtual queues. The diagram in Figure 19 illustrates this scenario.

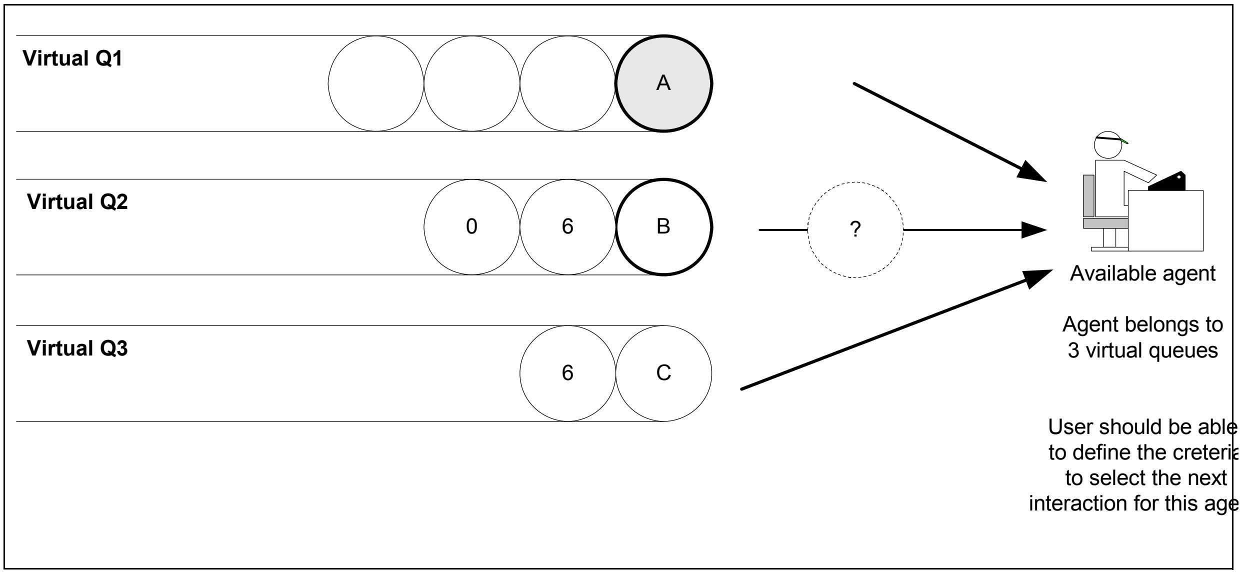

Virtual Q1
A
Virtual Q2
0
6
B
?
Virtual Q3
6
C
Available agent
Agent belongs to
3 virtual queues
User should be able
to define the creteri
to select the next
interaction for this age

Figure 19: Agent with Interactions Waiting From Multiple Virtual Queues

In the above scenario, URS can decide which interaction is the most suitable for this agent based on the user-defined selection criteria discussed in this chapter.

Available Selection Criteria

In Universal Routing, you can route based on the following criteria:

- Highest priority interaction
- Longest current wait time
- Interaction with oldest age
- “What-if” wait time
- Highest risk factor in service objective based on current wait time
- Highest risk factor in service objective based on age of interaction
- Highest risk factor in service objective based on predicted wait time

The sections that follow discusses each method of selection.

Selecting the Highest Priority Interaction

Objective: Select the highest priority interaction when an agent can receive interactions of various priorities from multiple virtual queues.

Benefit: Prevents URS from routing a lower-priority item an agent who belongs to multiple target groups.

Business Scenario

- Interactions are queued to Virtual Q1.
- Interactions are queued to Virtual Q2.
- Agent can receive interactions from VQ1 and VQ2.

As shown in Figure 20, interactions with highest priority (at the head of the VQ1 with priority 10) are routed to the agent.

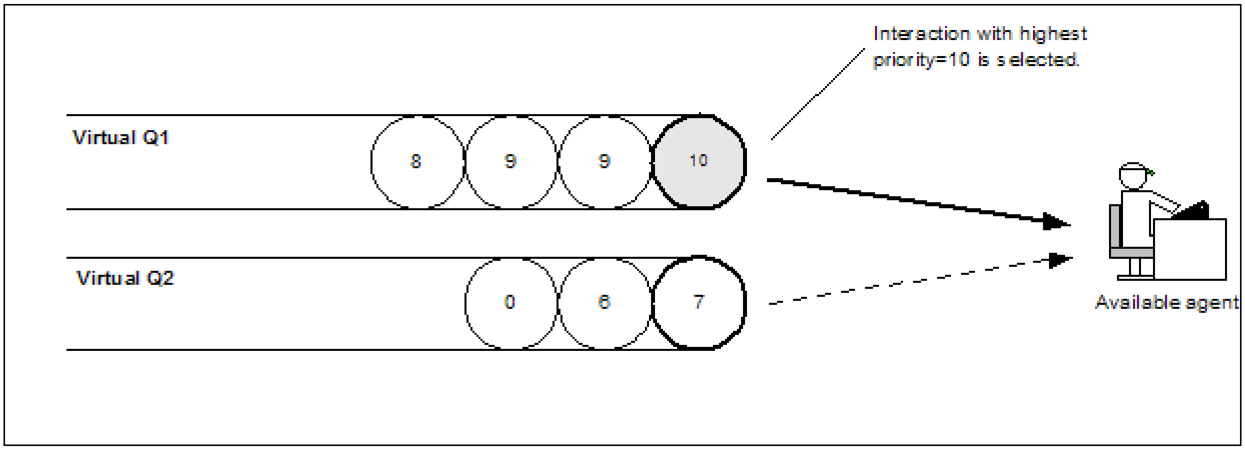


Figure 20: Highest Priority Interaction Selected

Selecting the Interaction with Longest Current Wait Time

Objective: Select the next interaction for an agent (who can be a member of multiple targets, such as multiple virtual queues) based on the current wait time in the virtual queue. The interaction with the longest current wait time in virtual queue is routed to an agent.

Definition: The current wait time is the amount of time that the interaction has been waiting in the virtual queue.

Benefit: Provides fair selection of interactions when customer is using FIFO routing.

Business Scenario

- Interactions are queued to Virtual Q1.
- Interactions are queued to Virtual Q2.
- Agent can receive interactions from VQ1 and VQ2.

As shown in Figure 21, the interaction with longest current wait time (at the head of the VQ1 with 60 second current wait time) is routed to the agent.

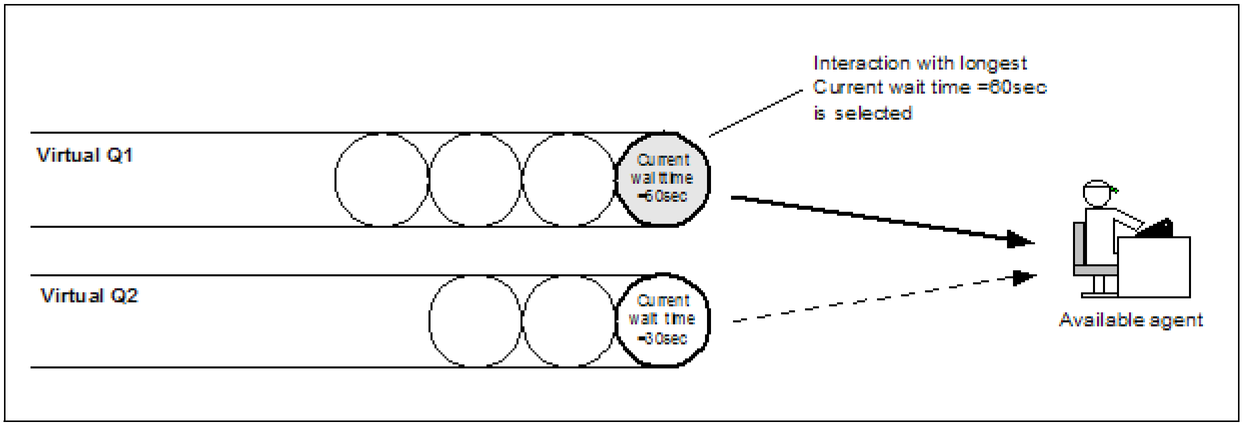

Interaction with longest
Current wait time =60sec
is selected
Virtual Q1
Current
wait time
=60sec
Virtual Q2
Current
wait time
=30sec
Available agent

Figure 21: Interaction with Longest Current Wait Time Selected

Selecting an Interaction with the Oldest Age

Objective: Select the next interaction for an agent (who can be a member of multiple targets, such as multiple virtual queues) based on the interaction lifespan or age of interaction. URS routes the oldest interaction to an agent.

Definition: Age of interaction is the time accumulated since the interaction was first recognized by the Genesys software. To route by age of interaction, you must set function SetInteractionAge to `true` in the strategy at the first route point the interaction enters.

Benefit: Well-suited for contact centers that have many interaction collaborations and transfers among teams to fulfill customer requests.

Business Scenario

- Interactions are queued to Virtual Q1.
- Interactions are queued to Virtual Q2.
- Agent can receive interactions from VQ1 and VQ2.

See Figure 22 for a diagram.

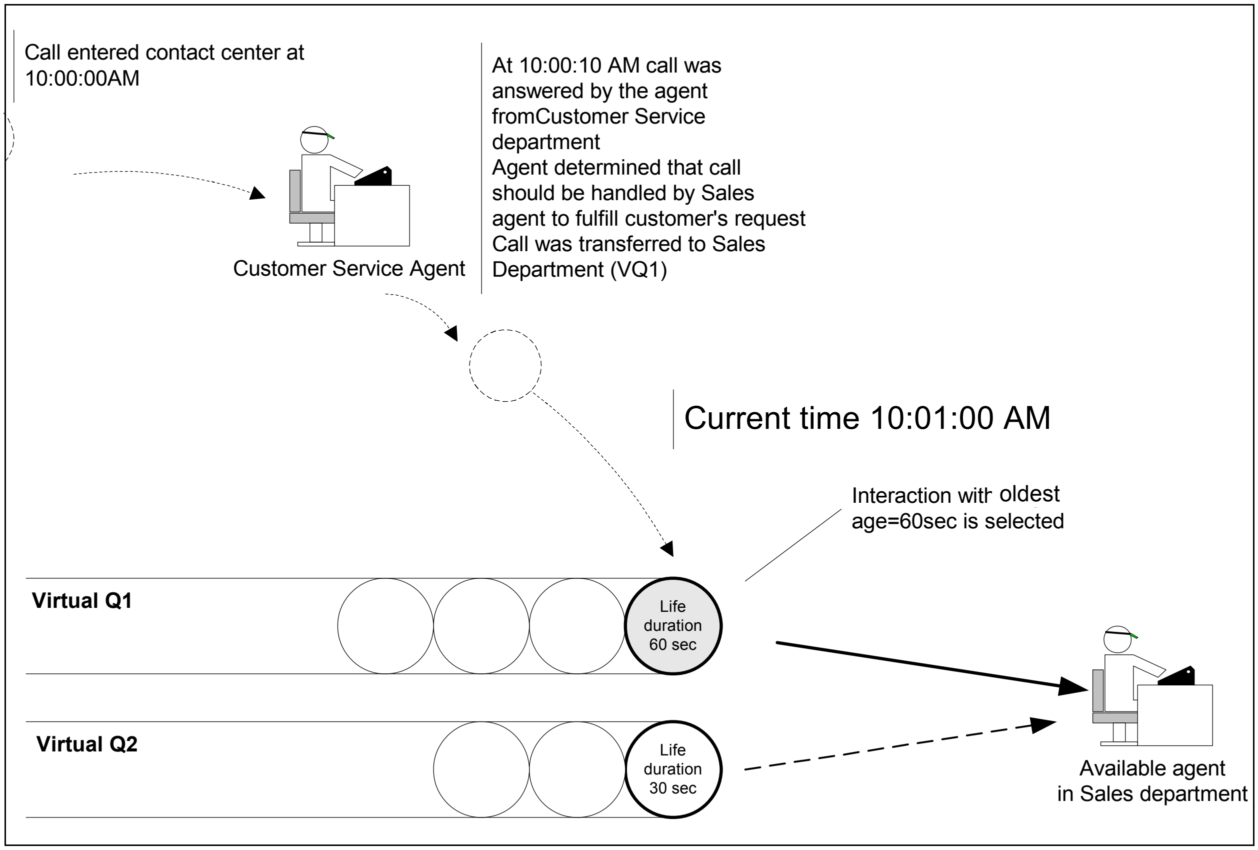

Call entered contact center at 10:00:00AM
At 10:00:10 AM call was answered by the agent fromCustomer Service department
Agent determined that call should be handled by Sales agent to fulfill customer's request
Call was transferred to Sales Department (VQ1)
Customer Service Agent
Current time 10:01:00 AM
Interaction with oldest age=60sec is selected
Virtual Q1
Life duration 60 sec
Virtual Q2
Life duration 30 sec
Available agent in Sales department

Figure 22: Interaction With Oldest Age Selected

Selecting Based On “What-If” Wait Time

Objective: In an interaction-surplus scenario, select the next interaction for an agent (who can be a member of multiple targets, such as multiple virtual queues) by evaluating the worst-wait scenario if this interaction is not routed to the one currently available skilled agent right away (that is, evaluate the what-if scenario).

This interaction selection method is based on the observation that an overstaffed virtual queue tends to have interactions distributed faster than an understaffed queue. When an agent is shared among these unevenly staffed virtual queues, URS must decide which interaction from the queues must be routed first to the shared agent.

URS will predict the what-if wait time for each interaction for those queues. The what-if wait time of each interaction is the current wait time plus additional predicted wait time if a counterpart interaction is routed instead. URS will select the interaction for routing with the longest what-if wait time.

Definition: What-if wait time is the current wait time plus the additional predicted wait time if another competing interaction is routed instead. Technically, it is the current wait time plus the average speed of distributing interactions from the virtual queue.

Benefit: Favors the selection of an interaction from the understaffed queue. Balances the routing opportunity between overstaffed and understaffed queues, making sure that routing from the understaffed queue does not lack behind.

Business Scenario

- Interactions are queued to Virtual Q1 - Agent Group 1 with 10 agents.
- Interactions are queued to Virtual Q2 - Agent Group 2 with 30 agents.
- Agent belongs to Agent Group 1 and Agent Group2 - can receive interactions from VQ1 and VQ2.
- A call queued to VQ1 staffed with a small number of agents has only been waiting in queue for 30 seconds. It has a predicted wait time of an additional 90 seconds because of the small number of agents assigned to the skill.
- Call queued to VQ1 which is staffed by many agents has been waiting for 60 seconds, but is predicted to wait in queue for an agent for only 15 seconds.

Predicted wait time will select the call for the specialized skill first, because its overall predicted wait time will be 120 seconds (30 +90). The other call will continue to wait in queue because its overall predicted wait time is only 75 seconds. See Figure 23 for a diagram.

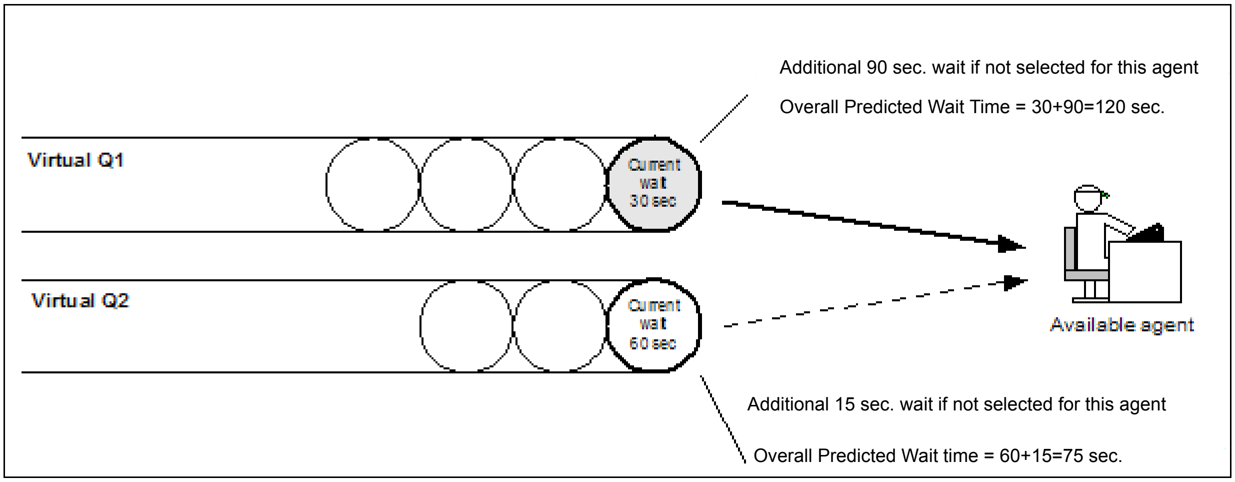

Additional 90 sec. wait if not selected for this agent
Overall Predicted Wait Time = 30+90=120 sec.
Virtual Q1
Current wait 30 sec
Virtual Q2
Current wait 60 sec
Available agent
Additional 15 sec. wait if not selected for this agent
Overall Predicted Wait time = 60+15=75 sec.

Figure 23: Interaction With Longest Predicted Wait Time Selected

Selecting Based On Highest Risk Factor of Service Objective

Objective: Selects the next interaction for an agent (who can be a member of multiple targets, such as multiple virtual queues) by determining which interaction is most at risk relative to its particular time objective for servicing (service objective). Using this method, strategy developers can assign priority and incremental values to waiting interactions. The end result is that each interaction has a fair chance of being addressed within an acceptable service objective.

Benefit: Among queues, favors the selection of the interaction that has been waiting longest and has the highest risk of missing its service objective. This method is mainly used by voice contact centers that use first in/first out (FIFO) routing (i.e. not using priority in strategies) where straight FIFO adherence can be overridden by risk factor of service objective.

Types of Risk Factors

There are different types of risk factors for service objective that you can use to address the specific needs of your contact center.

1. Risk factor in service objective based on current wait time is calculated as current wait time divided by service objective.
2. Risk factor in service objective based on age of interaction is calculated as age of interaction divided by service objective.

   Benefit: This selection method can be used by contact centers that have a lot of collaboration and transfer of interactions among teams in order to fulfill a customer request. The measurement of service level of the contact center is not based on queue level, but instead is based on the combined service objective. An example is a contact center that needs a customer interaction to be responded to within 24 hours, no matter how many different parties collaborate in the response.
3. Risk factor in service objective base on predicted wait time is calculated as predicted wait time divided by service objective.

   Benefit: This selection method can be used by contact centers that want to use predicted wait time in an interaction surplus scenario, but also want service objective adherence.

Business Scenario

- Interaction are queued to Virtual Q1.
- Interaction are queued to Virtual Q2.
- Agent can receive interactions from VQ1 and VQ2.
- Current wait time of voice interaction in VQ1 is 10 seconds. Service objective for voice interactions is 20 seconds. Risk factor in service objective: 10/20 = 0.5.
- Current wait time of voice interaction in VQ2 is 15 seconds. Service objective for voice interactions is 20 seconds. Risk factor in service objective: 15/20 = 0.75.

As shown in Figure 24, the Interaction in Virtual Q1 will be routed to an agent.

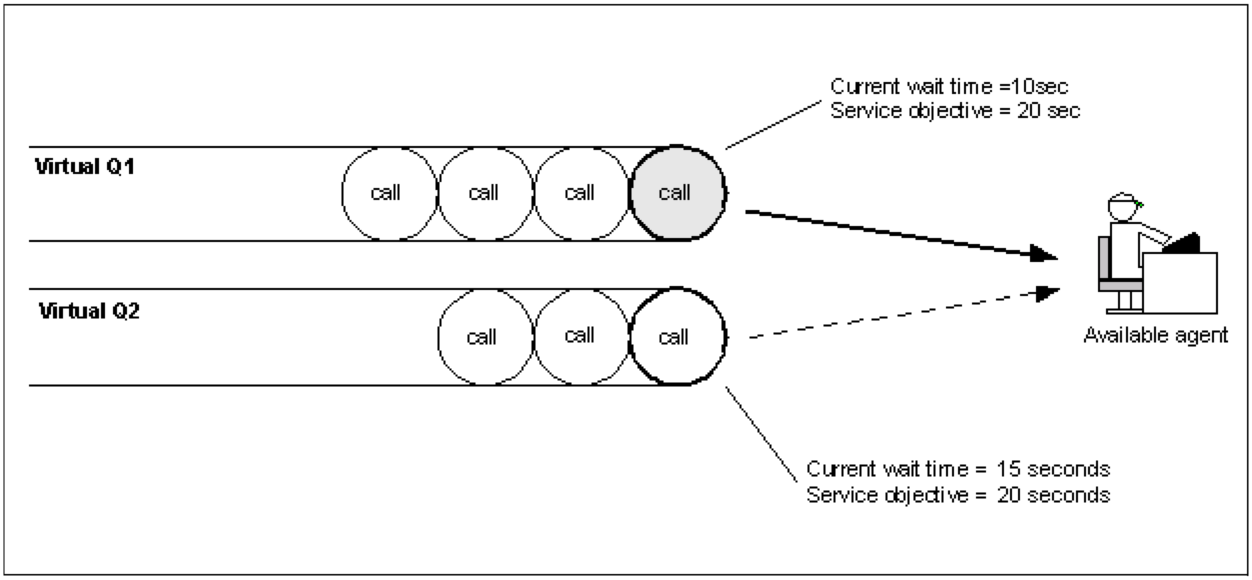

Current wait time =10sec
Service objective = 20 sec
Virtual Q1
call
call
call
call
Virtual Q2
call
call
call
Available agent
Current wait time = 15 seconds
Service objective = 20 seconds

Figure 24: Interaction With Highest Risk Factor of Service Objective Selected

Recommended Settings

Service objective, as used in the Recommended Settings table below, is the time objective to service a voice interaction.

Table 1 gives recommended settings to both intelligently route voice interactions and achieve business-priority routing based on contact center characteristics. For detailed information on the objects, functions, and options in the Configuration column of Table 1, see the *Universal Routing 7.6 Reference Manual*.

Note: Business priority routing is supported for multimedia interactions only when using Genesys Internet Contact Solution 6.5.

Table 1: Recommended Settings

Contact Center Characteristic	Applicable For Voice / MM		Configuration	How Selection Is Made
Interactions queued by FIFO.	X	X	• No special setting required.	
Route based on customer segmentation indicated by priority setting. Normally number of customer segments is small (of 3-4* levels).	X		• Use function Priority or SetVQPriority as needed.	Interaction with the highest priority will be selected. Among equal priorities interaction will be selected randomly.
Route based on combination of: • Interactions queued by FIFO. • Competing interaction is evaluated by service objective based on customer segment. Have more then 4 levels of customer segmentation.	X	X	• First set up Objective Tables in Configuration Layer. Then use function FindServiceObjective to associate interactions with predefined business attributes and predefined service objective. Or use the MultiAttach object to override the predefined service objective. Set option `use_service_objective` to `true`.	Interaction with the highest risk factor in service objective based on current wait time will be selected.
Route based on combination of: • Interactions queued by FIFO. • Contact center staffs queues unevenly and agents are shared among these queues.	X		• Use function PriorityTuning with parameter `UsePrediction` set to `true`.	Interaction with the highest risk factor in service objective based on predicted wait time will be selected.
Route based on combination of: • Interactions queued by FIFO. • Business process and call flow requires many transfers/collaborations.	X		• Use function PriorityTuning with parameter `UseAgeOfInteraction` set to `true`; might also set `SetInteractionAge` to `true`.	Interaction with the oldest age will be selected.

Table 1: Recommended Settings (Continued)

Contact Center Characteristic	Applicable For Voice / MM		Configuration	How Selection Is Made
Route based on combination of: • Interactions queued by FIFO. • Business process and call flow requires many transfers/collaborations. • Contact center staffs queues unevenly and agents are shared among these queues.	X		• Use function PriorityTuning with parameter `UseAgeOfInteraction` to `true`; might also set function `SetInteractionAge` to `true`. • Use function PriorityTuning with parameter `UsePrediction` set to `true`.	Interaction with the highest sum of age plus predicted wait time will be selected.
Route based on combination of: • Interactions queued by FIFO. • Uneven staffing among queues. • Competing interaction is evaluated by service objective based on customer segment.	X	X	• Use function PriorityTuning with parameter `UsePrediction` set to `true`. • First set up Objective Tables in Configuration Layer. Then use function FindServiceObjective to associate interactions with predefined business attributes and predefined service objective. Or use the MultiAttach object to override the predefined service objective. Set option `use_service_objective` to `true`.	Interaction with the highest risk factor in service objective based on predicted wait time will be selected.

Table 1: Recommended Settings (Continued)

Contact Center Characteristic	Applicable For Voice / MM		Configuration	How Selection Is Made
Route based on combination of: • Interactions queued by FIFO. • Business process and call flow requires many transfers/collaborations. • Competing interaction is evaluated by service objective based on customer segment.	X	X	• Use function PriorityTuning with parameter UseAgeOfInteraction to true; might also set function SetInteractionAge to true. • First set up Objective Tables in Configuration Layer. Then use function FindServiceObjective to associate interactions with predefined business attributes and predefined service objective. Or use the MultiAttach object to override the predefined service objective. Set option `use_service_objective` to `true`.	Interaction with the highest risk factor in service objective based on age of interaction will be selected.
Route based on combination of: • Interactions queued by FIFO. • Business process and call flow requires many transfers/collaborations. • Uneven staffing among queues. • Competing interaction is evaluated by service objective based on customer segment.	X	X	• Use age of interaction. • Use function PriorityTuning with parameter UsePrediction set to true. • First set up Objective Tables in Configuration Layer. Then use function FindServiceObjective to associate interactions with predefined business attributes and predefined service objective. Or use the MultiAttach object to override the predefined service objective. Set option `use_service_objective` to `true`.	Interaction with the highest risk factor in service objective based on predicted wait plus age of interaction will be selected.

Table 1: Recommended Settings (Continued)

Contact Center Characteristic	Applicable For Voice / MM		Configuration	How Selection Is Made
Route based on combination of: • Priority of customer segmentation. • Competing interaction is evaluated by service objective based on customer segment.	X	X	• Use function Priority or SetVQPriority as needed. • First set up Objective Tables in Configuration Layer. Then use function FindServiceObjective to associate interactions with predefined business attributes and predefined service objective. Or use the MultiAttach object to override the predefined service objective. Set option `use_service_objective` to `true`.	Interaction with the highest priority will be selected. Among equal priorities, the interaction with the highest risk factor in service objective based on current wait time will be selected.
Route based on combination of: • Priority of customer segmentation. • Contact center staffs queues unevenly and agents are shared among these queues.	X		• Use function Priority or SetVQPriority as needed. • Use function PriorityTuning with parameter `UsePrediction` set to `true`.	Interaction with the highest priority will be selected. Among equal priorities, the interaction with the highest predicted wait time will be selected.
Route based on combination of • Priority of customer segmentation. • Business process and call flow requires many transfers/collaborations.	X		• Use function Priority or SetVQPriority as needed. • Use function PriorityTuning with parameter `UseAgeOfInteraction` to `true`; might also set function `SetInteractionAge` to `true`.	Interaction with the highest priority will be selected. Among equal priorities, the interaction with the oldest age will be selected.

Table 1: Recommended Settings (Continued)

Contact Center Characteristic	Applicable For Voice / MM		Configuration	How Selection Is Made
Route based on combination of: • Priority of customer segmentation. • Competing interaction is evaluated by service objective based on customer segment. • Contact center staffs queues unevenly and agents are shared among these queues.	X	X	• Use function Priority or SetVQPriority as needed. • First set up Objective Tables in Configuration Layer. Then use function FindServiceObjective to associate interactions with predefined business attributes and predefined service objective. Or use the MultiAttach object to override the predefined service objective. Set option `use_service_objective` to `true`. • Add customer segmentation. • Set interaction predicted wait time.	Interaction with the highest priority will be selected. Among equal priorities, the interaction with the highest risk factor in service objective based on predicted wait time will be selected.
Route based on combination of: • Priority of customer segmentation. • Competing interaction is evaluated by service objective based on customer segment. • Business process and call flow requires many transfers/collaborations.	X	X	• Use function Priority or SetVQPriority as needed. • First set up Objective Tables in Configuration Layer. Then use function FindServiceObjective to associate interactions with predefined business attributes and predefined service objective. Or use the MultiAttach object to override the predefined service objective. Set option `use_service_objective` to `true`. • Use function PriorityTuning with parameter `UseAgeOfInteraction` to `true`; might also set function `SetInteractionAge` to `true`.	Interaction with the highest priority will be selected. Among equal priorities, the interaction with the highest risk factor in service objective based on age of interaction will be selected.

Table 1: Recommended Settings (Continued)

Contact Center Characteristic	Applicable For Voice / MM		Configuration	How Selection Is Made
Route based on combination of: • Priority of customer segmentation. • Contact center staffs queues unevenly and agents are shared among these queues. • Business process and call flow requires many transfers/collaborations.	X		• Use function Priority or SetVQPriority as needed. • Use function PriorityTuning with parameter `UsePrediction` set to `true`. • Use function PriorityTuning with parameter `UseAgeOfInteraction` to `true`; might also set function `SetInteractionAge` to `true`.	Interaction with the highest priority will be selected. Among equal priorities, the interaction with the highest sum of age plus predicted wait time will be selected.
Route based on combination of: • Priority of customer segmentation. • Contact center staffs queues unevenly and agents are shared among these queues. • Business process and call flow requires many transfers/collaborations. • Competing interaction is evaluated by service objective based on customer segment.	X	X	• Use function Priority or SetVQPriority as needed. • Use function PriorityTuning with parameter `UsePrediction` set to `true`. • Use function PriorityTuning with parameter `UseAgeOfInteraction` to `true`; might also set function `SetInteractionAge` to `true`. • First set up Objective Tables in Configuration Layer. Then use function FindServiceObjective to associate interactions with predefined business attributes and predefined service objective. Or use the MultiAttach object to override the predefined service objective. Set option `use_service_objective` to `true`.	Interaction with the highest priority will be selected. Among equal priorities, the interaction with the highest risk factor in service objective based on age of interaction plus prediction will be selected.
* An arbitrary number.				

Note: For information on implementing the various selection criteria, see the *Universal Routing 7.5 Reference Manual*, specifically the chapters on Interaction Routing Designer objects, functions, and options.

Chapter

4

Cost-Based Routing

Note: This chapter presents a high-level overview of cost-based routing. For detailed information, as well as instructions on how to configure a cost-based routing solution, refer to the *Universal Routing 7.6 Cost-Based Routing Configuration Guide*.

With a cost-based routing (CBR) solution, Universal Routing Server (URS) can:

- Calculate the cost of routing to any target based on configuration information, statistical values, and its own data.
- Use the cost of routing to target as additional target selection criteria.
- Use information contained in strategies to activate/de-active cost-based routing during target selection.
- Automatically attach to interactions information that can be used for cost-based routing reporting.

While the cost-based routing model described in this chapter is not media-specific, Universal Routing currently supports cost-based routing for voice (TDM or VOIP) interactions only.

The information in this chapter is divided among the following topics:

- What Is a CBR Routing Solution?, page 58
- Interaction Types, page 59
- Cost as an Agent Property, page 61
- Cost-Based Routing Reporting, page 62
- Features and Benefits of CBR, page 64
- Limitations, page 65

What Is a CBR Routing Solution?

A *routing solution* refers to the method of, and configuration elements for, getting a customer interaction to the right target in the shortest amount of time. In the case of a CBR solution, URS considers the cost of routing to a target, comprised of the *Infrastructure* cost and/or the *Resource* cost, as additional selection criteria when choosing the right target.

Infrastructure Cost

Infrastructure cost is related to items such as switches, phones, transport layer, and so on. It is the cost to transfer an interaction from Site A to Site B including Sites associated with Switches that can service multiple locations. Or it can be the cost to transfer an interaction back to the Enterprise from a Site. You can also define Infrastructure cost for an interaction that is being sent from Switch A to an outsourcer whose Resources (agents, DNs, and so on) are not defined by Genesys (see "Non-Configured DNs" below). Infrastructure cost is associated with a Configuration Layer entity called a `Site` object.

Resource Cost

A Resource can be a human (agent, knowledge worker, employee, and so on defined as a `Person` object) or a non-human (IVR, IVR port, and so on) entity that belongs to the Enterprise or Network Provider.

Resources can also include outsourcers. For the purpose of CBR, there are two types of outsourcers:

- An outsourcer that is involved only in staffing (supplying agents). In this case, the Enterprise is responsible for supplying the Infrastructure. For this type of outsourcer, the Enterprise's Genesys software can monitor the outsourcer's Resources, such as DNs and agents.
- An outsourcer that manages everything from Infrastructure to staffing. For this type of outsourcer, the Enterprise's Genesys software does not have the necessary visibility to monitor the outsourcer's Resources (DNs, agents, and so on) because the outsourcer does not have the Genesys software installed. The routing targets are typically expressed as non-configured DNs (see "Non-Configured DNs" below).

Resource cost is represented by a Configuration Layer entity called a `Cost Contract` object.

Both contact center Infrastructure cost and Resource cost use the same cost unit (US cents, euros, or abstract units). It is the responsibility of the user to consistently use the same cost units when configuring a CBR solution.

Non-Configured DNs

Certain types of `DN` objects in the Configuration Database can have associated `Cost Contract` objects. However, if a particular DN is associated with a routing destination where the Genesys software is not installed, Stat Server cannot monitor the DN for the purpose of generating state and statistical information. In this case, the main usage for such a DN is to enable the routing of calls to a *non-monitored destination* (a Site where there is no Genesys software installed). This is a common practice for hosted vendors who route calls in load balancing mode to different Sites that might not be Genesys customers.

Interaction Types

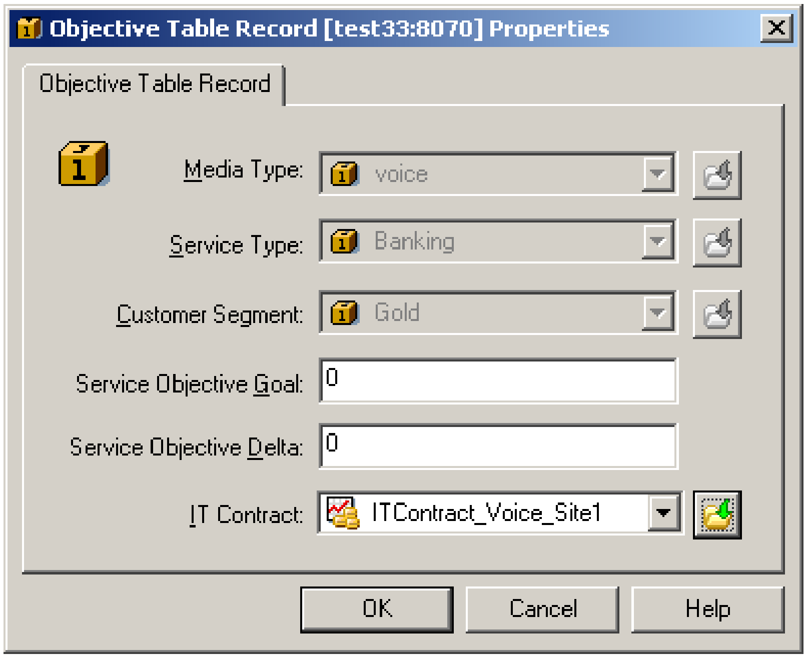
Resource cost is represented in Configuration Layer by a `Cost Contract` object, which is comprised of Interaction Type (IT) contracts and Interaction Type (IT) records. Interaction Types for a `Cost Contract` object are different combinations of:

```
Media Type + Service Type + Customer Segment
```

Example Interaction Types:

```
voice + Service + Gold
voip + Sales + Silver
```

In effect, each Interaction Type record represents an Interaction Type contract. Figure 25 shows an example Interaction Type record:



Media Type: voice
Service Type: Banking
Customer Segment: Gold
Service Objective Goal: 0
Service Objective Delta: 0
IT Contract: ITContract_Voice_Site1

Figure 25: Example Interaction Type Record

Interaction Type Contracts

Genesys offers two kinds of processing for Interaction Type contracts:

1. **Variable rate**, which does not impose any volume commitment from the Enterprise. Since there is no volume commitment, the cost is typically higher than the volume rate discussed below.
2. **Volume-based**. Since there is a volume commitment, the negotiated cost can be a more of a “bargain” price.

Note: The same `Cost Contract` object can have a Variable Rate contract for one Interaction Type and a Volume contract for another Interaction Type. You indicate whether to use a Variable rate or Volume processing for an Interaction Type by the `IT Contract` object you specify in the `Cost Contract` object.

Variable Rate Contract

When creating a new `IT Contract` object, you can select `Variable Rate Contract`. If selected, you can then choose between `Flat` and `Agent Hourly`.

- For flat rate per interaction processing, you enter a value in dollars and cents.
- For agent hourly processing, you also enter a value in dollars and cents. URS calculates the variable rate based on the Average Handling Time statistic.

Volume Contract

When creating a new `IT Contract` object, you can also select `Volume Contract`. With a Volume contract, URS calculates the price of an interaction based on a `Day Contract` object.

Day Contract

A `Day Contract` object defines:

- A forecasted volume for each time interval (called a *volume period*).
- A base rate for each interaction in the volume period.
- Over and under penalties (if applied).

With Volume contracts, URS counts the number of interactions sent to every target during a specific interval. URS derives the cost of interactions by comparing these numbers with forecasted volumes during the same period.

- If the actual number of interactions routed within the current period is within the forecasted boundary, URS evaluates each potential routing destination by using a predefined base rate per interaction.
- If the actual number of interactions routed within the current period is over or under the forecasted boundary, URS includes overflow/underflow penalty cost information when it calculates the cost for each potential routing destination.

Note: Day Contracts do not apply to Variable-rate IT Contracts.

The end result of defining Interaction Types are records in a cost contract table read by URS when calculating the Resource cost of an interaction.

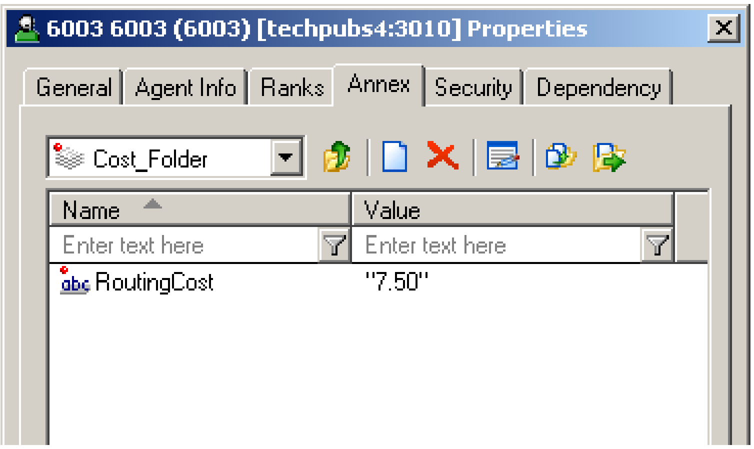
Cost as an Agent Property

Configuring a full-scale CBR solution may not always be the best approach. Deploying and maintaining a full-scale CBR solution can be a complex task. For example, some Sites may want only simple cost-based routing, not a cost-based routing solution. In such cases, Universal Routing provides a lighter alternative to a full-scale solution. You may wish to do this if:

- There is no need to define Cost Contracts for different Interaction Types.
- Agent cost is based on a flat rate per call.
- You do not plan to use Infrastructure cost.

Specifying Agent Cost in the Annex Tab

Figure 26 shows an example of how agent cost might look when specified in the `Annex` tab of the `Person Properties` dialog box.



Cost_Folder

Name	Value
RoutingCost	"7.50"

Figure 26: Person Properties, Annex Tab

Cost-Based Routing Reporting

Note: This release of cost-based routing does not supply any "out-of-the-box" cost-based routing reports. Instead you can configure Genesys ICON/Info Mart to capture sufficient data from Universal Routing to allow the building of CBR reports as a Genesys Professional Services engagement.

CBR Information Attached to Interactions

URS automatically attaches cost-based routing information to interactions when:

- The URS option `report_targets` is set to `true` (for information on this option, see the *Universal Routing 7.6 Reference Manual).*
- You are implementing Infrastructure and/or Resource cost.

The attached cost-based routing data is propagated into interaction-related event messages from:

- T-Server (for voice interactions). For information on T-Server Event messages, see *Genesys 7 Events and Models Reference Manual.*
- Interaction Server (for non-voice interactions).

Note: Note: This release of CBR supports `voice` and `voip Media Types` only).

Reporting Data Flow

When URS attaches CBR reporting information to interactions, the data flow for generating CBR reports is as follows:

- When configured to do so, Genesys Call Concentrator and ICON process these events and store interaction-specific details in their databases.
- When configured to do so, Genesys Info Mart batch processes use ICON databases as inputs for loading into a Genesys Info Mart database. For more information, see "Special Note on Interaction Attached Data" below.
- The reporting tool of your choice (for example, Hyperion) extracts data from Genesys Info Mart and Genesys Configuration Databases and lets you build custom reports as a Genesys Professional Services engagement.

Figure 27 depicts this graphically.

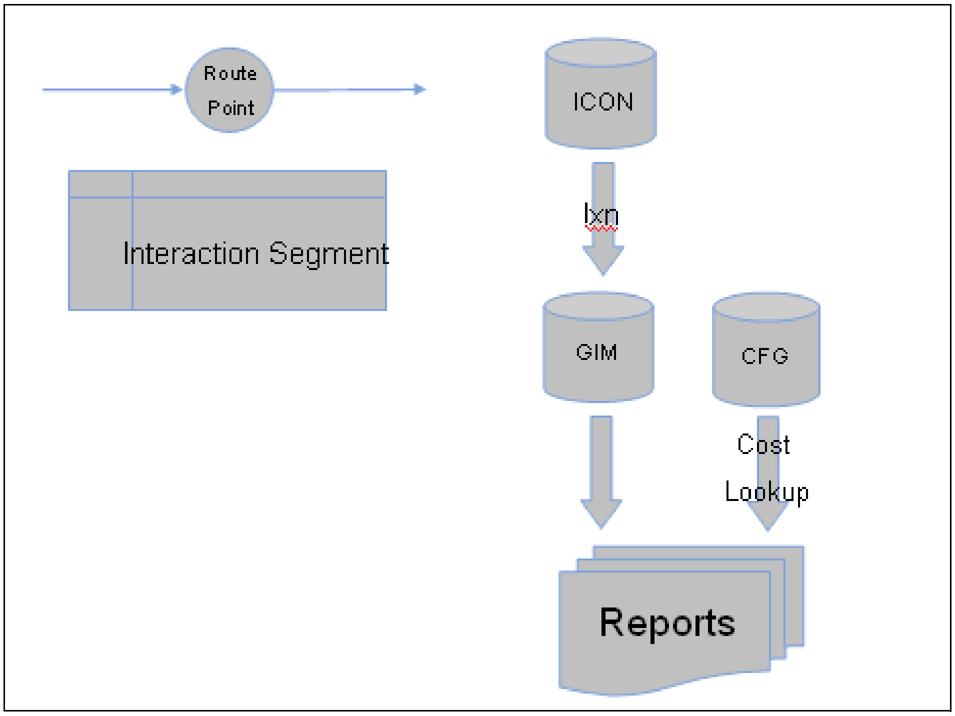


Figure 27: CBR Reporting Data Flow

Special Note on Interaction Attached Data

If default routing occurs, such as when the Switch handles an interaction instead of URS routing, attached data (such as reporting data) can become outdated. This occurs for all types of reporting based on interaction attached data, not just cost-based data. For this reason, Genesys recommends that you work with Professional Services to handle this situation for purposes of reporting.

- You may wish to set the URS option `default-destination` to one that can be monitored by Genesys.
- You can also use the `report_reasons` option, which enables you to add information (database identifier for a Reason code) to interactions regarding the reason for routing. The primary intent is for reporting purposes, to distinguish a URS routing attempt from default routing performed by the switch, such as during cost-based routing.

For information on these options, see the *Universal Routing 7.6 Reference Manual*.

Features and Benefits of CBR

The features of a CBR routing solution are as follows:

- Enables you to define two types of interaction cost: Resource cost and Infrastructure cost. Together, Resource cost and Infrastructure cost comprise the total routing cost of an interaction. You can also define Infrastructure cost for an interaction being sent to a Site (such as an outsourcer) whose Resources (Persons, DNs, and so on) are not defined by Genesys (non-monitored destination).
- To define Infrastructure cost, uses a Configuration Layer entity called a `Site` object to define Sites (remote and otherwise) that URS can potentially route to. Each `Site` object can have its own `Configuration Units` (such as `Persons` (agents), `Switches`, and so on) and references to other Sites that can potentially be routed to (including the transfer cost to each Site).
- You can configure CBR solutions of varying complexity:

  Level 1: Define Infrastructure cost only for Sites to which URS can potentially route.

  Level 2: Define Resource cost only, which is represented in the Configuration Layer by a Cost Contract object. A Cost Contract can use an agent hourly rate, a flat rate per interaction, or a volume-based rate.

  Full-Scale: Use a combination of Level 1 and Level 2.

  You can also define Cost as an agent property in the Configuration Layer.
- You can assign Resource cost to various objects in the Configuration Layer: `Person`, `AgentGroup`, `Place`, `PlaceGroup`, `DN` (certain types), `Site`, and `Tenant`.
- Gives the flexibility of defining Resource cost for different Interaction Types.
- For each Interaction Type defined, you can specify a Dominant Optimization Factor. This factor controls whether URS should use Cost as additional selection criteria or whether it should route based on Performance/Service Objective (minimum/maximum value of a statistic).
- You have the option of defining Resource cost for different Interaction Types based on interaction volume (Volume Contract) or using a variable rate (Variable Rate Contract). If you select variable rate processing, you can specify a flat rate per interaction or use an agent hourly rate/average handling time.
- If you use a Volume Contract, you then define one or more Day Contracts. A Day Contract forecasts interaction volume for a specific day, such as a holiday, day of the week, or a specific day of the year. For each Day Contract, you forecast interaction volume for different volume periods during the day, define a base rate per interaction in each volume period, and penalties for interaction volume over or under the forecast.

- When a Volume Contract is used, URS implements a special pacing and regulating algorithm to evenly distribute the number of interactions sent to a routing destination.
- Existing Configuration Manager objects are extended to support Resource cost: `Objective Table` is extended to represent Cost Contract. `Statistical Table` is extended to represent IT Contract. `Statistical Day` is extended to represent Day Contract. `Business Attribute` is extended to represent IT Record.
- You can activate CBR via a function or an IRD predefined statistic, `RStatCost`.
- Universal Routing provides sample strategy files that demonstrate how to activate and configure cost-based routing.
- Genesys ICON/Info Mart can be configured to capture sufficient data to allow the building of CBR reports as a Professional Services engagement.

Limitations

For information on the limitations of a cost-based routing solution, see the *Universal Routing 7.6 Cost-Based Routing Configuration Guide*.

Note: CBR is not supported in a Federated environment in which Resources are shared across Enterprises, as described in the *Framework 7.5 Federation Proxy Deployment Guide*.

Chapter

5

Share Agent By Service Level Agreement Routing

Note: The routing model described in this chapter is not media-specific. It is applicable to both non-voice (Open-Media) and voice (TDM or VOIP) interactions.

A share agents by *service level agreement* (SLA) routing solution (also called *conditional routing*) enables a business user that manages multiple business lines to define the triggering conditions and constraints that allow agents to be shared among business lines. Applicable to all media types, the solution can work in concert with cost-based routing (see page 57) and business-priority routing (see page 41).

Note: See page 93 for important information on routing models incompatible with a SLA routing solution.

The information in this chapter is divided among the following topics:

- Benefits and Features, page 68
- Problem Addressed By Solution, page 69
- Goal of Solution, page 69
- Use Case, page 70
- Implementing a SLA Solution, page 71
- List Objects in SLA Routing, page 81
- Trigger Conditions Supported, page 91
- Multi-Tiered Design, page 92
- Limitations, page 93

Benefits and Features

Following are the major features and benefits of an SLA solution:

- Allows you to perform conditional routing without the need to configure "looping" in complex strategies.
- Allows you to define triggering conditions for borrowing agents from other business lines as well as the conditions that apply to the lending business line. You do this by constructing a *threshold expression* as described on page 74. A single threshold expression contains both the borrowing and lending conditions.
- See page 91 for detail on the types of triggering conditions supported. In summary, trigger conditions contained in a threshold expression can be stated as:

    The number of interactions of a specific media type currently in queue. This number can also be stated as less than or equal to a user-defined number.

    A requirement to always have X number of agents ready at any time, including X number of agents skilled in a particular media type ready at any time.

    The estimated wait time for a queue exceeding a user-defined number of seconds or minutes.

    A comparison of an IRD predefined statistic or a custom statistic to a user-defined value.

    A comparison to a service level objective; for example, a service level objective of X percent of calls answered within Y number of seconds.

    A comparison of data received from an external enterprise system to a user-defined value.

    The skill criteria for the shared agents from the lending business line. You can use a multi-tier mode to specify how long to wait before extending to the next tier of shared agents from another lender business line. You can also specify how long to wait before switching back to the previous tier.

    From an interface outside of a routing strategy, such as conditions contained in an IRD list object or a Configuration Manager object. When you change a triggering condition from outside the strategy (including agent skills), the change affects existing calls waiting for the business line and new incoming calls.

    Any combination of the above using the relationship operators defined on page 92.

- IRD supplies the following threshold functions to facilitate the use of threshold expressions:

    `data` for routing conditions based on statistics.

`acfgdata` to return a numeric value from a Configuration Layer Application object.

`callage` to return the age of an interaction in seconds.

`lcfgdata` to return a numeric value from an IRD list object.

- URS routes interactions to targets only if both borrowing and lending conditions are met.
- Interactions waiting for the main business line can be routed to skilled agents as the first choice.
- Once URS determines that lending conditions are no longer met, it revokes the agents' shared status so they can once again only handle interactions from their main business line.
- The Universal Routing 7.6 installation package provides sample strategies that demonstrate SLA routing. See "Implementing a SLA Solution" on page 71 for more information.

Problem Addressed By Solution

In certain contact center operation models where there are multiple business lines to manage, a supervisor manages the SLA for a specific business line and the group of agents staffed for it. With a service level agreement, a specific group of agents (bearing some other business skills) can sometimes help handle interactions from other business lines.

Previously, you could only specify overflow conditions from the main business line to agents in other business lines. After that, interactions were queued and delivered to the first agent that became available. In some cases, while occupied with an overflow interaction, a shared agent could sometimes be delayed in responding to interactions from their core business line, which should be the agent's main focus. This could affect performance (Average Speed of Answer, Average Handling Time, and so on) for the agent's core business line.

Goal of Solution

With SLA routing:

- You can define a specific set of activation conditions for the main business line to invoke shared agents (i.e., to borrow agents).
- You can also define the "guarding" conditions so that the shared agents eligible to receive interactions from non-primary business lines do not negatively impact their own business goals.

Below is an example use case for SLA routing.

Use Case

ACME is a company that provides credit card customer services to other companies. It has two main credit card customer services groups (business lines):

1. Customer services for VisaCard.
2. Customer services for MasterCard.

Each card group manager wants to meet their own service level objectives (e.g., number of calls waiting in queue and targeted average handling time per call).

- The VisaCard business line wants to borrow agents from the MasterCard business line only under certain conditions.
- The MasterCard business line only wants to lend agents to the VisaCard business line only if their lender conditions are met.

Borrowing Triggering Conditions

The VisaCard business line defines the triggering conditions to borrow agents from MasterCard as follows:

- If the VisaCard queue has more than 30 voice calls waiting in virtual queue and
- If the number of stolen card in VisaCard system exceeds 200.

Lending Triggering Conditions

The MasterCard business line defines the conditions to lend agent to VisaCard as follows:

- If the MasterCard queue has 0 calls waiting and two agents have the MasterCard skill level >= 5 and with an available voice channel.

URS will distribute VisaCard calls to agents whose primary responsibility is the MasterCard business line when when triggering conditions for *both the borrower and lender* are met.

Implementing a SLA Solution

You can implement the solution using two methods. Both methods are implemented in a routing strategy using a threshold expression to state both borrowing and lending triggering conditions. The implementation methods are as follows:

1. "Method #1: Target Selection Object"

   In the `General` tab of a Selection object in a routing strategy (which defines the routing targets) you can open a dialog box for building threshold expressions.

2. "Method #2: Function SetTargetThreshold"

   You can associate threshold expressions with targets using function SetTargetsThreshold in a Function object within a routing strategy.

Note: You can use Method #1 and Method #2 simultaneously.

Method #1: Target Selection Object

Figure 28 shows the `sla2_sample` strategy supplied by Universal Routing.

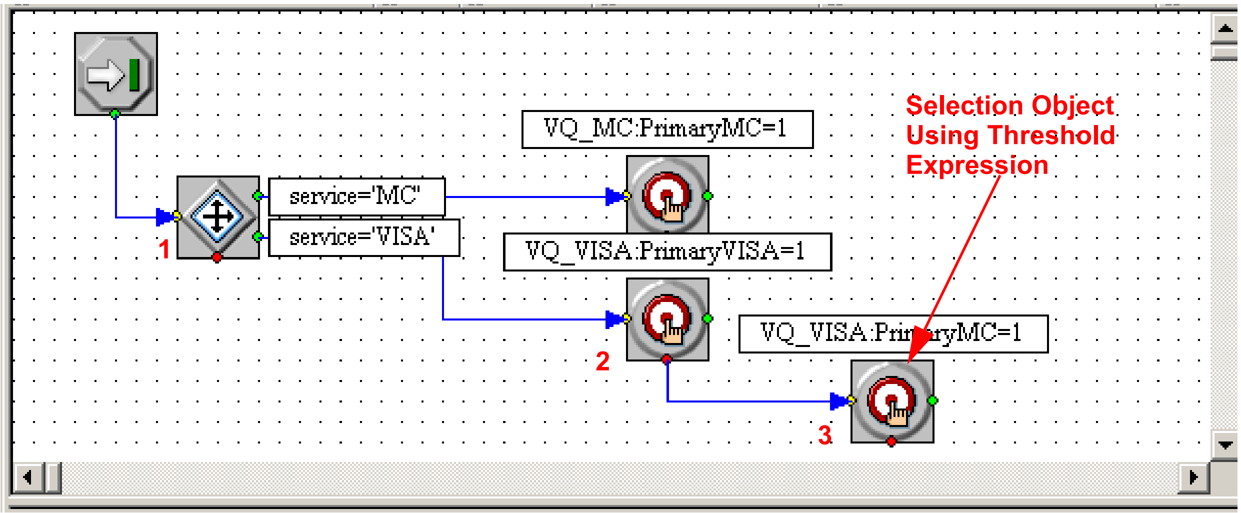

VQ_MC:PrimaryMC=1
Selection Object Using Threshold Expression
service='MC'
service='VISA'
1
VQ_VISA:PrimaryVISA=1
VQ_VISA:PrimaryMC=1
2
3

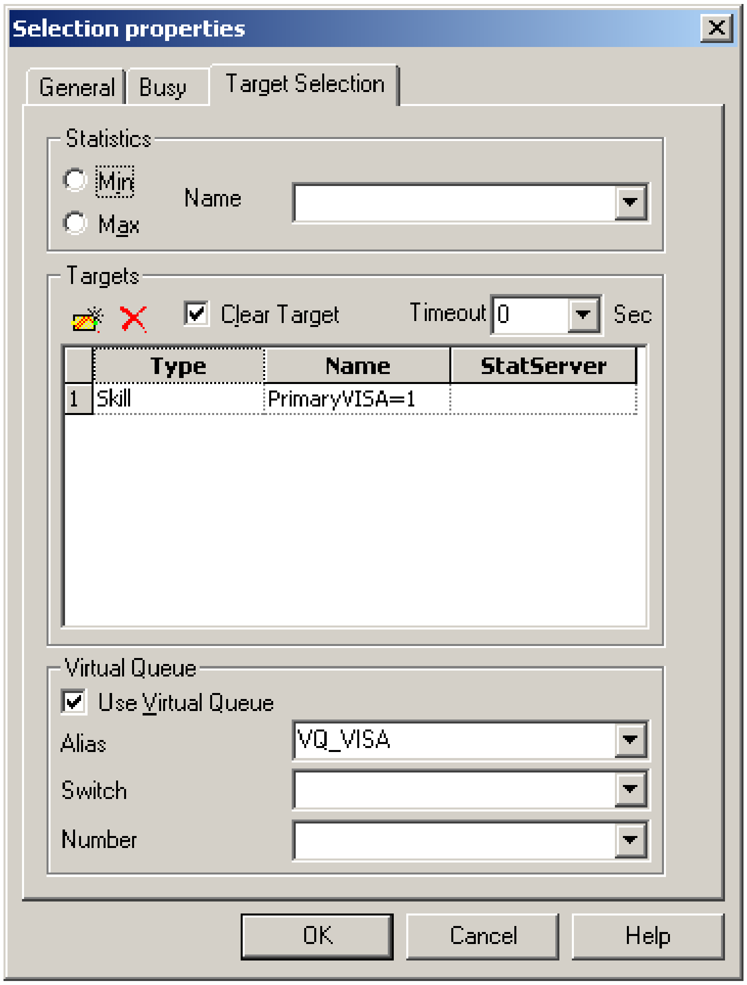
Figure 28: Strategy sla2_sample

The sample strategy contains a Selection object that uses a threshold expression.

Processing Flow

1. After the Entry object, the next object in Figure 28 on page 71 is a Generic Segmentation object (1). It segments interactions to take different paths in the strategy based on the service requested. Assume that customers identify themselves via the IVR unit as MasterCard (“`MC`”) or a VisaCard (“`VISA`”) customers.
2. The remaining objects are all Routing (target) Selection objects.

   Figure 29 shows the `Target Selection` tab in the properties dialog box for the middle Selection object (2).


Selection properties
General
Busy
Target Selection
Statistics
Name
Targets
Type
Name
StatServer
Virtual Queue
Alias
Switch
Number
OK
Cancel
Help

Statistics: ○ Min ○ Max

☑ Clear Target Timeout 0 Sec

	Type	Name	StatServer
1	Skill	PrimaryVISA=1	

☑ Use Virtual Queue

Alias: VQ_VISA

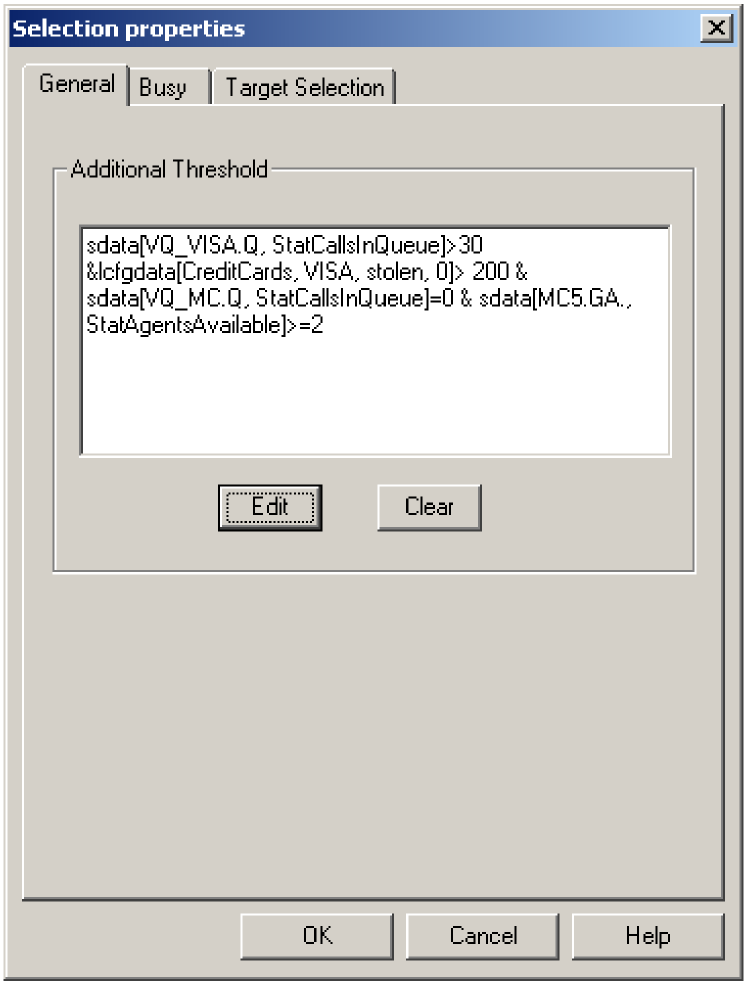
Figure 29: Routing Target Selection Object, Target Selection Tab

Under `Type` in Figure 29, `Skill` is selected. This indicates calls are being routed to agents based on a skill expression (agents having the `PrimaryVISA` skill where the skill level = `1`). **Note:** Even though `Clear Target` is checked in the sample, you must uncheck this flag for this particular Target Selection object to make the sample workable.

3. If URS does not find any available agents meeting this criteria (if all agents are busy), the call goes out the bottom (error) port to the Routing Selection object marked with a "3" in Figure 28 on page 71.

   Note: This is the Selection object that demonstrates use of a threshold expression.

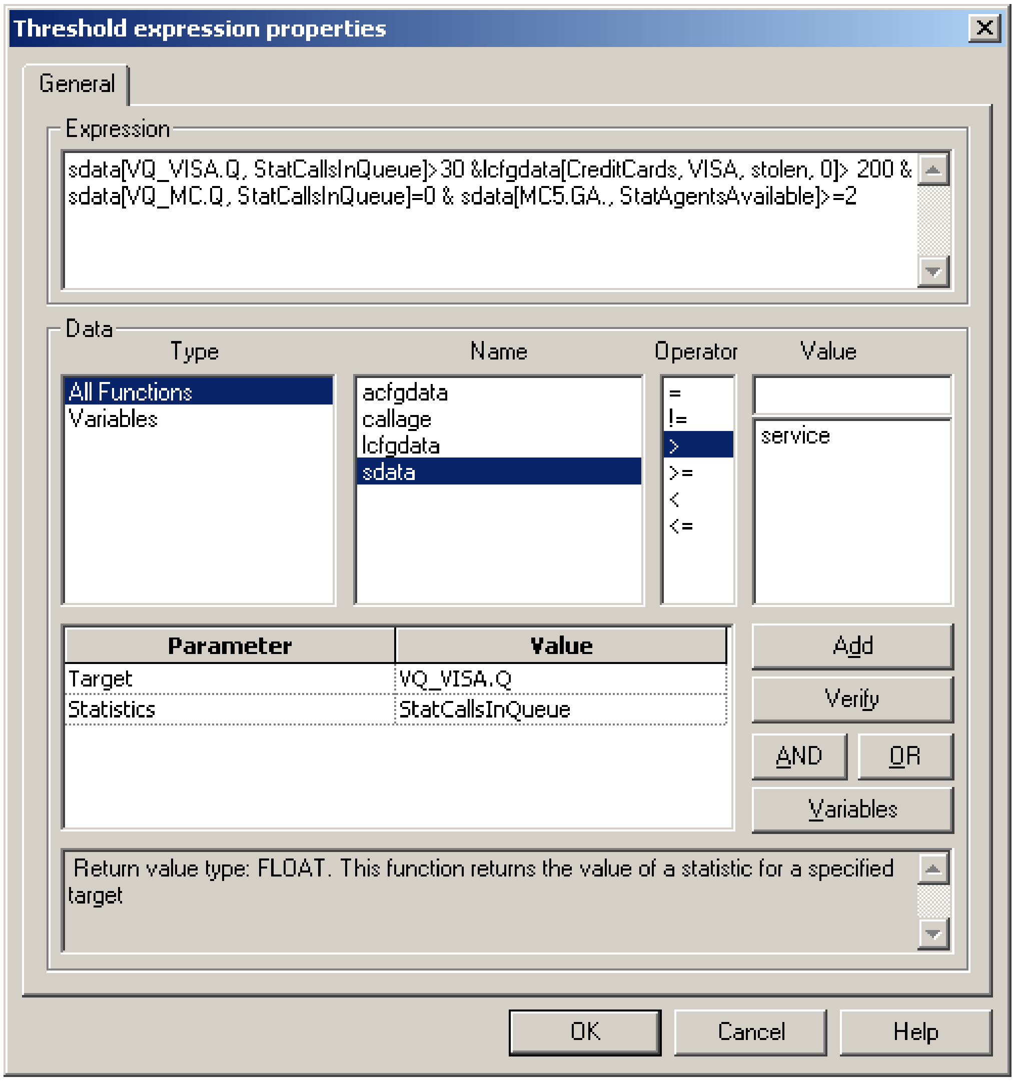
   Double-clicking this Selection object opens a properties dialog box. The `General` tab contains the borrowing/lending conditions (see Figure 30).



```
sdata[VQ_VISA.Q, StatCallsInQueue]>30
&lcfgdata[CreditCards, VISA, stolen, 0]> 200 &
sdata[VQ_MC.Q, StatCallsInQueue]=0 & sdata[MC5.GA.,
StatAgentsAvailable]>=2
```

Figure 30: Selection Object, General Tab

Note: While you can enter the borrowing/lending conditions under `Additional Threshold` in the `General` tab, it is much easier to click the `Edit` button and use the `Threshold Expression Properties` dialog box (see Figure 31).


Threshold expression properties
General
Expression
Data
Type
Name
Operator
Value
All Functions
Variables
acfgdata
callage
lcfgdata
sdata
=
!=
>
>=
<
<=
service
Add
Verify
AND
OR
Variables
OK
Cancel
Help

sdata[VQ_VISA.Q, StatCallsInQueue]>30 &lcfgdata[CreditCards, VISA, stolen, 0]> 200 & sdata[VQ_MC.Q, StatCallsInQueue]=0 & sdata[MC5.GA., StatAgentsAvailable]>=2

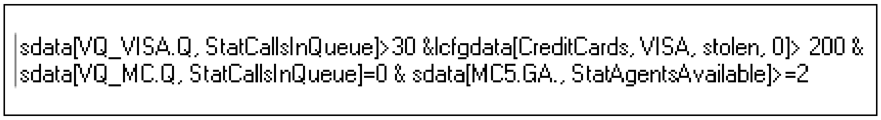
Parameter	Value
Target	VQ_VISA.Q
Statistics	StatCallsInQueue

Return value type: FLOAT. This function returns the value of a statistic for a specified target

Figure 31: Threshold Expression Properties Dialog Box

Threshold Expression

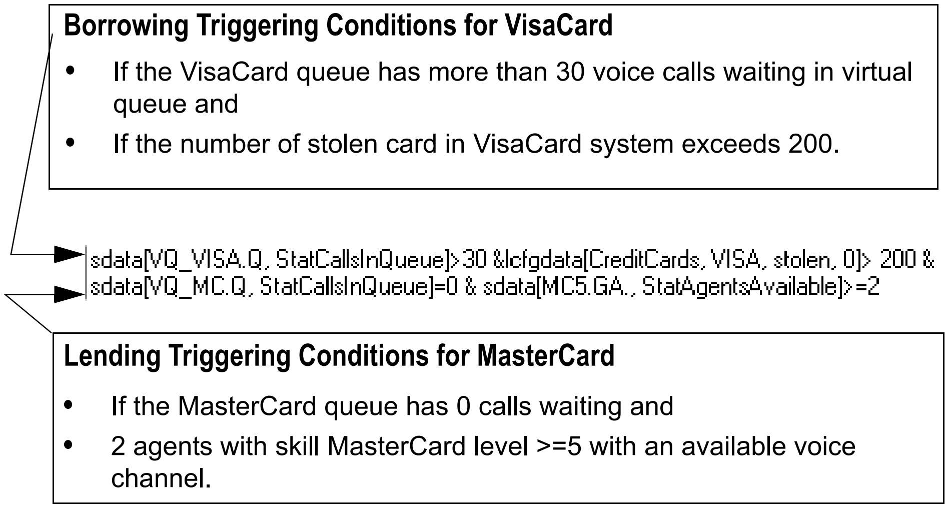
A threshold expression is text string very similar to the regular expressions used in Generic Segmentation or If strategy-building objects, but uses the predefined threshold functions described on page 75. In the example in Figure 32, *sdata* and *lcfgdata* are the predefined threshold functions.



sdata[VQ_VISA.Q, StatCallsInQueue]>30 &lcfgdata[CreditCards, VISA, stolen, 0]> 200 & sdata[VQ_MC.Q, StatCallsInQueue]=0 & sdata[MC5.GA., StatAgentsAvailable]>=2

Figure 32: Example Threshold Expression

Both the borrowing and lending conditions are defined in a single threshold expression (see Figure 33):



Borrowing Triggering Conditions for VisaCard

- If the VisaCard queue has more than 30 voice calls waiting in virtual queue and
- If the number of stolen card in VisaCard system exceeds 200.

```
sdata[VQ_VISA.Q, StatCallsInQueue]>30 &lcfgdata[CreditCards, VISA, stolen, 0]> 200 &
sdata[VQ_MC.Q, StatCallsInQueue]=0 & sdata[MC5.GA., StatAgentsAvailable]>=2
```

Lending Triggering Conditions for MasterCard

- If the MasterCard queue has 0 calls waiting and
- 2 agents with skill MasterCard level >=5 with an available voice channel.

Figure 33: Example Threshold Expression Using sdata Function

URS will distribute VisaCard calls to the MasterCard group only when triggering conditions for both the borrower and lender are met. Operations can be performed on string/numeric constants, strategy variables, and functions. See “Trigger Conditions Supported” on page 91 for more information.

An empty value in the `General` tab indicates that the target specified in the `Target Selection` tab has no routing conditions.

Predefined Threshold Functions

You can use the following functions in threshold expressions (all lowercase):

`sdata(target, statistic)`

Use this function to affect routing conditions based on statistics. Specify targets and statistics just like for the SData[] function described in the *Universal Routing 7.6 Reference Guide*. You can use IRD predefined statistics, such as: `StatPositionInQueue`, `StatCallsWaiting`, `StatInVQWaitTime`.

Examples:

```
sdata(Group2.GA, StatAgentsAvailable)>2
```

`acfgdata(Application name, folder, property, default value)`

Use this function to affect routing conditions based on external data stored in properties of Configuration Layer Application objects (`ApplicationConfigDATA`). Returns a numeric value for specified `Application` option. If an `Application` has no such option then the default value is returned.

Example:

```
sdata(Group2.GA, StatAgentsAvailable)>acfdata(URS,
default, MinNumOfRdyAgents, 2)
```

`callage`

Use this function to return the age of an interaction in seconds. Use for time-based routing conditions, such as a call that can only be routed if it waits more then 60 seconds.

`lcfgdata(list name, folder, property, default value)`

Use this function to affect routing conditions based on external data stored in IRD list objects. Returns a numeric value for a specified attribute of a list object's item (see Figure 40 on page 81). If a list object has no such item or attribute, the default value is returned. Works like `acfgdata`, but uses an IRD list object (`ListConFigDATA`) instead of an `Application`. Return value type: FLOAT. If you need a review of list objects, see the *Universal Routing 7.6 Reference Manual*.

Note: The above threshold functions are only for use in threshold expressions. IRD's `Function Properties` dialog box does not list them in the `Data` pane under `Type` (see Figure 36 on page 79).

Method #2: Function SetTargetThreshold

The second method for implementing SLA routing is through the strategy function SetTargetThreshold, which defines the statistical thresholds for borrowing and lending agents.

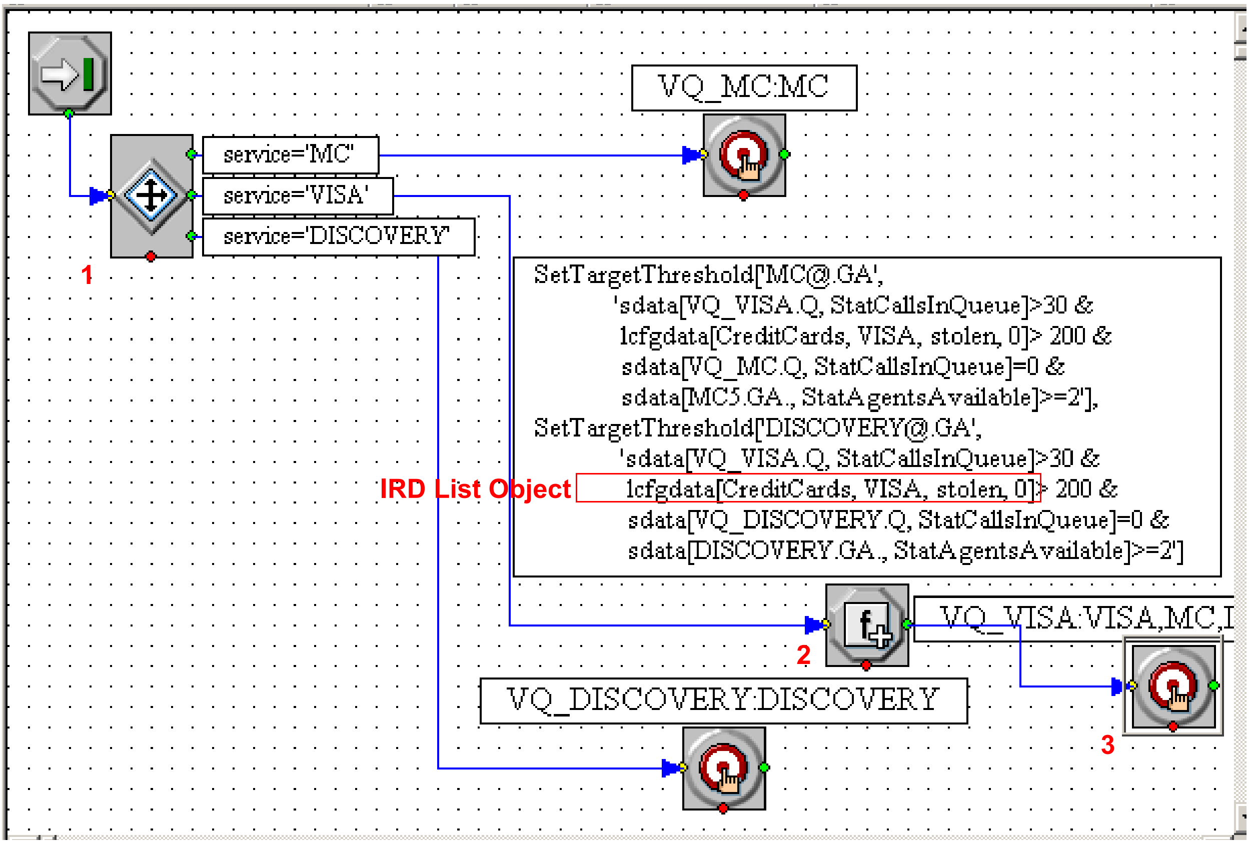
Parameters: `Target:` STRING (statistical object) or variable (representing a string for the target that the routing condition is imposed upon), such as a string for the target that can lend agents if all conditions are met. See Figure 36 on page 79.

`Expression`: STRING. Statistical (threshold) expression representing a condition that must be true for the conditional routing to occur.

Note: Interactions can only be routed to the target if the expression resolves to a not zero (0) value.

Example Strategy

Figure 34 shows the Universal Routing-supplied `sla1_sample` strategy, which implements the use case on page 70 in a slightly different fashion.



```
SetTargetThreshold['MC@.GA',
        'sdata[VQ_VISA.Q, StatCallsInQueue]>30 &
         lcfgdata[CreditCards, VISA, stolen, 0]> 200 &
         sdata[VQ_MC.Q, StatCallsInQueue]=0 &
         sdata[MC5.GA., StatAgentsAvailable]>=2'],
SetTargetThreshold['DISCOVERY@.GA',
         'sdata[VQ_VISA.Q, StatCallsInQueue]>30 &
          lcfgdata[CreditCards, VISA, stolen, 0]> 200 &
          sdata[VQ_DISCOVERY.Q, StatCallsInQueue]=0 &
          sdata[DISCOVERY.GA., StatAgentsAvailable]>=2']
```

Figure 34: Strategy sla1_sample

This strategy uses the SetTargetThreshold function and a list object to contain routing conditions. **Note:** Only VISA services demonstrate the usage of SetTargetThreshold.

Strategy Assumptions

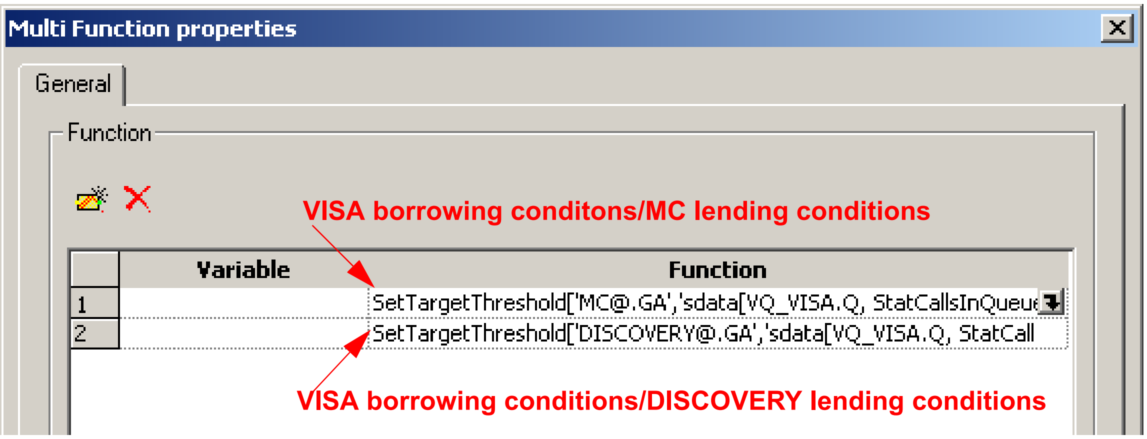
- MasterCard (MC) calls are served with any agent from Agent Group `MC`; the skill level is defined by skill `MC`.
- VisaCard (VISA) calls are served with any agent from Agent Group `VISA`; the skill level is defined by skill `VISA`.
- There is virtual group `MC5` (`MC5.GA` in Figure 35 on page 78) in Configuration Manager, which is defined as containing agents with the `MC` skill >=5.
- No agents with `MC`>=5 are in `VISA` Agent Group.

Note: The use case requires getting statistics for agents with `MC>=5`. Stat Server can take a statistic only for objects defined in Configuration Manager so an Agent Group representing those `MC>=5` agents is required.

- The number of stolen VISA cards are stored in a list object named `CreditCards` in item `VISA` under the key `stolen` (see Figure 41 on page 82).

Processing Flow

1. After the Entry object in Figure 34 on page 77, the next object (1) is a Generic Segmentation object. It segments interactions to take different paths in the strategy based on the requested service. Assume that customers identify themselves as `MC`, `VISA`, or `DISCOVERY` customers.
2. The middle port (`service=VISA`) directs interactions for VISA customers to a Multi Function object (2), which allows you to use multiple functions within one object. You can then specify conditions for borrowing from the `MC` Agent Group and conditions for borrowing from the `DISCOVERY` Agent Group. Figure 35 shows a partial view of the properties dialog box for the Multi Function object (2) in the strategy in Figure 34 on page 77.



VISA borrowing conditons/MC lending conditions

	Variable	Function
1		SetTargetThreshold['MC@.GA','sdata[VQ_VISA.Q, StatCallsInQueue
2		SetTargetThreshold['DISCOVERY@.GA','sdata[VQ_VISA.Q, StatCall

VISA borrowing conditions/DISCOVERY lending conditions

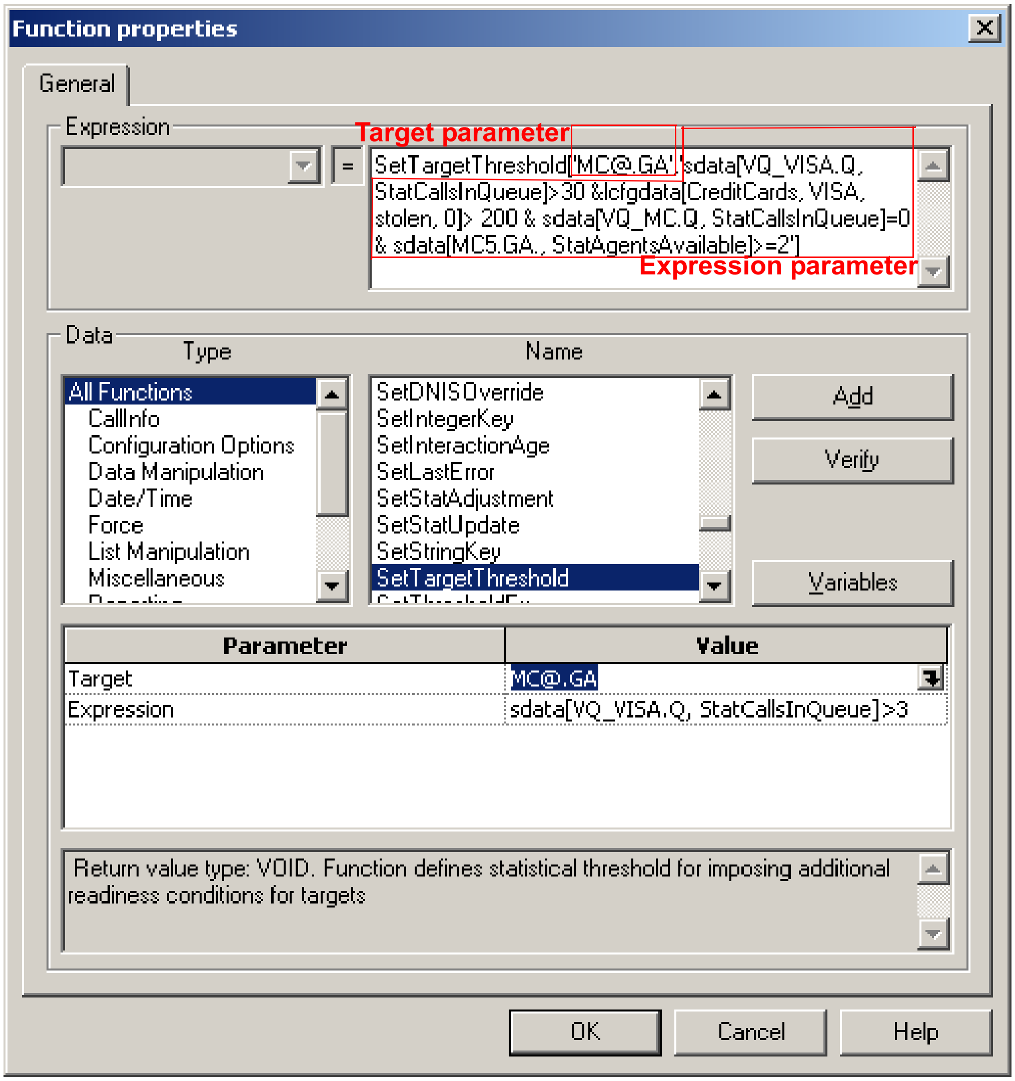
Figure 35: Multi Function Object Properties Dialog Box

Note that the Multi Function object is placed before the Routing Selection object in the strategy shown in Figure 34 on page 77. It specifies the borrowing/lending conditions for the virtual Agent Group (`VQ_VISA.Q`) that must exist in order to borrow agents from:

- The `MC` virtual Agent Group (`VQ_MC.Q`) and
- The `DISCOVERY` virtual Agent Group (`VQ_DISCOVERY.Q`)

As shown in Figure 35, clicking a row under the `Function` column displays a down arrow. Clicking the down arrow opens the `Function Properties` dialog box where the function name was selected and its parameters assigned.

Figure 36 shows the `Function Properties` dialog box for the first use of the SetTargetThreshold function in Figure 35.


Function properties
General
Expression
=
Target parameter
Expression parameter
Data
Type
Name
All Functions
CallInfo
Configuration Options
Data Manipulation
Date/Time
Force
List Manipulation
Miscellaneous
SetDNISOverride
SetIntegerKey
SetInteractionAge
SetLastError
SetStatAdjustment
SetStatUpdate
SetStringKey
SetTargetThreshold
Add
Verify
Variables
OK
Cancel
Help

```
SetTargetThreshold['MC@.GA','sdata[VQ_VISA.Q,
StatCallsInQueue]>30 &lcfgdata[CreditCards, VISA,
stolen, 0]> 200 & sdata[VQ_MC.Q, StatCallsInQueue]=0
& sdata[MC5.GA., StatAgentsAvailable]>=2']
```

Parameter	Value
Target	MC@.GA
Expression	sdata[VQ_VISA.Q, StatCallsInQueue]>3

Return value type: VOID. Function defines statistical threshold for imposing additional readiness conditions for targets

Figure 36: Function Properties Dialog Box

Target Parameter

In Figure 36, note the `Target` parameter of the SetTargetThreshold function. This is the target that the routing condition (specified opposite `Expression` under `Value`) is imposed upon. In this example, the target is the `MC` Agent Group, the first Agent Group that `VISA` can potentially borrow agents from.

You select the `Target` parameter by clicking under `Value` to display a down arrow. Clicking the down arrow opens a dialog box where you select the target `Type`, target `Name`, and `Location`. Figure 37 shows available selections for the `Type` field.

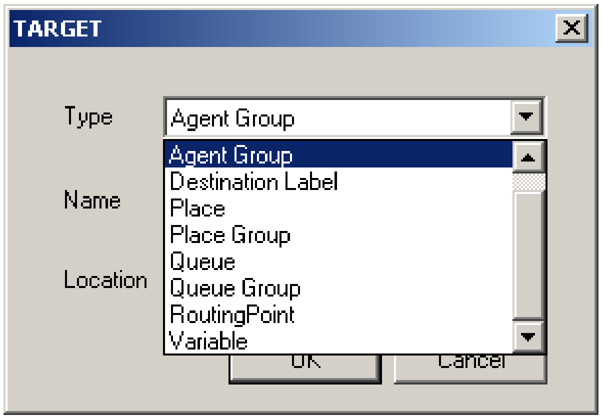
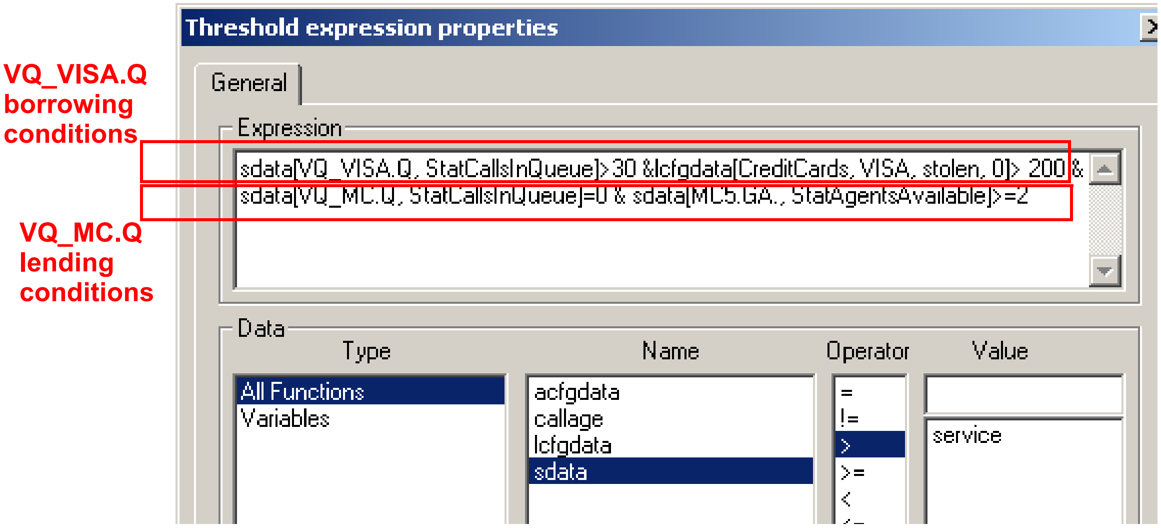

TARGET
Type
Agent Group
Name
Location
Agent Group
Destination Label
Place
Place Group
Queue
Queue Group
RoutingPoint
Variable
OK
Cancel

Figure 37: Target Dialog Box

Expression Parameter

The `Expression` parameter is where you construct a threshold expression as discussed previously on page 74. Clicking opposite `Expression` under `Value` in Figure 36 on page 79 displays a down arrow. Clicking the down arrow brings up the `Threshold Expression Properties` dialog box (see Figure 38).


Threshold expression properties
General
Expression
Data
Type
Name
Operator
Value
All Functions
Variables
acfgdata
callage
lcfgdata
sdata
=
!=
>
>=
<
service
VQ_VISA.Q borrowing conditions
VQ_MC.Q lending conditions

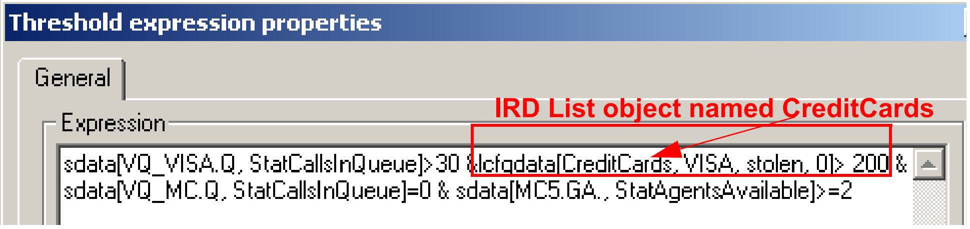
sdata[VQ_VISA.Q, StatCallsInQueue]> 30 &lcfgdata[CreditCards, VISA, stolen, 0]> 200 &
sdata[VQ_MC.Q, StatCallsInQueue]=0 & sdata[MC5.GA., StatAgentsAvailable]>=2

Figure 38: Threshold Expression Properties Dialog Box

Note: In order for the share to occur, both borrowing conditions (in this case, for the virtual Agent Group `VQ_VISA.Q`) and lending conditions (in this case, for the virtual Agent Group `VQ_MC.Q`) must be true.

List Objects in SLA Routing

You can construct expressions (borrowing and lending conditions) in a strategy dynamically from smaller parts. Parts of expressions (or an entire expression) can be stored outside of the strategy; for example inside list objects. The dynamic parts can be as simple as threshold values or as complex as sub-expressions. Figure 39 shows the part of the previously discussed expression that uses a list object named `CreditCards`.

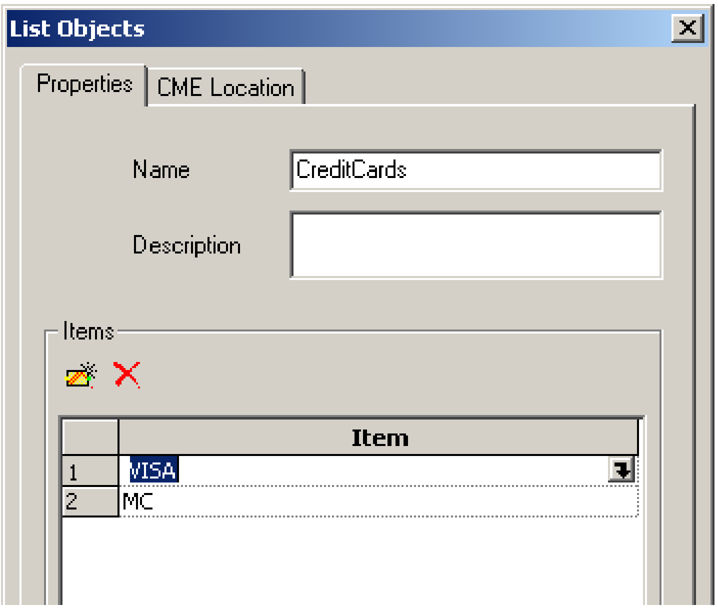


IRD List object named CreditCards

```
sdata[VQ_VISA.Q, StatCallsInQueue]>30 &lcfgdata[CreditCards, VISA, stolen, 0]> 200 &
sdata[VQ_MC.Q, StatCallsInQueue]=0 & sdata[MC5.GA., StatAgentsAvailable]>=2
```

Figure 39: Predefined Threshold Function lcfgdata

The `lcfgdata` function (see page 76) specifies as a borrowing condition (see Figure 39) that the number of VISA stolen credit cards must be greater than 200. Figure 40 shows `Properties` tab of the `CreditCards` list object used in the above expression.



Name: CreditCards

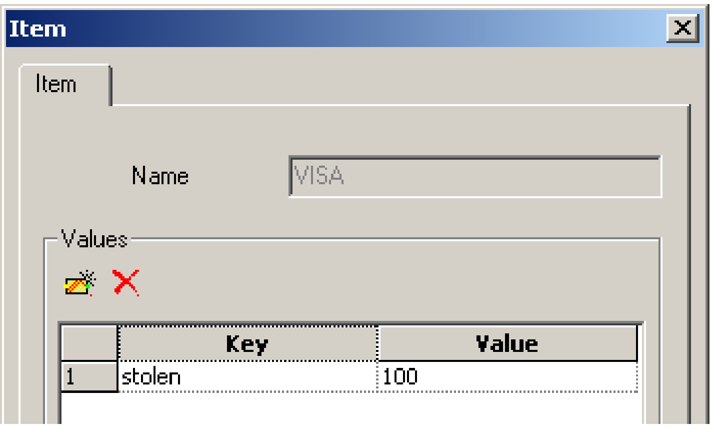
Description:

	Item
1	VISA
2	MC

Figure 40: CreditCards List Object

Note: Universal Routing 7.6 supplies a sample list object called `CreditCardsSample`. For more information, see the *Universal Routing 7.6 Deployment Guide.*

Click the down arrow opposite `VISA` in Figure 42 on page 82 to view the routing condition for the `lcfgdata` portion of the threshold expression (see Figure 41).



Name: VISA

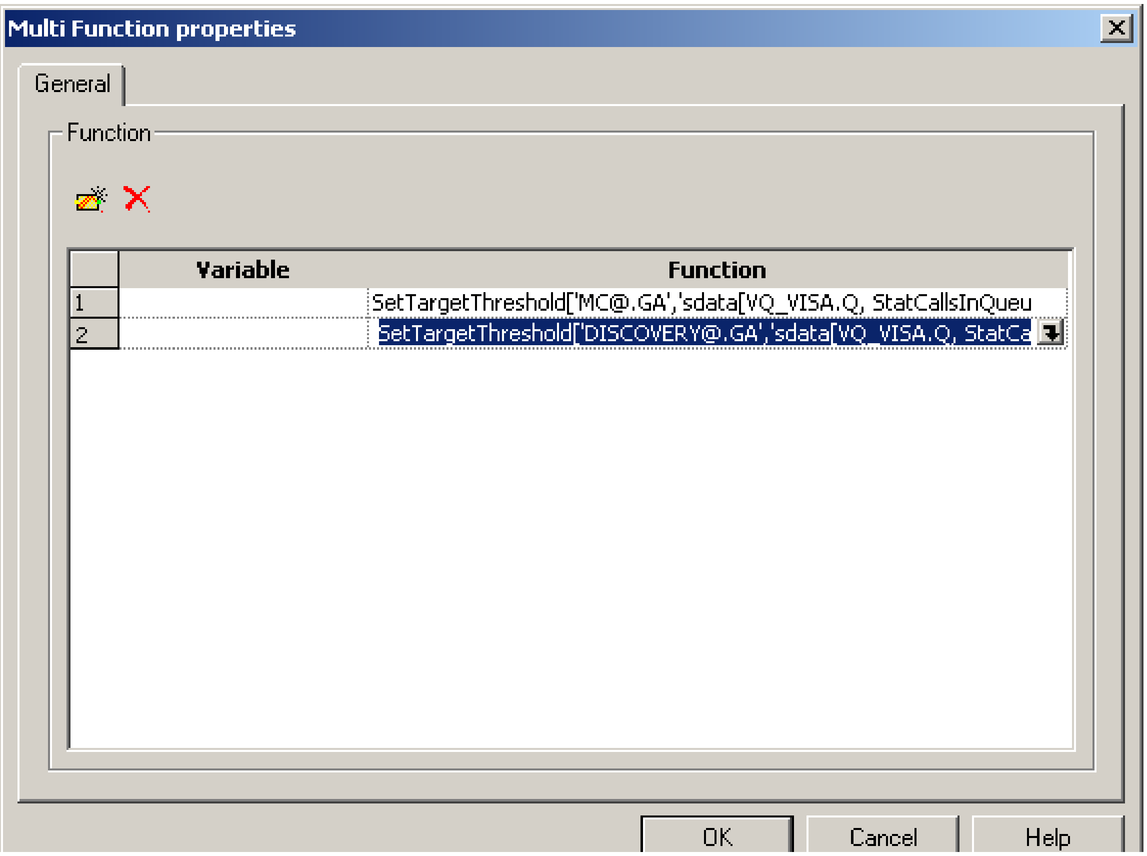
Values

	Key	Value
1	stolen	100

Figure 41: Routing Condition for VISA Agent Group

The next three figures review the chain of dialog boxes to get to the point where you specify the list object.

1. Figure 42 shows the SetTargetThreshold function in the `Multi Function Properties` dialog box.

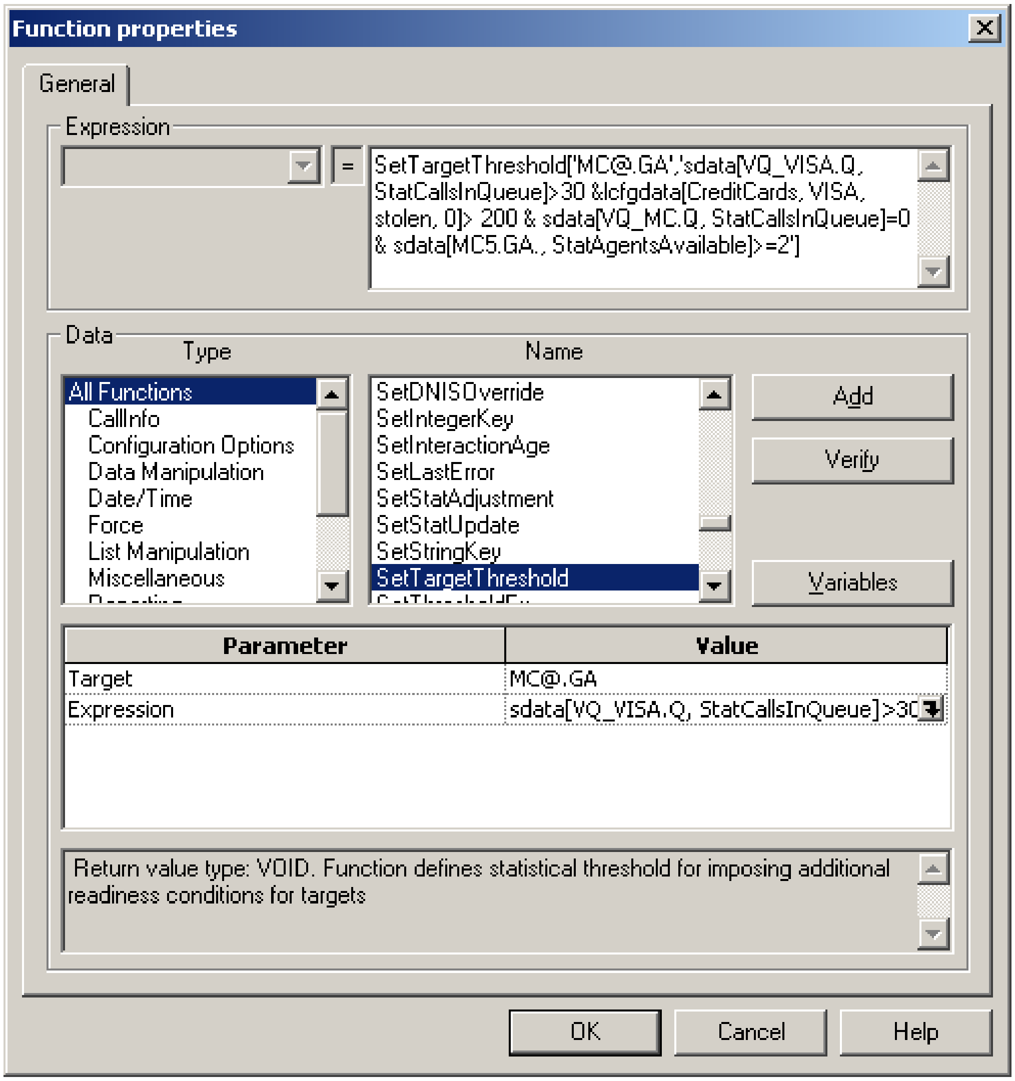


	Variable	Function
1		SetTargetThreshold['MC@.GA','sdata[VQ_VISA.Q, StatCallsInQueu
2		SetTargetThreshold['DISCOVERY@.GA','sdata[VQ_VISA.Q, StatCa

Figure 42: Multi Assign Object with SetTargetThreshold Function

The information in Figure 42 on page 82 was previously entered in the `Function Properties` dialog box shown in Figure 43 on page 83.

2. Clicking the down arrow in Figure 42 opens the `Function Properties` dialog box where you entered the SetTargetThreshold function and its parameters (see Figure 43).


Function properties
General
Expression
=
Data
Type
Name
All Functions
CallInfo
Configuration Options
Data Manipulation
Date/Time
Force
List Manipulation
Miscellaneous
SetDNISOverride
SetIntegerKey
SetInteractionAge
SetLastError
SetStatAdjustment
SetStatUpdate
SetStringKey
SetTargetThreshold
Add
Verify
Variables
OK
Cancel
Help

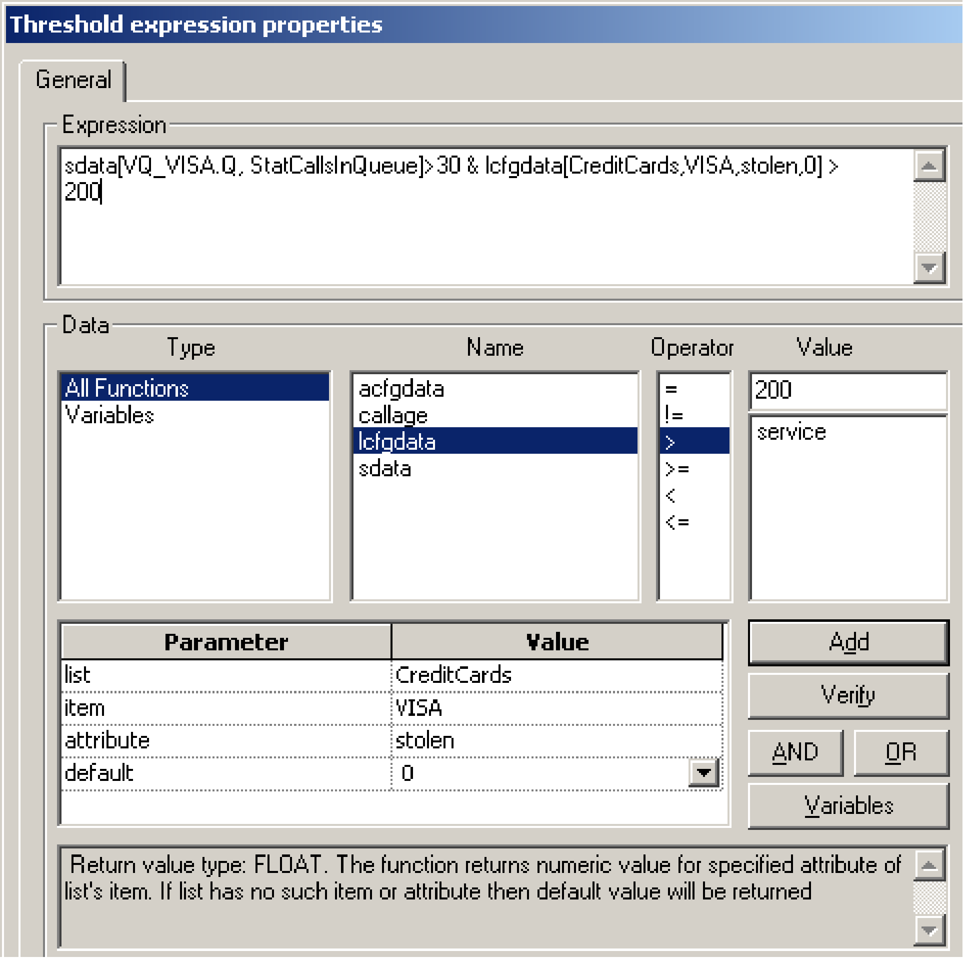
SetTargetThreshold['MC@.GA','sdata[VQ_VISA.Q, StatCallsInQueue]>30 &lcfgdata[CreditCards, VISA, stolen, 0]> 200 & sdata[VQ_MC.Q, StatCallsInQueue]=0 & sdata[MC5.GA., StatAgentsAvailable]>=2']

Parameter	Value
Target	MC@.GA
Expression	sdata[VQ_VISA.Q, StatCallsInQueue]>30

Return value type: VOID. Function defines statistical threshold for imposing additional readiness conditions for targets

Figure 43: Function Properties, Target and Expression Parameters

3. Clicking the down arrow opposite `Expression` in Figure 43 opens the dialog box where you entered the threshold expression, which specifies the list object name and parameters.
   - Figure 38 on page 80 shows the completed expression in the `Threshold Expression Properties` dialog box.
   - Figure 44 shows the dialog box after entering only the `lcfgdata` part of the expression, where the list object (`CreditCards`) and its parameters are specified.



sdata[VQ_VISA.Q, StatCallsInQueue]>30 & lcfgdata[CreditCards,VISA,stolen,0] > 200

Type: All Functions, Variables

Name: acfgdata, callage, lcfgdata, sdata

Operator: =, !=, >, >=, <, <=

Value: 200

service

Parameter	Value
list	CreditCards
item	VISA
attribute	stolen
default	0

Return value type: FLOAT. The function returns numeric value for specified attribute of list's item. If list has no such item or attribute then default value will be returned

Figure 44: List Parameters in Threshold Expression Properties

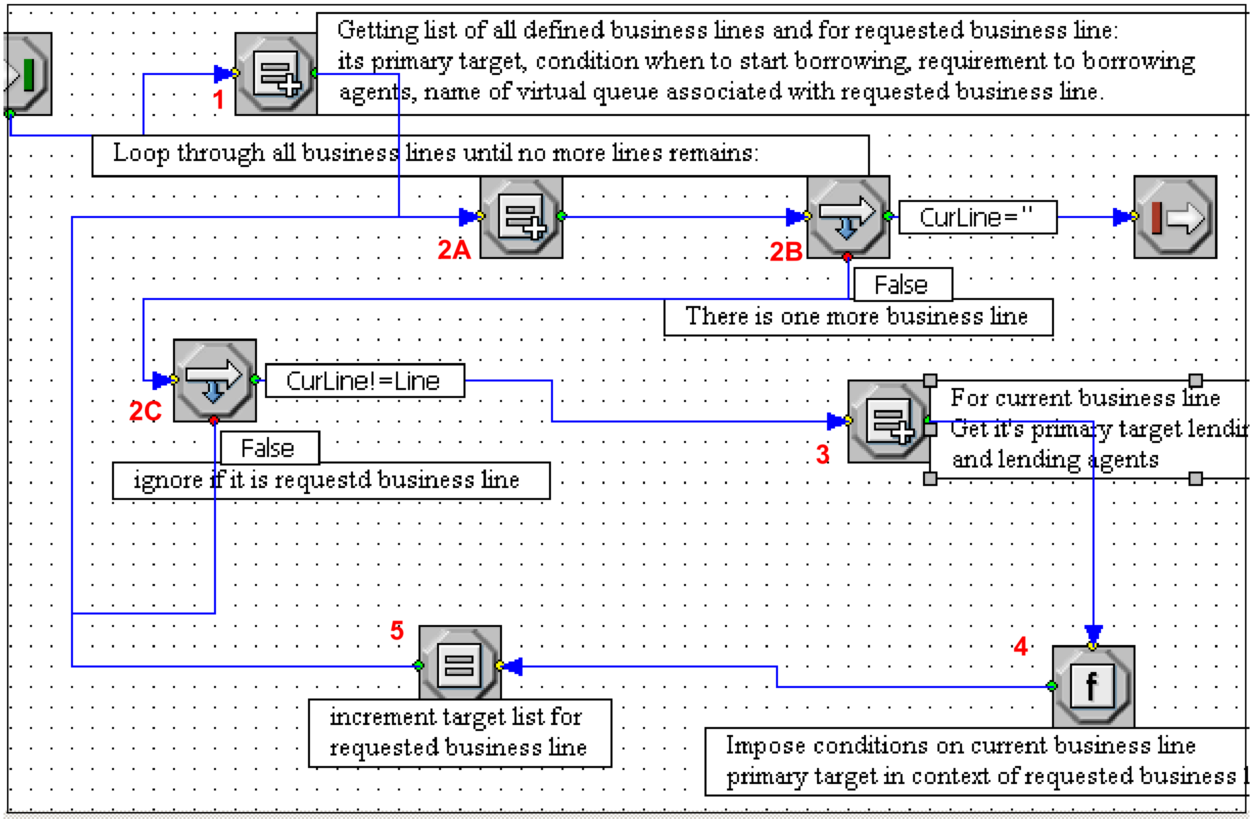
Sample Subroutine and List Object

Universal Routing supplies a sample subroutine called `servicelevelagreement_sample`. It uses a list object (`businesslines_sample`) to contain a larger subset of routing information than that contained in the `CreditCards` list object previously discussed.

Subroutine Context

Assume that an IVR has identified customers as wanting information on the MC, VISA, or DISCOVERY business line, the requested business line information has been passed to the calling strategy, the strategy has segmented interactions to take different paths based on the requested business line. Also assume that all agents serving the requested business line are busy. When SLA routing is implemented, URS can borrow agents from other business lines.

Figure 45 shows the `servicelevelagreement_sample` subroutine.


Getting list of all defined business lines and for requested business line: its primary target, condition when to start borrowing, requirement to borrowing agents, name of virtual queue associated with requested business line.

Loop through all business lines until no more lines remains:

There is one more business line

ignore if it is requestd business line

For current business line Get it's primary target lendi and lending agents

increment target list for requested business line

Impose conditions on current business line primary target in context of requested business l

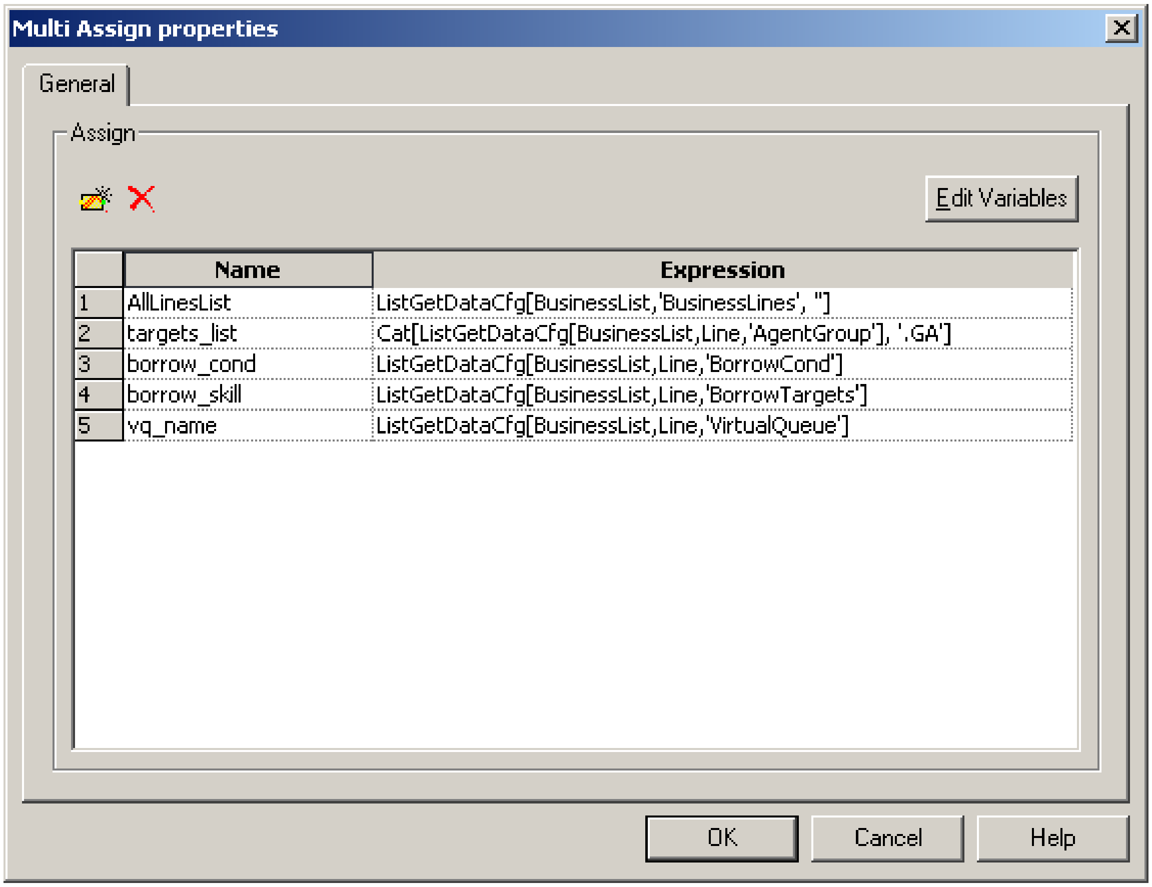
Figure 45: Subroutine servicelevelagreement_sample

Processing Flow

1. After the Entry object, the next object in Figure 45 is a Multi Assign object (1). It retrieves all defined business lines from a list object. For the business line requested by the strategy calling the subroutine, it gets:
    - The requested business line’s primary target.
    - Conditions when to start borrowing.
    - Requirements for lending agents.
    - Name of virtual queue associated with the requested business line.

    Data retrieved is written to variables.

Figure 46 shows the properties dialog box for the Multi Assign object (1).



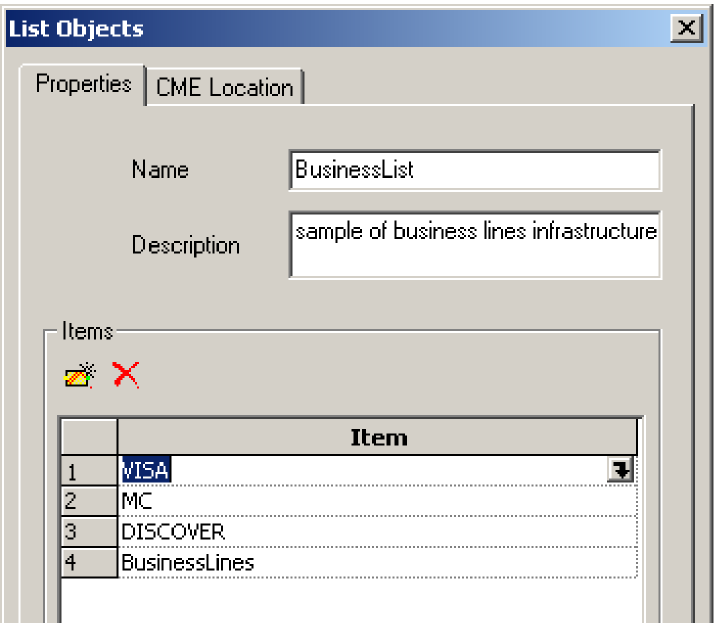
	Name	Expression
1	AllLinesList	ListGetDataCfg[BusinessList,'BusinessLines', '']
2	targets_list	Cat[ListGetDataCfg[BusinessList,Line,'AgentGroup'], '.GA']
3	borrow_cond	ListGetDataCfg[BusinessList,Line,'BorrowCond']
4	borrow_skill	ListGetDataCfg[BusinessList,Line,'BorrowTargets']
5	vq_name	ListGetDataCfg[BusinessList,Line,'VirtualQueue']

Figure 46: Multi Assign Object 1

In the Multi Assign Properties dialog box shown in Figure 46, function ListGetDataCfg extracts various pieces of information from a list object named `BusinessList` and writes the information to the variables listed under `Name`.

- The `AllLinesList` variable holds the names of business lines.
- The `targets_list` variable holds the names of Agent Group targets that can be routed to. The Cat function concatenates strings returned by ListGetDataCfg (list object name, item, key).
- The `borrow_cond` variable holds borrowing conditions for each business line's Agent Group.
- The `borrow_skill` variable holds the skills that an agent to be borrowed must possess.
- The `vq_name` variable holds the virtual queues associated with each business line.

Figure 47 shows the properties dialog box for the `BusinessList` list object.



Name: BusinessList

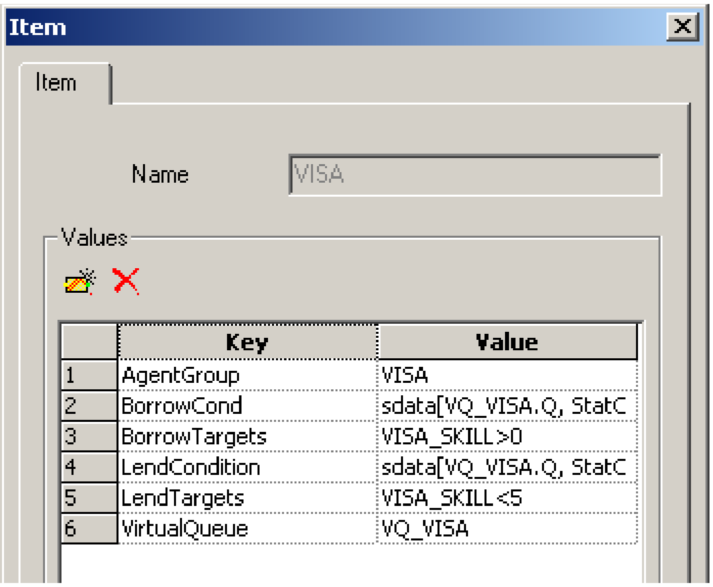
Description: sample of business lines infrastructure

	Item
1	VISA
2	MC
3	DISCOVER
4	BusinessLines

Figure 47: Sample List Object, Properties Tab

Note: The `BusinessList` list object in Figure 47 is the same as the `businesslines_sample` list object supplied by Universal Routing.

Click the down arrow opposite `VISA` to see the routing information stored in the list object for the `VISA` Agent Group (see Figure 48).



Name: VISA

	Key	Value
1	AgentGroup	VISA
2	BorrowCond	sdata[VQ_VISA.Q, StatC
3	BorrowTargets	VISA_SKILL>0
4	LendCondition	sdata[VQ_VISA.Q, StatC
5	LendTargets	VISA_SKILL<5
6	VirtualQueue	VQ_VISA

Figure 48: VISA Agent Group Routing Information

Note: The same keys shown in Figure 48 on page 87 exist for the `MC` and `DISCOVER` Agent Groups in Figure 47 on page 87.

Table 2 lists each `Key` in Figure 48 on page 87 and describes its value.

Table 2: Business Line Properties

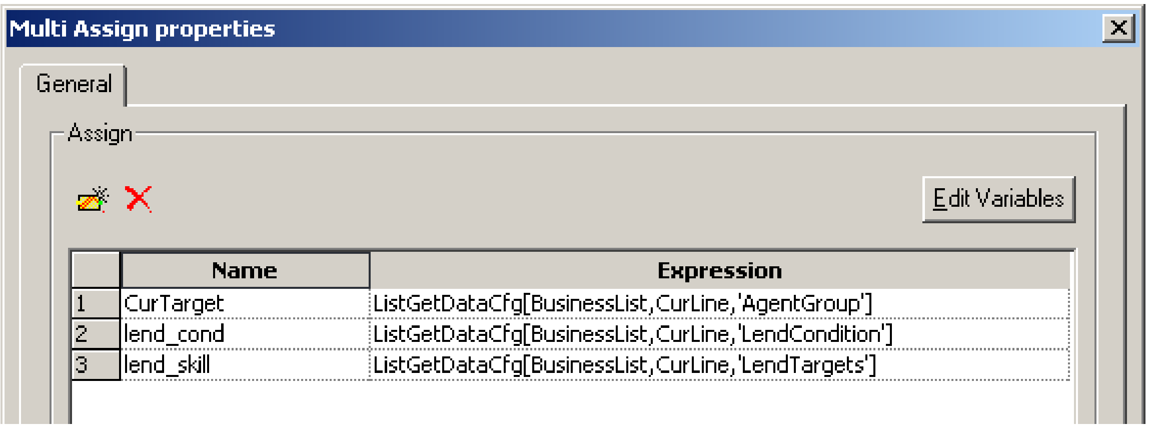
Key	Value
AgentGroup	Name of real or virtual group of agents responsible for primary task of serving the business line.
BorrowCond:	Threshold expression defining borrowing conditions. In Figure 48 on page 87, opposite BorrowCond, the entire value is: sdata[VQ_VISA.Q, StatCallsInQueue]>30 & lcfgdata[CreditCards, VISA, stolen, 0]> 200
BorrowTargets:	Skill expression defining agents to be borrowed from other business lines.
LendCondition	Threshold expression defining lending conditions. In Figure 48 on page 87, opposite `LendCondition`, the entire value is : sdata[VQ_VISA.Q, StatCallsInQueue]=0 & sdata[VISA.GA, StatAgentsAvailable]>=2
LendTargets	Skill expression defining requirements for agents that other business lines can borrow.
VirtualQueue	Virtual queue associated with business line.

Processing Flow Continued

This section continues the `servicelevelagreement_sample` processing flow started on page 85.

2. Objects 2A, 2B and 2C in the `servicelevelagreement_sample` subroutine shown in Figure 45 on page 85 cause URS to loop through the list object (`BusinessList`) until all business line information is stored in variables (see Figure 46 on page 86). If the current business line being read from the list object is not the business line requested by the customer, the interaction goes out to green port to Object 3.
3. Object 3 in Figure 45 on page 85 is another Multi Assign object. For the current business line being evaluated to see if it can lend agents, URS gets the following from the list object and write the information to variables:
   - Agent Group primary target (`CurTarget`)
   - Lending conditions that must be met (`lend_cond`)
   - Skills that agents to be lent/borrowed must have (`lend_skill`).

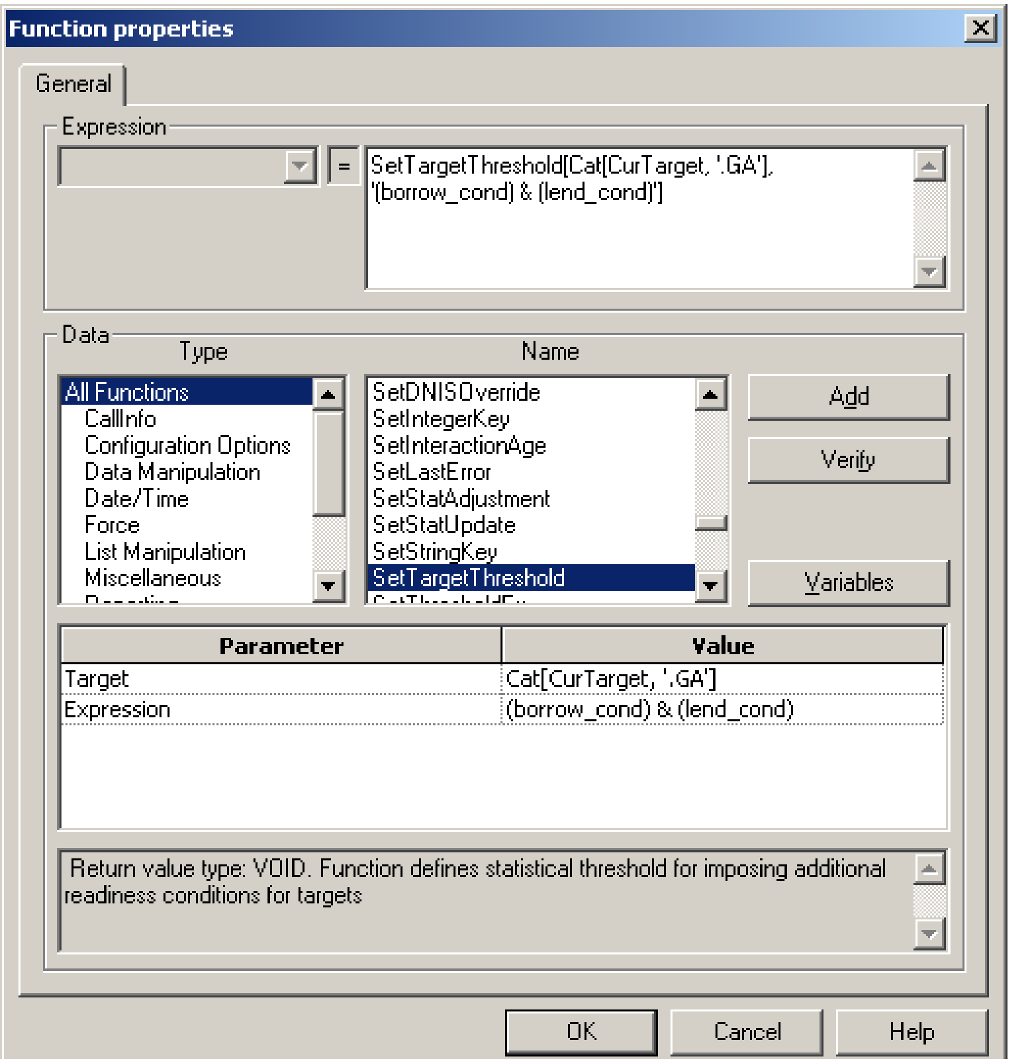
   Figure 49 shows the properties dialog box.


Multi Assign properties
General
Assign
Edit Variables

	Name	Expression
1	CurTarget	ListGetDataCfg[BusinessList,CurLine,'AgentGroup']
2	lend_cond	ListGetDataCfg[BusinessList,CurLine,'LendCondition']
3	lend_skill	ListGetDataCfg[BusinessList,CurLine,'LendTargets']

Figure 49: Multi Assign Properties 3

4. Object 4 in Figure 45 on page 85 is a Function object (see Figure 50).


Function properties
General
Expression
=
Data
Type
Name
All Functions
CallInfo
Configuration Options
Data Manipulation
Date/Time
Force
List Manipulation
Miscellaneous
SetDNISOverride
SetIntegerKey
SetInteractionAge
SetLastError
SetStatAdjustment
SetStatUpdate
SetStringKey
SetTargetThreshold
Add
Verify
Variables
OK
Cancel
Help

SetTargetThreshold[Cat[CurTarget, '.GA'], '(borrow_cond) & (lend_cond)']

Parameter	Value
Target	Cat[CurTarget, '.GA']
Expression	(borrow_cond) & (lend_cond)

Return value type: VOID. Function defines statistical threshold for imposing additional readiness conditions for targets

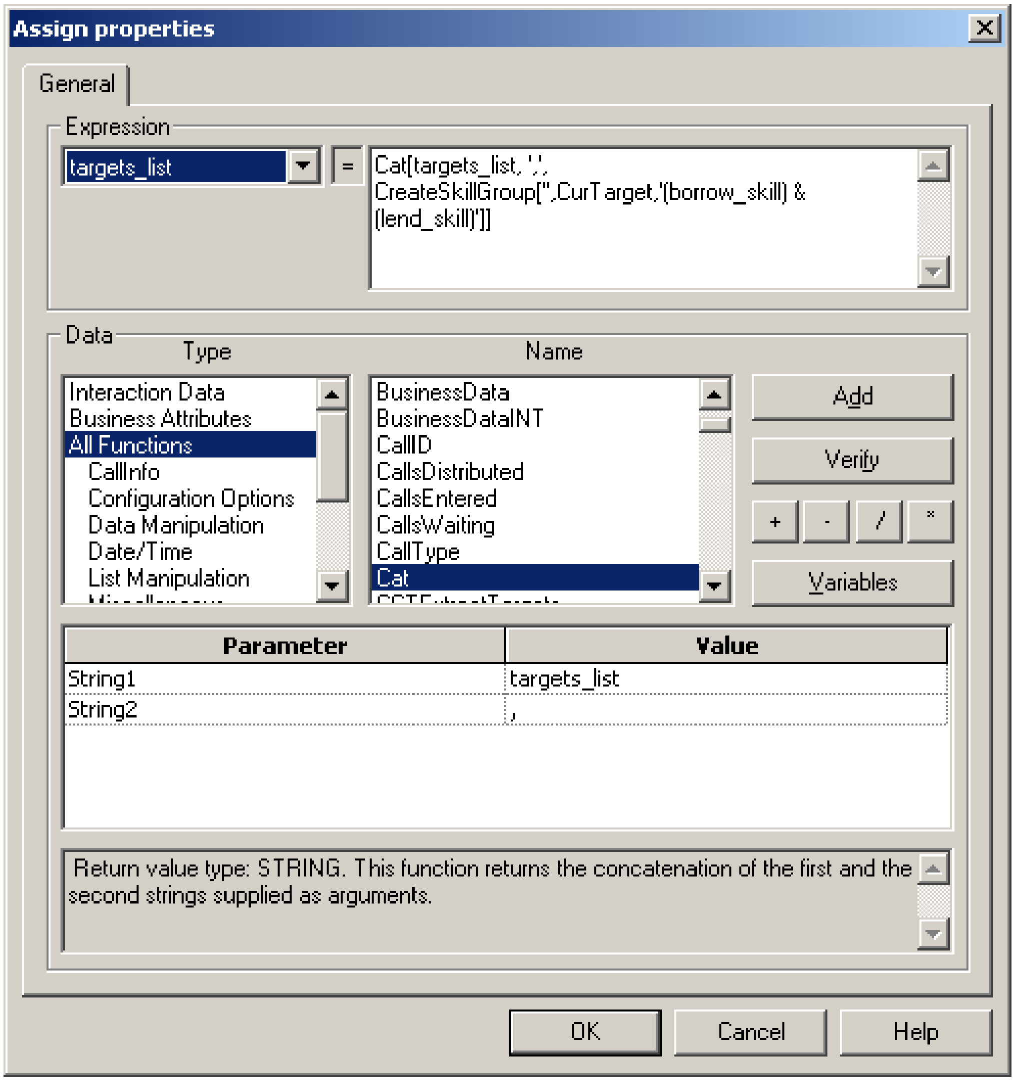
Figure 50: Function Properties

The Function object in Figure 50 on page 89 imposes the conditions contained in variables on the current business line primary target (business line being evaluated) in context of the customer's requested business line.

Note: The interaction can only be routed if `Expression in` Figure 50 on page 89 resolves to a not zero (value) indicating both the borrowing and lending conditions are true.

---

5. Object 5 in Figure 45 on page 85 is another Multi Assign object. It increments the target list for the requested business line (see Figure 51).


Assign properties
General
Expression
Data
Type
Name
Interaction Data
Business Attributes
All Functions
CallInfo
Configuration Options
Data Manipulation
Date/Time
List Manipulation
BusinessData
BusinessDataINT
CallID
CallsDistributed
CallsEntered
CallsWaiting
CallType
Cat
Add
Verify
+
-
/
*
Variables
OK
Cancel
Help

targets_list = Cat[targets_list, ',', CreateSkillGroup['',CurTarget,'(borrow_skill) & (lend_skill)']]

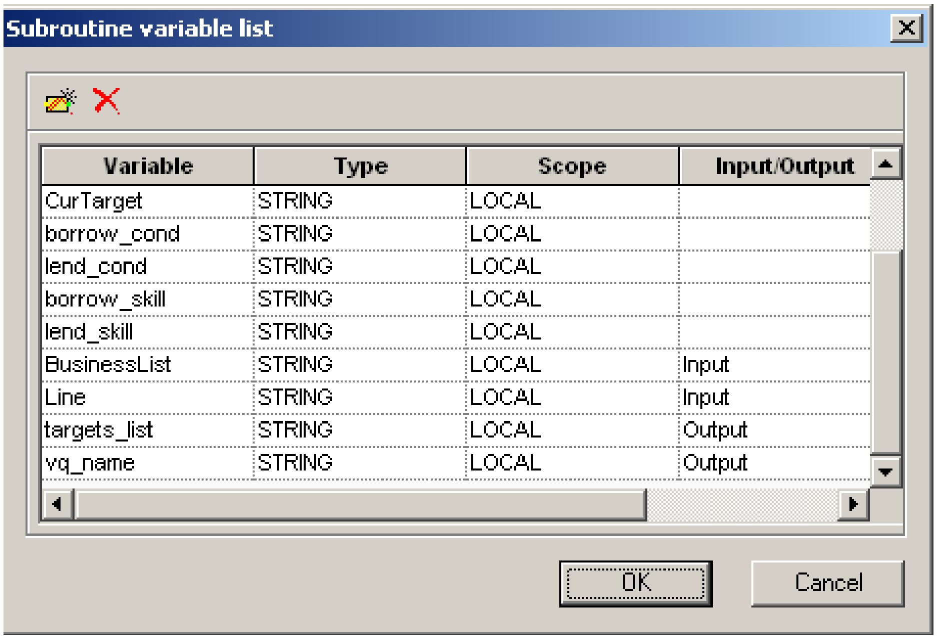
Parameter	Value
String1	targets_list
String2	,

Return value type: STRING. This function returns the concatenation of the first and the second strings supplied as arguments.

Figure 51: Assign Properties Dialog Box 5

The Cat function concatenates the strings returned by ListGetDataCfg.

As shown in Figure 46 on page 86 and described in Table 2 on page 88, the `targets_list` variable holds the names of Agent Group targets that can be routed to. The `target_lists` variable was previously defined as an `Output` variable along with. `vq_name`. To see this, click the `X=` icon in the `Routing Design` window to open the `Variable List` dialog box (see Figure 52).



Variable	Type	Scope	Input/Output
CurTarget	STRING	LOCAL	
borrow_cond	STRING	LOCAL	
lend_cond	STRING	LOCAL	
borrow_skill	STRING	LOCAL	
lend_skill	STRING	LOCAL	
BusinessList	STRING	LOCAL	Input
Line	STRING	LOCAL	Input
targets_list	STRING	LOCAL	Output
vq_name	STRING	LOCAL	Output

Figure 52: Variable List Dialog Box

Trigger Conditions Supported

Listed below are trigger conditions that are supported for use in threshold expressions:

- Number of interactions of a specific media type currently in queue. Examples:

  ```
  sdata(BLVirtualQueue, StatCallsInQueue)<x
  ```

  or

  ```
  sdata(BLVirtualQueue, StatCallsInQueueForMedia)<x
  ```

  where `StatCallsInQueueForMedia` is a custom statistic similar to `StatCallsInQueue`, but filtered by media type.

- Estimated wait time for this queue exceeding X number of seconds or minutes.

  Examples:

  ```
  sdata(BLVirtualQueue, StatExpectedWaitingTime)<x
  ```

  or

  ```
  sdata(BLVirtualQueue, StatExpectedWaitingTimeForMedia)<x
  ```

  where:

  `StatExpectedWaitingTimeForMedia` is a custom statistic similar to `StatExpectedWaitingTime`, but filtered by media type.

- Comparing IRD predefined statistics or custom statistics (see the chapter on routing statistics in the *Universal Routing 7.6 Reference Manual*) with a certain value.

  Example:

  Current Service Level is less than 80% of calls answered within 20 seconds.
- Comparing result data retrieved from an external enterprise system with some user-defined value.
- Comparison operators supported are:

  `+, -, *, /, <, >, <=, >=, =, !=, &, |, ()`
- Any combination of the above operators using `AND, OR, ()`.
- Trigger conditions contained outside of a strategy in an IRD list object or a Configuration Manager object when used with predefined threshold functions `acfdata` and `lcfdata` (see page 75).

  When you change a trigger condition contained in a list object or Configuration Manager object, the change takes place immediately (i.e., new incoming interactions and existing interactions waiting for the business line are affected).
- The lender always having X number of agents ready at any time or X number of agents ready at any time for a specific media type.

  Example:

  `sdata[VISA.GA, StatAgentsAvailable]>=x`
- Stating the lender condition using a Service Level statistic, such as Service Level of X% of calls answered within Y seconds.

  Example:

  `sdata(BLVirtualQueue, StatServiceFactor)<x`

Multi-Tiered Design

You can define agent skill criteria using a “multi-tiered” routing strategy design where each tier specifies:

- The skill criteria of the shared agents from the lender business line in a threshold expression.
- How long to wait before extending to the next tier of shared agents from another lending business line.
- How long to wait before switching back to the previous tier of agents from the previous lending business line.

Possible methods to implement a multi-tier approach include:

1. Using a cascading series of Routing target Selection objects connected through their red ports.

2. Strategy “looping” with the target set extended on every loop and then re-entering the same target Selection object.

Note: It is not necessary to encode within the strategy the targets to be added on every iteration. Instead the targets can be obtained from outside the strategy, such as list objects and database lookups.

Limitations

A share agent by service level agreement solution is applicable to and compatible with all routing models (including business-priority routing and cost-based routing) with the following exceptions:

- **Load balancing** (Load Balancing IRD object) based on `StatExpectedWaitingTime`, `StatEstimatedWaitingTime`, `StatLoadBalance`, `StatCallsInQueue`, and other statistic derived from these stats. Routing based on the value of these statistics focus load balancing on wait time; using the additional targets (associated with the lending business line) will upset the balance.
- Routing based on **Service Level routing rules**. Routing based on meeting Service Level objectives will upset the balance.
- **Percentage distribution** (Percentage IRD object), which focuses on a volume ratio distribution. Using the additional targets as target selection criteria will upset the balance.
- The use of Workforce Routing Rules.
- Routing based on the value of any type of statistic that leads to **equal or quantifiable distribution of interactions to routing targets**.

Chapter

6

Proactive Routing

In general, proactive routing means using the Genesys software to send potential customer interactions to agents prior to customer contact when running a *Campaign*. Examples of Campaigns include a telephone collection Campaign aimed at customers with outstanding balances on credit cards or an e-mail Campaign marketing a new product. The goal is to prepare agents for customer contact prior to running the Campaign. Contrast proactive routing with the routing of interactions that originate from customers. Proactive routing can also be used for agent work items initiated in-house.

Note: This chapter presents summary information on a Genesys Proactive Routing solution. For detailed information and step-by-step configuration instructions, see the *Genesys 7.6 Proactive Routing Solution Guide*.

The information in this chapter is divided among the following topics:

- What Is a Proactive Routing Solution?, page 95
- Component Products, page 96
- Business Use Cases, page 97

What Is a Proactive Routing Solution?

Note: From a Genesys Configuration Database standpoint, proactive interactions are Open Media interactions with a `media type` of `outbound preview`.

A Proactive Routing solution provides the ability to:

1. Proactively route `outbound preview` interactions to Genesys Agent Desktop. Only non-voice interactions of the `outbound preview` media type can be processed in Push Preview mode.

2. Completely process Calling List and Do Not Call List records solely from the logic of a routing strategy without agent intervention.
3. Use the same Outbound List and Campaign Management capabilities for managing both voice and non-voice interactions.
4. Configure the solution to select agents based on business rules contained in routing strategies while still considering agent capacity rules.

For a complete list of features and benefits, see the *Genesys 7.6 Proactive Routing Solution Guide*.

Proactive Routing Strategies

You can create proactive routing strategies that use the following Outbound strategy-building objects for “agent-less” processing of Campaign List records: Add Record, Reschedule, Update, Do Not Call, and Processed. Example of agent-less processing (second strategy):

1. A customer calls, but abandons the call before an agent can answer.
2. The first routing strategy detects the abandoned call.
3. The routing strategy uses the Create Interaction IRD strategy-building object to create a customer interaction record in the Universal Contact Server Database and then writes the interaction to a queue in a business process.
4. A second strategy in the business process uses the Add Record object to add the customer to a specified Calling List without agent intervention.

The Calling List can subsequently be used by an Outbound Campaign that dials out these customers during off peak hours and has the agent apologize and follow up.

Component Products

The ability to proactively route outbound preview interactions to the Agent Desktop is enabled through the integration of the following Genesys products/servers:

- Outbound Contact and Outbound Contact Server (the dialing engine)
- Universal Routing and Universal Routing Server (the routing engine)
- Multimedia and Interaction Server (the workflow engine)

Outbound Contact Server `push preview` mode pushes interactions to the Genesys Agent Desktop using a combination of Interaction Server and Universal Routing Server.

Business Use Cases

Business use cases for a Proactive Routing solution fall into the following categories:

- **High value/low volume activities such as:**

  Multi-lingual Outbound Campaign

  Flexible callback routing

  Last minute pre-dial check
- **Strategic interactions such as:**

  Training Campaigns

  Automated follow-up list development
- **Non-voice communications (multimedia interactions)**

  Simple outbound e-mail Campaigns

  The new Proactive Contact – E-mail/SMS package described in the *Genesys 7.5 Proactive Contact Solution Guide*

The next section presents some specific use cases.

Use Case #1: Multi-lingual Outbound Campaign

A Proactive Routing solution could be used to implement the following use case:

- Single Campaign running in `Preview` mode (calls are dialed only after the agent first previews a Calling List record and manually requests the call to be dialed).
- Customers on the Calling List speak different languages.
- Agents possess multiple language skills, with those `Skills` defined in the Configuration Database and assigned to the `Person` (agent) object.
- Routing interactions to agents is accomplished by URS executing a routing strategy, matching the customer's primary language with agent language skills.
- This is a multi-lingual fraud protection Campaign directed at credit card customers because a recent transaction triggered the suspicion of fraud.
- Calling List is generated dynamically (new records arrive, old records may disappear as customers call in themselves).
- Customer's language is contained in the interaction as a record attribute.
- Each agent's language is identified as a `Skill` object in Configuration Manager and the `Skill` object is assigned to the `Person` (agent) object.
- Outbound records routed to appropriate language agents in `Preview` mode.

- If the attempt to contact the customer fails (exceeds five hours), solution generates an e-mail with the text: `We blocked your card for the fraud suspicion. Tried to contact you. Please call this number.`
- The Campaign attempts to contact high-value customers first (`Customer Segment` specified as a record attribute).
- If the customer calls in, the call is matched with the case (record) and the record is updated with the appropriate result.
- Agents are blended (can work with media channels other than `voice`). Priority is defined by customer value, but inbound calls with the same value have a higher priority than outbound.

Use Case #2: Callback Routing

A Proactive Routing solution could be used to implement the following use case:

- Contact center with specific business requirements associated with outbound calls and callback distribution among agents.
- Outbound agents are divided into relatively small teams (5-7 people) with specific revenue objectives. When an outbound call results in a callback request, this callback request must be managed by the same agent team in order to keep track of the revenue.
- Outbound call distribution is implemented according to the following rules:

  `Predictive` dialing mode used to create new calls (records) (agent availability is predicted). Calls are delivered to any Campaign agent.

  Personal callback uses `Preview` mode (calls dialed from a Calling List only when an agent previews a customer Calling List record and manually requests a call to be dialed).

  Solution delivers Personal Callback record to requesting agent. If requesting agent is not available, deliver to requesting agent’s team. If no agents available in Team, deliver to any Campaign agent.

This scenario is graphically depicted below.

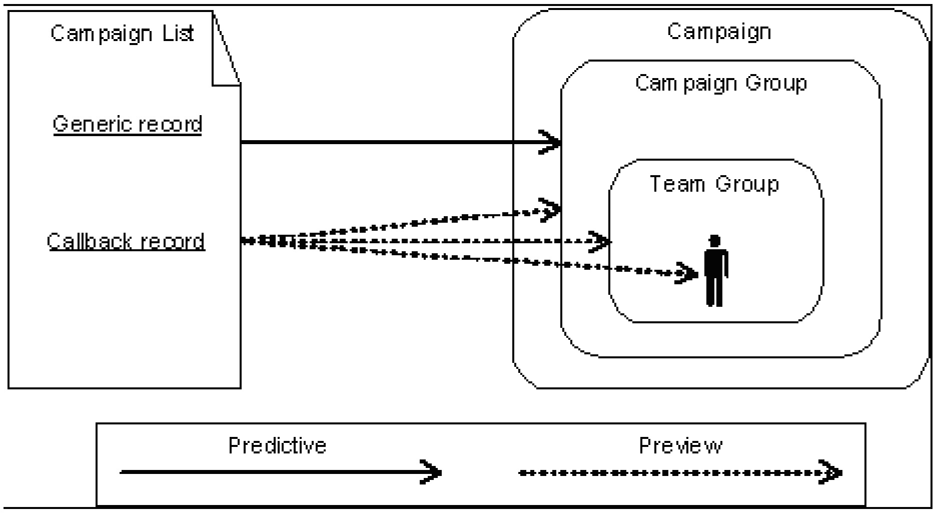


Figure 53: Callback Routing

Use Case #3: Last minute Pre-Dial Check

A Proactive Routing solution could be used to for the following use case:

- Collection Campaign running in preview mode.
- Preview records are routed to agents with routing strategy.
- Before sending the record to the Agent Desktop, the strategy checks if customer still has an outstanding balance or whether the issue was resolved after the Calling List was built for the collection Campaign. If the issue is resolved, the record is completed without sending it to the agent.

Use Case #4: Training Campaign

A Proactive Routing solution could be used for the following use case:

- There is a shortage of agents trained (skilled) for selling product XYZ in a call center. It is identified that at least 20 more agents should be trained for this skill.
- An online web session delivers agent training to individual agents so that training time does not negatively affect Service Level (for example, you may want to deliver 60% of interactions in less than 10 seconds).

To handle this use case, create a Proactive Campaign with 20 training work items. Route these work items to idle agents during low traffic times who are the best choice for this task (have adjacent skill but not the required skills).

Use Case #5: Automated follow-up list development

A Proactive Routing solution could be used for the following use case:

- Automatically develop a Calling List to follow up on inbound calls, abandoned during traffic peaks.
- A routing strategy detects the abandoned calls and adds a record to the specified list with the parameters of the incoming interaction.

Use the Calling List for an outbound Campaign that dials these customers during off peak hours to apologize and to follow up.

Use Case #6: Simple Outbound E-mail Campaigns

A Proactive Routing solution could be used for the following use case:

- Create a template using the Genesys E-mail software for the outbound e-mail.
- Create an Outbound List with e-mail address as one of the record attributes.
- Configure a Campaign for proactive interaction routing.
- Routing strategy does not route interactions to the Agent Desktop, but instead sends outbound e-mails using integrated Genesys E-mail capabilities.

Note: For detailed information, including Features and Benefits, as well as step-by-step configuration instructions, see the *Genesys 7.6 Proactive Routing Solution Guide*.

Appendix

List of Terms

Table 3 lists some important terms for Genesys 7.6 and beyond.

Table 3: List of Terms

Term	Definition
Business	Legal entity like a corporation or enterprise that is either: Using single or multiple Genesys environments. Not using a Genesys environment, but is providing or consuming services for/from another Business or Business Unit.
Business Provider	Business or Business Unit that is providing its Local Resources or services to another Business or Business Unit.
Business Consumer	Business or Business Unit that is relying on Remote Resources or services provided by another Business or Business Unit.
Business Line	In certain contact center operation models, where there are multiple Business Units, there are multiple Business Lines to manage. Example: ACME is a company that provides credit card customer services to other companies. It has two main credit card customer services groups (business lines): Customer services for VisaCard and Customer services for MasterCard.
Business Unit	Business subdivision, department or subsidiary that is operating in one consistent namespace (unique Resource IDs, application IDs, Agent names, and so on). Consistency of the name space is either enforced by the Genesys environment or by a third party system (LDAP, Active Directory, and so on).
Cost Contract	Part of the cost of routing an interaction is Resource cost. Since resources, such as agents, usually work under contracts, Resource cost in a cost-based routing solution is based on contracts. In this case, a cost contract is represented in Configuration Layer by a special type of `Objective Table` called a `Cost Contract` object.

Table 3: List of Terms (Continued)

Term	Definition
Day Contract	When you create a Cost Contract object based on Volume processing, URS calculates the price of an interaction based on a Day Contract, which defines: a forecasted volume, for each time interval (called a volume period), a base rate for each interaction in the volume period, over and under penalties (if applied).
Genesys Environment	Genesys suit of products to manage Resources inside (agents, IVRs, and so on) or outside (knowledge workers, mobile workers, employees, and so on) of the contact center. Usually includes a single configuration server and Configuration Database, Management Layer, router(s), stat server(s), various media servers (T-server, etc.), interaction servers, reporting, and user-facing applications.
Enterprise	A contact center's infrastructure is comprised of an *Enterprise*, which may be `Single-Tenant` or `Multi-Tenant`.
Federation	Community of Businesses, Business Units or/and Network Providers involved in interaction processing mitigated by business agreements.
Federated Enterprise	The first phase of the Genesys Federated Enterprise will link multiple Enterprises and their federated units with each federated unit owning its own Configuration Database. This first phase will allow: • Routing and transfer of interactions with attached data across Genesys-enabled sites within Federated Enterprises, including remote sites, such as outsourcer sites. • The sharing of selected configuration data among Enterprises. The Federated Enterprise will also allow each configuration owner (whether an Enterprise, service provider, or outsourcer) to control access rights to their configuration information.
Infrastructure cost	Infrastructure cost is the transfer cost associated with an interaction being sent from Site A to Site B (whose resources are configured in a single Configuration Database). Supported Switches include those used for large enterprises, such as SIP/IP-based Switches able to service multiple contact centers in different cities. Infrastructure cost can also be defined for an interaction being sent from Switch A to an outsourcer whose resources are not defined by Genesys (non-monitored destination).
Network Provider	Special entity that is either offering resources or services to multiple Businesses (acting as Business Provider) or only helping to increase the efficiency of communications between Business Providers and Business Consumers.

Table 3: List of Terms (Continued)

Term	Definition
Outsourcer	A type of Genesys-enabled Site that supplies customer care services to other companies. Outsourcers supply the agents to take inquires for other companies. A cost-based routing solution distinguishes two types of outsourcers: monitored and non-monitored. • Monitored outsourcer. Provides staffing (agents) while the Enterprise supplies the infrastructure, such as switch, phones, transport layer, and so on. The enterprise's Genesys software can monitor the outsourcer's resources, such as DNs and agents. • Non-monitored outsourcer. Provides everything from infrastructure to staffing. For this type, the enterprises's Genesys software cannot monitor the outsourcer's resources (DNs, agents, and so on). The routing targets are expressed as non-configured DNs.
Resource	Human (agent, knowledge worker, employee, and so on) or not human (IVR, IVR port, and so on) entities that belongs to the Business, Business Unit or Network Provider.
Resource Local	Resource that is not available to Business Consumers and owned by Business or Business Unit.
Remote Resource	Resource that is made available to Business Consumer by Business Provider. This is usually subset of the Local Resource pool owned by Business Provider.
Site	A Site refers to a location of contact center resources (agents, places, DNs, and so on). Contact center resources located close together are associated with a single Site. The concept of Site is similar to the concept of Switch, but is more generic in that Site is not limited to voice DNS.
Tenant	Within Genesys Configuration Manager, tenants in a Multi-Tenant environment share the same Configuration Environment. Each tenant is a business entity with common goals and procedures that occupies part or all of a contact center. Tenants sharing a contact center might be different businesses, or different divisions within the same business. Each Tenant has its own directory numbers (DNs) and agents; it can also have its own switch. Some contact center Resources, such as the switch, can be shared among tenants.

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