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GENESYS™

CIC ACD Processing

Technical Reference

Abstract

Customer Interaction Center's ACD (Automatic Communication Distribution) system intelligently routes interactions based on agent availability, skill levels, costs, priority, and any other attributes you choose. ACD quickly finds the best match between agent and interaction by calculating agents' scores and interaction scores. This document provides an overview of how ACD works in CIC (Customer Interaction Center), and explains how to set up and configure CIC's ACD processing to meeting your organization's needs.

For the latest version of this document, see the PureConnect Documentation Library at: http://help.genesys.com/pureconnect.

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Introduction to ACD Processing

The *ACD Processing Technical Reference* provides an overview of how ACD (Automatic Communication Distribution) works in CIC (Customer Interaction Center) and explains how to set up and configure ACD processing to meet your organization's needs.

Audience

The information is for two groups of people:

- People who want to learn about Customer Interaction Center's ACD capabilities.
- People setting up and configuring ACD on their Customer Interaction Center system.

Summary

Customer Interaction Center's ACD intelligently routes telephone calls, chat calls, email messages, social media conversations and direct messages, and generic objects (collectively referred to as interactions). ACD routing is based on agent availability, skill levels, costs, priority, and any other attribute you choose. There is no limit to the number or size of the ACD queues configured to receive interactions. Customer Interaction Center's ACD quickly finds the best match between agent and interaction by calculating agents' scores and interaction scores. A subsystem on the CIC server, called ACD Server, calculates these scores. This subsystem's main job is to calculate agent and interaction scores, even when there are many interactions in an ACD queue. By configuring the formula used to calculate these scores, you customize the ACD system to meet your needs.

Some of the elements of the agent score and interaction score formulas are:

- Agent skills
- Agent cost
- Time an agent has been available
- Interaction skill requirement
- Interaction priority level
- Time an interaction has been in an ACD Queue
- Time an interaction has been in CIC

An administrator can configure Customer Interaction Center's ACD capabilities using Interaction Administrator settings and handlers, and can assign attributes for each agent (skills, proficiencies, cost, or other attributes you create). Whether you add an agent or update an agent's profile, the change takes effect immediately.

Handlers assign the skill, priority, and cost requirements to an interaction. When an interaction comes in, handlers assign minimum requirements to an interaction. Customer Interaction Center generates a list of available qualified agents who can take the interaction. Then Customer Interaction Center selects the most appropriate agent to take the interaction based on any combination of skills, cost, or availability. If an interaction goes unanswered or remains on hold too long, you can flag that interaction for special processing.

Customer Interaction Center's ACD is designed to work in two scenarios:

- There are many agents available to take an interaction. In this situation, Customer Interaction Center chooses the best agent to take the interaction.
- There are many interactions waiting and an agent becomes available. In this case, Customer Interaction Center selects the best interaction for that agent to answer.

Concepts and Terms

Following are common terminology and features associated with Customer Interaction Center's Automatic Communication Distribution.

ACD

Automatic Communication Distribution (called an Automatic Call Distributor in more limited systems). A system that intelligently routes interactions (calls, and in Customer Interaction Center's case, Internet chat sessions, email messages, and other interactions) to available agents. You can configure Customer Interaction Center's ACD to distribute interactions to agents based on:

- Agent skills
- Agent cost
- Time an agent has been available
- Interaction skill requirement
- Interaction priority level
- Time an interaction has been in an ACD Queue
- Time an interaction has been in CIC

ACD Queue

A container for interactions flagged for ACD processing. Agents are members of the ACD workgroups and manage the interactions as they appear in the ACD Workgroup queue. You can have as many ACD queues as you like. There is no limit to the number of agents who can be members of an ACD queue.

If the **Workgroup has Queue** box is selected in the Workgroup Configuration page in Interaction Administrator, then you must select a queue type. This queue type determines how ACD Server routes the incoming interaction.

Agent

An agent is someone who receives incoming interactions. Agents have attributes such as skills, costs, and the amount of time since they last answered an interaction. An agent can be a member of any number of ACD queues.

Agent Score Formula

The agent score formula is the configurable formula that calculates an agent's score. If there are agents available when an interaction arrives in an ACD queue, the agent with the highest score receives that interaction. Agent scores take into account an agent's skills, cost, amount of time that agent has been available, and other custom attributes you define.

Attributes

Attributes are agent and interaction characteristics such as skills, cost, and priority. An administrator can assign agent attributes in Interaction Administrator. You can also use handlers to assign and modify interaction attributes. Each attribute has an associated weight that determines how that attribute affects the agent or interaction score. With Customer Interaction Center, you can define your own custom agent attributes.

Cost

Cost is an agent attribute. Agent cost can be used in calculating an agent's score. You can configure your ACD to prefer agents with low cost or high cost. While cost can be an agent's salary, you can assign a high cost to agent's that takes longer to determine a solution. It can also be cost to the customer.

Handlers

Handlers are the programs that define how Customer Interaction Center manages interactions. ACD handlers define how interactions are processed before they arrive in an ACD queue and after they leave an ACD queue. Both interaction scores and agent scores are configured and calculated in handlers. You can use Interaction Designer to create and modify handlers.

Interaction Score Formula

The interaction score formula is the configurable formula that ACD Server uses to calculate an interaction's score. Interaction scores take into account interaction skill requirements, priority, the amount of time an interaction has been in the ACD queue or the CIC system. If there are many interactions waiting and an agent becomes available, a score is calculated for each interaction. The interaction with the highest score goes to that agent.

Interactions

Interactions are telephone calls, chat calls, email messages, social media conversations and direct messages, generic objects, and work items. For purposes of ACD processing, interactions can be assigned priorities and skill requirements. Times are also recorded. Times include both the length of time an interaction waits in an ACD queue and the length of time an interaction has been in the CIC system.

Skills

A skill is an agent attribute, and each agent can have one or more skills. (Agents can also inherit one or more skills when they become a member of a certain workgroup.) Along with each skill is a proficiency level. ACD uses proficiency levels in calculating both agent and interaction scores. Interactions can require minimum proficiency levels for one or more skills. For example, an agent can have a Microsoft Word skill with a proficiency of 50. That agent cannot be assigned to any interactions with a Microsoft Word proficiency requirement greater than 51.

Associated with each skill is a measure of that agent's desire to use that skill. (This factor can also be the organization's desire for an agent to use that skill.) This value can also be used to increase an agent's score, and therefore increase their chance of receiving an interaction that requires that skill.

Weights

Weights are part of both the agent and interaction score formulas. Both formulas contain several elements and a weight associated with each element. Assigning an element a weight of zero means that you do not want that element to impact the score. Assigning an element a positive or negative weight means that you want that element to influence the score.

Interaction Types

Call

Telephone calls are the most common type of interaction that ACD routes.

Callback

A callback is a request sent from a customer at a website that generates an outbound call to the customer from an available agent. Aside from how the call is made, this interaction is essentially a standard telephone call. For licensing purposes, ACD treats callbacks as calls.

Chat

ACD processes chats just like telephone calls, with two exceptions:
- ACD cannot assign chats to phone-only agents.
- Chats cannot use hunt groups or group ring.

Email

Depending on configuration, workgroups can receive ACD-routed email. Agents can also create outbound email messages on behalf of a workgroup. To configure a workgroup for email, select a workgroup, open the **Workgroup Configuration** dialog box, click the **ACD** tab, and then click **Routing** in the left-hand window. To allow the workgroup to receive ACD-routed email messages, or to allow an agent to send email messages on behalf of the workgroup, select the **ACD E-Mail Routing Active** check box.

You must also specify in the mailbox configuration whether the mailbox is for incoming or outgoing email messages, or both. For more information about mailbox configuration, refer to the Interaction Administrator help.

ACD routing processes all email messages in the folder specified in the **Inbound Folder** field in the **Mailbox** configuration using the same logic as it uses for calls.

When an agent sends a response, the **From** field of the response contains the name indicated in the **Display Name** field. If recording is enabled for the workgroup, a copy of the email is sent to the mailbox user specified for that workgroup in the **Configuration** tab. The workgroup must have an ACD queue configured using the **Workgroup has Queue** check box and the type list on the **Configuration** page.

If any of the following situations occur, all email objects are removed from all queues, reinserted into the workgroup queues on restart, and processed by ACD:
- The Post Office subsystem process stops
- The IP subsystem stops
- A switchover, if used, occurs
- The CIC service restarts (or the CIC server restarts)

Email objects are not necessarily routed to the same agent and any response that was in progress is lost.

Email Distribution

To determine when new messages are received, the inbound folder of a mailbox associated with a workgroup queue is polled at various intervals. The Polling Interval setting on the **Mail** configuration page defines the intervals.

Secure Email Messages

If the workgroup to which you belong is properly configured in Interaction Administrator, your workgroup's mailbox can process a secure email message and route it to you for reply. Secure email messages include encryption to provide confidentiality by preventing anyone from reading the message while it is in transit. A cryptographic signature prevents anyone from modifying the contents of the email message while it is in transit. An email signature can also provide authentication of the sender of a message and verify that they are who they say they are.

The icons for secure email interactions indicate whether the interaction originated with a message that was encrypted or signed, and whether the message is successfully decrypted.

Icon	Description
	Content of the email message is successfully decrypted.
	Content of the email message was encrypted but decryption failed. This condition could be due to one of these reasons: • Decryption was contrary to a Customer Interaction Center policy. For example, the workgroup to which this email message was sent is not configured to receive encrypted email messages. • The private key is not installed. • CIC does not support the encryption algorithm used in this email message.
	Verified digital signature.
	A digital signature is present, but Customer Interaction Center experienced one of the following problems: • The signer's certificate is not trusted. • The email message was modified in transit. • The "From" address in the email header does not match the digital signature.

These icons appear as buttons on the Email window. After you open a secure email message, you can check the icons to determine the status of the message. To display a tooltip that explains the icon, hover over a button, or click the icon button to display details about the associated signature or encryption.

Generic Object (requires an intermediate or advanced Server)

CIC supports a generic object type for routing customer-defined objects such as a third-party chat system, a video, or a workflow document to agents in workgroups. These generic objects function like other interactions within the CIC client.

A generic object appears in the **My Interactions** tab in an agent's workgroup queue in the CIC client, just like other interactions. When you click it, the application or document pops open in the CIC client. You can transfer it, disconnect it, etc., like with other interactions.

For information about tools for creating, disconnecting, getting, setting, and transferring generic objects, see the Interaction Designer help.

SMS

SMS stands for short message service and is useful for sending and receiving text messages to and from cell phones.

Social Conversation

PureConnect supports incoming Facebook and Twitter social media messages as interactions. ACD routing for social conversations is similar to routing for chats.

Social Direct Message

PureConnect support incoming private Facebook messages and Twitter direct messages.

Work Item

Work items appear in the **My Work Items** tab in the CIC client for agents with assigned tasks in Interaction Process Automation. A work item is a collection of forms that an agent sees as part of a process. Work items also include the logic of routing between forms.

Licensing for Interaction Types

A user must have one of the following license types assigned in Interaction Administrator:

License Type	Description
Media 1	Allows for the use of one interaction type.
Media 2	Allows for the use of two interaction types.
Media 3 Plus	Allows for the use of three or more interaction types.

Note:
The license types listed do not include work items. ACD-routed IPA work items require one of the client licenses listed, plus the IPA Group Routed Work Items user access license. For more information about IPA user access licenses, see the Interaction Administrator help topic "Licensing".

How to Configure ACD

Customer Interaction Center's ACD is intelligently matches interactions to available agents under two scenarios.

The first scenario occurs when an interaction arrives in the ACD queue and there are many agents available to answer the interaction. In this scenario, the goal is to pick the most appropriate agent for that interaction. You configure ACD processing to pick the most appropriate agent based on skills, cost, and the amount of time an agent has been available. You can also create custom attributes on which the agent is selected.

The second scenario occurs when there are many interactions waiting and an agent becomes available. The goal for this scenario is to select the most appropriate interaction for the available agent to pick up. Again, you configure ACD processing to select the appropriate interaction based on an agent's skills, the interaction's priority, and the amount of time an interaction has been waiting in the ACD queue or system.

For more information about how Customer Interaction Center matches agents to interactions in both scenarios, see the following:

- Scenario 1: Two or more agents available to take an interaction
- Scenario 2: Many interactions to be answered, agent becomes available

Scenario 1: Two or more agents available to take an interaction

This scenario describes what happens when many agents are available to take an incoming interaction that arrives in the ACD queue.

Step 1: An interaction arrives

Each time an interaction arrives in Customer Interaction Center, it is evaluated and routed to the appropriate queue. Possible queues are user queues, workgroup queues, station queues, and ACD queues. CIC flags any interaction sent to an ACD queue for ACD processing. This processing includes assigning skill requirements and priority levels to the interaction.

Step 2: A list of available agents is generated

In most ACD configurations, every activated agent that has an Available status and is not already engaged in an interaction is added to the list of agents that could answer the interaction. This processing is a bit different in ACD configurations that use the Percent Agent Utilization feature. A description of that feature appears later in this document. When Percent Agent Utilization is in use, the list of available agents consists of every agent with a status of Available who is under 100% utilization. You can also route a specific interaction type to an agent. For more information, see "Route a Specific Interaction Type to an Agent" in the "ACD Server Parameters" section of this document.

Step 3: The agent list is filtered

In step 1, the interaction is assigned minimum skill requirements. The list of available agents is filtered by removing any agents who do not have the minimum skill requirements to handle the interaction. For example, if the interaction requires an agent with a Spanish skill of at least 50 and a UNIX skill of 35, then available agents who do not meet those requirements are removed from the list. The only agents left on the list are ones that are qualified to answer the interaction. If there are no qualified agents left on the list, the interaction waits until an agent becomes available (see "Scenario 2: Many interactions that need to be answered, and an agent becomes available").

Step 4: Agent scores are calculated

Now Customer Interaction Center calculates a score for each agent in the list using the agent score formula. You can configure the agent score formula by modifying values for the following attributes:
- Agent skill proficiency, from 1 to 100 (configured in the Interaction Administrator)
- Agent cost (configured in the Interaction Administrator)
- Time an agent has been available (configured in the ACD Process Item tool)
- Any three custom attributes (configured in the Interaction Administrator and the ACD Process Item tool)
- Weight for utilization (configured in the ACD Process Item tool)

You decide whether to weight the selection toward an agent's skill proficiency, cost, the length of time an agent has been available, or any combination of the three. You can also define your own attributes and use them in determining an agent's score.
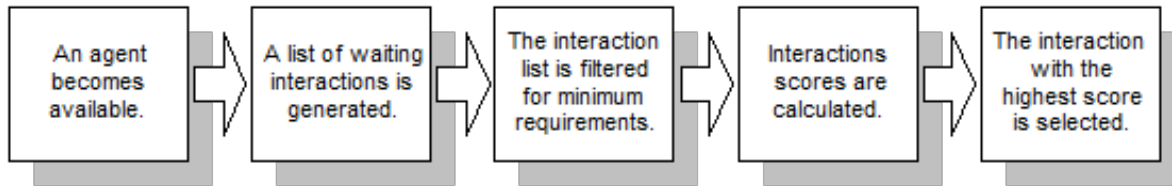
For more information about configuring the agent score formula, see "Configuring Customer Interaction Center's ACD Processing".

Step 5: The most appropriate agent is selected

ACD selects the agent with the highest score to receive the interaction. If two agents have the same score, the agent who has been available longest receives the interaction.

Scenario 2: Many interactions to be answered, agent becomes available

This scenario describes what happens when an agent becomes available and many interactions are waiting. This scenario might occur when a call center is busy and many interactions in the ACD queue are waiting.

An agent becomes available. → A list of waiting interactions is generated. → The interaction list is filtered for minimum requirements. → Interactions scores are calculated. → The interaction with the highest score is selected.

Step 1: An agent becomes available

An agent becomes available, either by finishing a previous interaction, logging in to Customer Interaction Center, or setting the CIC client status to Available. In any case, the agent is ready to answer another interaction. For more information about agent availability, see "Change Agent Availability for ACD Interactions" in **ACD Server Parameters**.

Step 2: A list of waiting interactions is generated

Customer Interaction Center generates a list of all the waiting interactions in the ACD queue. Each of these interactions was assigned minimal skill requirements and priority when it entered the ACD queue.

Step 3: The interaction list is filtered for minimum requirements

If an interaction requires skills and/or skill proficiencies that the available agent doesn't have, that interaction is removed from the list of interactions the agent can answer.

Step 4: Interaction scores are calculated

Customer Interaction Center calculates a score for each interaction using the interaction score formula. The configurable elements of the interaction score formula include:

- Agent skills
- Interaction priority level
- Time in queue
- Time in system

For more information about configuring the interaction score formula, see "Configuring Customer Interaction Center's ACD Processing".

Step 5: The interaction with the highest score is selected

ACD selects the interaction with the highest score and assigns it to the available agent.

Types of ACD

On the **Configuration** tab of the **Workgroup Configuration** dialog box, you can specify the type of ACD routing to use by selecting the appropriate item from the **Workgroup has Queue** list. Definitions of the ACD types appear below.

Custom

With custom ACD processing, agents and interactions each receive scores in various categories. CIC processes the scores to determine The scores are processed to determine the agents who are qualified to handle each interaction. Interactions are assigned to the available agent with the highest acceptable score. For more information about using custom ACD processing, see "Configuring Customer Interaction Center's ACD Processing".

Group Ring

This setting alerts all available members of a workgroup simultaneously when an interaction is available in the queue for that workgroup.

Selecting group ring disables the Agent Utilization, ACD Skills, and ACD Actions functions (the items on those tabs are not available). The **Workgroup Offering Call Timeout** setting determines the length of the group ring.

> **Note**:
> Group ring only works with queues that only handle telephone calls. You cannot use group ring with chats, email, social conversations, direct messages, or generic objects.

Sequential

This setting alerts individual members of a workgroup that a new interaction is available in the queue for that workgroup.

Members are alerted to the call in the order specified in **Workgroup Configuration properties** > **Members page** under **Currently Selected Users**. Every time an interaction comes in, the users are alerted in the listed order.

Selecting Sequential disables the Agent Utilization, ACD Skills, and ACD Actions functions (the items on those tabs are not available). The **Workgroup Offering Call Timeout** setting determines the length of the sequential ring.

> **Note**:
> Only telephone calls can alert hunt groups. Hunt groups are not usable with chats, email, social conversations, direct messages, or generic objects.
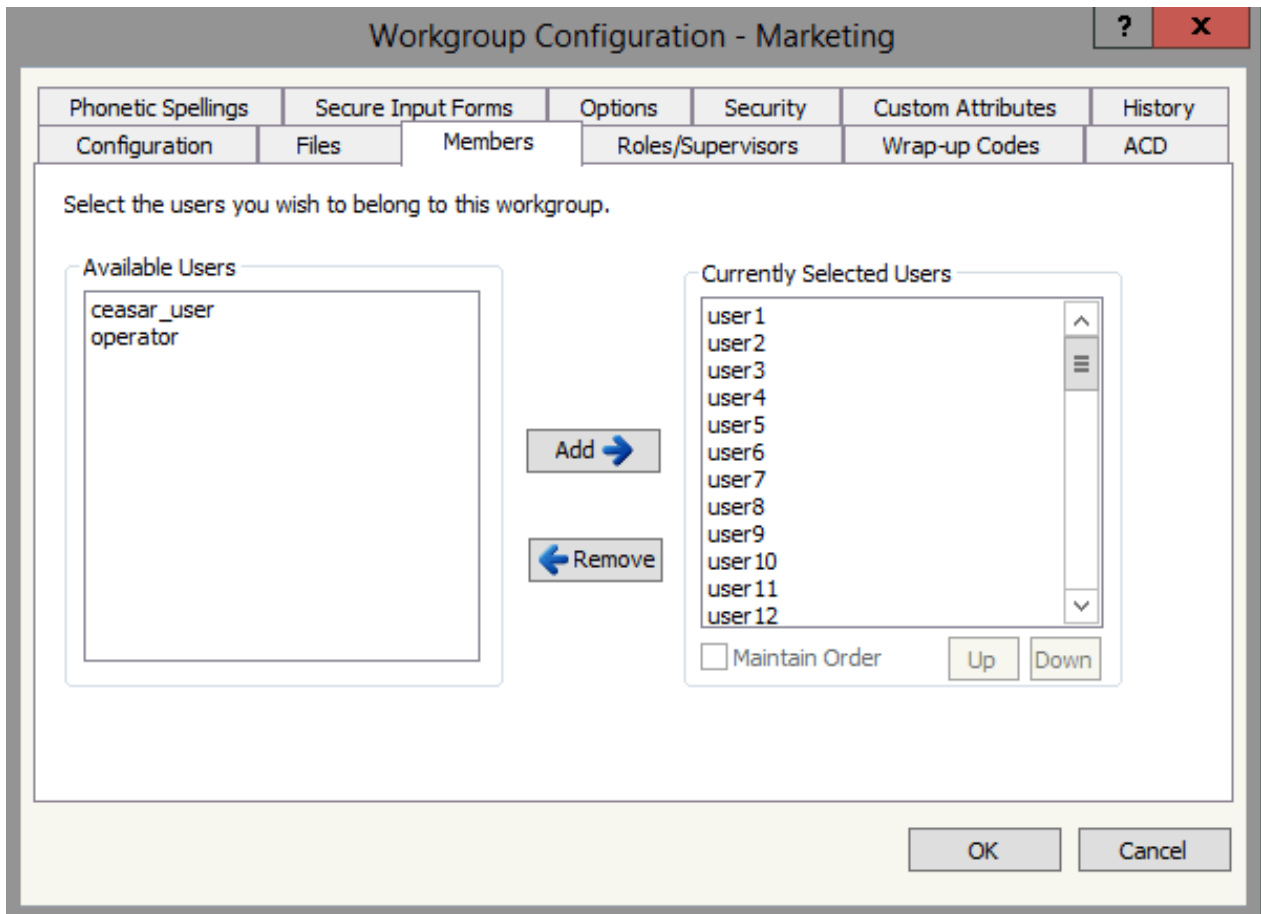
Round-robin

Similar to linear hunt groups, the round robin feature remembers the last user who was sent a call. Round robin works in a loop, repeating the process down through the list, and then the process starts over with the next call.

For example, a workgroup has three users (User1 - User3), all available for workgroup calls and listed as User1, User2, User3, in that order. If User1 received the last call but is available, the next alerting call goes to User2. The next alerting call after that goes to User3 if that user is available.

Selecting Round Robin disables the Agent Utilization, ACD Skills, and ACD Actions functions (the items on those tabs are not available). The length of the Round robin ring is determined by the **Workgroup Offering Call Timeout** setting.

> **Note:**
> Only telephone calls can alert hunt groups at this time. Hunt groups cannot be used with chats, emails, social conversations, direct messages, or generic objects.

ACD

This ACD routing type is a simplified form of ACD routing available in Interaction Administrator. It routes interactions based solely on each agent's time available. With this option, skills assigned to an agent or interaction by the ACD Specify Skill tool are only considered if the workgroup requires certain skills and proficiencies. Otherwise, all agents and interactions effectively have equal scores in all skills, so new interactions go to the agent with the longest available time. If an interaction comes in when no agents are available, it goes to the first agent that becomes available.

> **Note:**
> When ACD Server subsystem evaluates a call's skills, it first looks for skills that were explicitly assigned to that agent from Interaction Administrator. If the required skills were not explicitly assigned, ACD Server looks at the skills that the agent inherited from any workgroups to which he or she belongs. CIC uses the agent's entire set of skills is used to evaluate an interaction on a workgroup queue.

Bullseye

Bullseye routing, which is available only with a custom workgroup, assigns interactions to agents based on selection pools. Picture a target with a bullseye in the center and four rings around the bullseye. One or more agents are assigned to the bullseye (ring 1) and to each of the rings, 2-5, outside of the bullseye. Each ring has a configured timeout.

Bullseye routing is not configurable from workgroup configuration. You assign agents and a timeout to each ring using the ACD Initiate Bullseye Processing tool in Interaction Designer. Assign the preferred agents to ring 1, the bullseye, so they are considered first. For more information about the tool, see ACD Initiate Bullseye Processing in the Interaction Designer help.

When processing an interaction, ACD Server first attempts to assign the interaction to an agent in the bullseye selection pool. If none of the agents in that pool are available before the timeout, ACD Server then widens the selection pool to include the next ring. The selection pool continues to widen if ACD Server does not find an available agent. If a ring does not contain any agents who are logged in, ACD Server skips that ring without waiting for the timeout.

Once it exhausts all of the rings, ACD Server reverts to normal ACD processing where the selection pool includes any agent in the ACD workgroup.

When two or more agents are available, ACD Server bases the selection on the agent with the longest available time.

> **Notes:**
>
> - When two or more agents are available, ACD Server selects the agent with the longest available time.
> - If two or more interactions are available when an agent logs in, ACD Server considers their priority and then the longest wait time.

Configuring Customer Interaction Center's ACD Processing

The following information describes how you can configure both the agent score formula and the interaction score formula to match agents to interactions and interactions to agents. You can configure both formulas using handlers with the ACD Process Item tool.

Agent Score

When more than one agent is available to pick up an interaction from an ACD queue, the agent with the highest score is selected. Your configuration determines how agent scores are calculated. You might set up your formula so that higher scores are given to agents who have low cost, better skills, or have been off the telephone longest. You can even configure your formula to take two, or even all three of these factors into consideration. Here is the formula to calculate the agent's score:

```
Agent Score =
(Agent Cost * Weight for Agent Cost) +
(Agent Available Time * Weight for Agent Available Time)+
(Agent Skill Level * Weight for Agent Skill Level)+
(Agent Availability (Percentage)) * Weight for Utilization
```

You can configure how agent scores are calculated by adjusting the weights associated with each element. For example, if your main concern is agent cost, then set the weights for Agent Skill Level and Agent Available Time to zero. Doing this means that only agent cost would have a non-zero value, and only agent cost would be used to determine the agent's score. If you are only concerned with **Agent Skill Level**, then set both **Weight for Agent Cost** and **Weight for Agent Available Time**. All three of these weights are set in the ACD Process Item tool in your ACD handler.

Agent Cost

You can assign each agent a cost in Interaction Administrator. You can configure the agent score formula to give preference to agents with either low or high costs. Look at the following example to see how agent cost is determined.

Suppose your call center has two agents: Agent A with a cost of $10 and Agent B with a cost of $15. Both agents have been assigned these costs in Interaction Administrator. Because you've configured your agent score formula to calculate scores based on cost (that is, Weight for Agent Cost =1, Weight for Agent Available Time = 0, and Weight for Agent Skill Level = 0), the formula looks like this:

```
Agent Score =
(Agent Cost * 1) +
(Agent Available Time * 0)+
(Agent Skill Level * 0)
```

No matter which numbers are placed in Agent Available Time or Agent Skill Level, their values are multiplied by zero and have no impact on an agent's score. Therefore, only Agent Cost is a factor, leaving the agent score formula looking like this:

```
Agent Score =
(Agent Cost * 1)
```

The score for Agent A is 10, and the score for Agent B is 15. The agent with the higher score, Agent B, receives the interaction. If you want to assign interactions to agents with lower costs, use a negative weight for agent cost. Your equation might look something like this:

```
Agent Score =
(Agent Cost * -2)
```

Using a negative weight, Agents A's score is -20, and Agent B's score is -30. Agent A receives the interaction because -20 is greater than -30.

> **Warning!**
> Except for agent cost, you will not usually assign negative weights. For example, if you set a Weight for Agent Skill level to a negative number, then interactions are not assigned to the most qualified agents.

Agent Skill Level

You assign skills to agents in Interaction Administrator. Imagine that you manage a call center that answers Windows and UNIX questions. Some of your agents are Windows experts and some are UNIX experts. Each agent has both a Windows skill and a UNIX skill. To ensure that agents receive interactions they are best qualified to answer, you would assign Windows experts a high Windows skill proficiency level, and UNIX experts a high UNIX skill proficiency level.

Once you have assigned skills, modify your ACD handler to assign skill requirements to an interaction with ACD Specify Skill steps. Your handler (using a caller's input, evaluating the number dialed, or any other method) decides whether the interaction requires a Windows or UNIX skill and determines the minimum skill proficiency level. Only agents whose skill proficiencies meet the interaction's minimum skill requirements are considered as potential recipients. The available agent with the best proficiencies receives the interaction.

If you calculate an agent's score based only on one skill, the weights for Agent Cost and Agent Available Time could be set to zero in the ACD Process Item tool (that is, `Weight for Agent Cost = 0`, `Weight for Agent Available Time = 0`, and `Weight for Agent Skill Level = 1`). In this case, the agent score formula might look like the one below:

```
Agent Score =
(Agent Cost * 0) +
(Agent Available Time * 0)+
(Agent Skill Level * 1)
```

Scoring with Multiple Skills

In some cases, you may want to calculate a score based on two or more skills. This might occur when an interaction requires both a Windows skill and a Spanish skill. In this case, a composite Agent Skill Level is determined using the following formula:

```
Composite Agent Skill Level =
[(Skill 1 Proficiency Level * Weight for Skill 1 Level) +
(Skill 2 Proficiency Level * Weight for Skill 2 Level)


+ etc...]
  / absolute value of the sum of the Weight for Skill values
```

For example, suppose Agent A has a Windows skill proficiency of 50 and a Spanish skill proficiency of 75. Agent B has a Windows skill proficiency of 40 and a Spanish skill proficiency of 100. An interaction comes in requiring a minimum Windows proficiency of 30 and a Spanish proficiency of 70. Both agents are qualified to answer the interaction.

In your handler, you'll have an ACD Specify Skill toolstep for each skill you want to use in your calculations. In each of these ACD Specify Skill tools, you must configure the weight for using that skill. For example, if you are more concerned with the Spanish skill, you might configure the weight for Spanish at 2 and the weight for Windows at 1. You would set the Spanish weight to two because you think it is twice as important as the Windows skill. Using these settings, you can determine the scores for agent A and B.

Composite Agent Skill Level for Agent A =

```
[(Windows skill proficiency 50) * 1) +
(Spanish skill proficiency 40) * 2)]
 / absolute value of 3 = 43.3
```

Composite Agent Skill Level for Agent B =

```
[(Windows skill proficiency 40) * 1) +
(Spanish skill proficiency 100) * 2)]
/ absolute value of 3 = 80
```

The Composite Agent Skill Level is then placed in the Agent Skill Level portion of the Agent Score formula:

```
Agent Score =
(Agent Cost * 0) +
(Agent Available Time * 0)+
(Composite Agent Skill Level * 1)
```

Agent B, with a higher score of 80, receives the interaction.

Agent Available Time

If you want to route interactions to the agents who have been available the longest, then use the Agent Available Time portion of the agent score formula. When an agent becomes available, the time is recorded. Availability is only reset when an agent disconnects from an ACD interaction, or when follow-up time expires. Available time is **not** reset when an agent is off-hook for non-ACD purposes such as using their headset to record a new prompt.

You can also configure workgroups to reset agents' available time whenever their status changes to a non-ACD status or whenever they log on. In the **ACD Options** tab of the **System Configuration** page, select the **Reset Available Time on Status Change** and/or **Reset Available Time on login** check boxes. Open the System Configuration node in Interaction Administrator and selecting the appropriate checkboxes labeled **Reset Available Time on Status Change** and/or **Reset Available Time on login** in the **ACD Options** tab enables this functionality for all workgroups.

In the agent score calculation, the amount of time the agent has been available (in seconds) is divided by the Agent Available Time Interval; any resulting fraction is discarded. A higher value results in a higher agent score.

The value you enter in the Agent Available Time Interval parameter (in the ACD Process Item tool) is the interval at which an agent's Available Time is increased by one. For example, an agent who has been available 2 minutes in a system where the Agent Available Time Interval is 30 would have an Agent Available Time value of 4 (2 minutes = 120 seconds; 120 / 30 = 4). At 3 minutes, the agent would have an Agent Available Time value of 6 (3 minutes = 180 seconds; 180 / 30 = 6). If you calculate an agent's score entirely on Agent Available Time, the agents who are off the phone longest have higher scores.

Weight for Utilization

You can use Weight for Utilization to specify how much an agent's utilization impacts the assignment of interactions to an agent.

For example, a call center has two agents. Agent A and Agent B can both receive two chat interactions at a time. The call center uses Agent Cost and Agent Available Time to assign chat interactions to an agent.

Assume the following values for Agent A:
Agent Cost = $10
Weight for Cost = 1.0
Weight for Available Time = 1.0
Weight for Skill Level = 0
Available Time to Start = 10 seconds

Assume the following values for Agent B:
Agent Cost = $10
Weight for Cost = 1.0
Weight for Available Time = 1.0
Weight for Skill Level = 0
Available Time to Start = 5 seconds

This example uses the following formula to assign four chat interactions to Agent A and Agent B:

Agent Score = (Agent Cost * Weight for Agent Cost) + (Agent Available Time * Weight for Agent Available Time)

1. Chat 1 comes in:

Agent A score = (10 * 1.0) + (10 * 1.0) = 20

Agent B score = (10 * 1.0) + (5 * 1.0) = 15

Chat 1 is assigned to Agent A

2. Chat 2 comes in five seconds later:

Agent A score = (10 * 1.0) + (5 * 1.0) = 15

Agent B score = (10 * 1.0) + (10 * 1.0) = 20

Chat 2 is assigned to Agent B

3. Five seconds later, Agent B disconnects chat 2.

4. Chat 3 comes in five seconds later:

Agent A score = (10 * 1.0) + (15 * 1.0) = 25

Agent B score = (10 * 1.0) + (5 * 1.0) = 15

Chat 3 is assigned to Agent A

This example results in two chat interactions assigned to Agent A and no chat interactions assigned to Agent B.

Next consider the same example but add a Weight for Utilization value of 1.0 to distribute the chat interactions more evenly. Use the following formula with Weight for Utilization:

Agent Score = (Agent Cost * Weight for Agent Cost) + (Agent Available Time * Weight for Agent Available Time) + (Agent availability (Percentage)) * Weight for Utilization)

1. Chat 1 comes in:

Agent A score = (10 * 1.0) + (10 * 1.0) + (100 * 1.0) = 120

Agent B score = (10 * 1.0) +(5 * 1.0) + (100 * 1.0) = 115

Chat 1 is assigned to Agent A

2. Chat 2 comes in five seconds later:

Agent A score = (10 * 1.0) + (5 * 1.0) + (50 * 1.0) = 65

Agent B score = (10 * 1.0) +(10 * 1.0) + (100 * 1.0) = 120

Chat 2 is assigned to Agent B

3. Five seconds later, Agent B disconnects chat 2.

4. Chat 3 comes in five seconds later:

Agent A score = (10 * 1.0) + (15 * 1.0) + (50 * 1.0) = 75

Agent B score = (10 * 1.0) + (5 * 1.0) + (100 * 1.0) = 115

Chat 3 is assigned to Agent B

Adding Weight for Utilization to the example results in one chat interaction assigned to each agent.

Calculating Agent Scores with Custom Attributes

Along with skill, agent available time, and cost, you can add your own custom attributes into the calculation for agent score. You can configure custom attributes in Interaction Administrator. Weights for these attributes are assigned by the ACD Process Item tool. You can add up to three custom attributes. If you decide to use the custom attributes, they affect the agent score formula in the following way:

```
Agent Score =
(Agent Skill Level * Weight for Agent Skill Level) +
(Agent Cost * Weight for Agent Cost) +
(Agent Available Time * Weight for Agent Available Time)




 +
  (Attribute1 Value * Weight for Attribute1) +
  (Attribute2 Value * Weight for Attribute2) +
  (Attribute3 Value * Weight for Attribute3)
```

Tie Breakers

If two agents have the same score, a tie breaker determines the agent. The tie breaker is the amount of time an agent has been available. The agent with the longest available time receives the interaction.

Manipulate Email for a Custom Workgroup

To manipulate ACD email for a custom workgroup, modify the CustomIVRWorkgroupQueueEmail handler, just as you would modify the CustomIVRWorkgroupQueue handler for calls.

For emails, the variable that holds the workgroup name is p_sDestQueueName.

To open email and examine the subject, body, sender, and other fields on which you might base custom routing, first use the **Email Interaction Get Message** tool to get the current message cookie from the Interaction ID (variable is InteractionId). The cookie is stored in a variable named ecCookie, by default. Then, use the **Open Message by Cookie** tool to get all of the fields from the email message.

After retrieving the fields from the message, you can use various other tools to parse through the subject, body, and so on, looking for keywords, for example.

Use the ACD Specify Interaction Skill, ACD Specify Interaction Category, and ACD Initiate Processing tools as you would for a call.

As an example, look at the SystemIVRWorkgroupEmail.ihd handler and the IntAttEmailWorkgroupTransfer.ihd handler, which uses the two tools mentioned above, and then use the **Email Interaction Transfer** tool to transfer the email to a user queue or workgroup queue.

ACD and Email Concurrent Handler Limit Considerations

Starting with 2017 R3, concurrent handler limits for ACD and email handlers are set to:
- AcdAvailableAgent (350)
- AcdAvailableInteraction (350)
- System_QueueEmailOfferingNonSystemQueue (150)
- System_IncomingQueueEmail (150)

These limits help with stability during switchovers in environments with high load, with calls, agents, and email interactions being the largest factors in the load. You can configure these values in Interaction Administrator. For more information, see https://help.genesys.com/cic/mergedProjects/wh_ia/desktop/handler_configuration.htm.

Interaction Score

When an agent becomes available and there is more than one interaction waiting, the interaction with the highest score is selected. The formula used to calculate an interaction score is shown below:

```
Interaction Score
(Agent's Skill * Weight for Skills) +
(Priority * Weight for Priority) +
(Time in Queue * Weight for Time in Queue) +
(Time in System * Weight for Time in System)
```

Skills

If you are concerned with matching interactions to agents with the best skill for that interaction, then increase the Weight for Skills more than the weights for priority or time in queue or system. Scores for skills are calculated by multiplying the Weight for Skills by the available agent's proficiency for that skill. The interaction with the highest skill value is chosen. Skills and individual skill weights for an interaction are assigned in the ACD Specify Skill tool.

The formula for determining an interaction's skill score is:

```
Interaction skill =
(Agent's Skill Proficiency for Skill * Weight for Proficiency
```

```
of Skill) +
   (Agent's Desire to Use Skill * Weight for Desire To Use


of Skill)
   / absolute value of the sum of the Weight for Skill and


Desire to Use values
```

You can set the Agent's Skill Proficiency and Agent's Desire to Use Skill values in Interaction Administrator. The weights for these values determine their importance, and are specified in an ACD Specify Skill step.

This example shows how an interaction score is calculated based on a skill. Two interactions are waiting to be answered when an agent becomes available. The first interaction requires a Windows skill and the second requires a UNIX skill. The agent has a Windows skill proficiency of 70, and a desire to use level of 100. The agent also has a UNIX skill proficiency of 50, and a desire to use level of 50. If you weighted the portions of the Priority and Time in Queue elements of the interaction score formula at zero, the interaction score formula would look like this:

```
   Interaction Score= Agent's Skill * 1)
```

The first interaction's score is calculated in the Agent Skill formula, as shown below:

```
   Agent's Skill= (Agent's Skill Proficiency for Skill is


70 *
   Weight for Proficiency of Skill is 1) + (Agent's Desire


to Use Skill is 100 *
   Weight for Desire to Use of Skill is 1) / 2 = 85
```

The second interaction's score is calculated in the Agent Skill formula, as shown below:

```
   Agent's Skill=
   (Agent's Skill Proficiency for Skill is 50 * Weight for


Proficiency of Skill
   is 1) + (Agent's Desire to Use Skill is 50 * Weight for


Desire To Use of
   Skill is 1) / 2 = 50
```

The first interaction has the higher score and is assigned to the agent.

Composite Scores for Interactions with Skills

Composite or normalization skill scores are useful for these reasons:
- To ensure that skills with a weight greater than 1 still fall within the acceptable range of 0-100.
- To compare interactions with multiple skill requirements.

Normalizing the skills score makes it possible to compare, for example, an interaction with three skills and an interaction with one skill. Without composite skills, the score for an interaction with three skills would tend to be higher than the score of an interaction with one skill. The composite skill score calculation results in a single score that represents all of the skills for the interaction.

In this case, the Skills value in the Interaction Score formula would look something like this:

```
   Composite Skill Value =
   (Agent's Skill Proficiency for Skill 1 * Weight for Proficiency


of Skill 1) +
   (Agent's Desire to Use Skill 1 * Weight for Desire To
```

```
Use of Skill 1) +
   (Agent's Skill Proficiency for Skill 2 * Weight for Proficiency


of Skill 2) +
   (Agent's Desire to Use Skill 2 * Weight for Desire To


Use of Skill 2) + etc…
   / absolute value of the sum of the Weight for Proficiency


of Skill values and
   Weight for Desire to Use values
```

For an example of how CIC calculates composite skills, imagine that two interactions are waiting when an agent becomes available. The first interaction requires Windows and Spanish, and the second interaction requires UNIX and Spanish. You want to pick the interaction that best matches that agent's skills. The agent has a Windows skill proficiency of 70 and a desire to use level of 100. The agent also has a UNIX skill proficiency of 50 and a desire to use level of 50. The agent's Spanish skill proficiency is 100 and a desire to use level of 100.

Setting the weights for Priority and Time in Queue to zero, the interaction score formula looks like this:

```
Interaction Score=
(Agent's Skill * Weight for Skills)
```

Because you are calculating the Agent's Skill value based on multiple skills, the equation looks like this:

```
Interaction Score=
(Composite Skill Value * Weight for Skills)
```

Now plug the numbers into the Composite Skill Value formula:

The first interaction's score, calculated in the Agent Skill formula:

```
Composite Skill Value=
(Agent's Skill Proficiency for Skill 1 is 70 * Weight


for Proficiency of    Skill 1 is

1) +
   (Agent's Desire to Use Skill is 100 * Weight for Desire


to Use of Skill is 1) +
   (Agent's Skill Proficiency for Skill 2 is 100 * Weight


for Proficiency of Skill
  2 is 1) +    (Agent's


Desire to Use Skill is 100 * Weight for Desire to Use of Skill is

1)
   / absolute value of the sum of the Weight for Proficiency


of Skill values and
   Weight for Desire to Use values is 4 = 92.5
```

The second interaction's score, calculated in the Agent Skill formula:

```
Composite Skill Value=
(Agent's Skill Proficiency for Skill 1 is 50 * Weight


for Proficiency of    Skill 1 is

1) +
```

```
   (Agent's Desire to Use Skill is 50 * Weight for Desire


to Use of Skill is 1) +
   (Agent's Skill Proficiency for Skill 2 is 100 * Weight


for Proficiency of Skill
   2 is 1) +
   (Agent's Desire to Use Skill is 100 * Weight for Desire


to Use of Skill is 1)
   / absolute value of the sum of the Weight for Proficiency


of Skill values and
   Weight for Desire to Use values is 4 = 75
```

ACD Categories

Categories allow you to create subsets within workgroups. If an interaction has a category, then only agents who are members of that category receive that interaction. For example, if a chat session is in category A, then that chat session goes to an agent in that workgroup who belongs to category A. You can assign agents to categories with the ACD Agent Category tool; interactions are assigned to categories with the interaction category.

Categories are less persistent than ACD skills because they are held in memory on the ACD Server. When you restart CIC, all category information is removed. You can remove an agent from a category by executing the ACD Agent Category tool with the ACD Agent to Category option clear. The ACD Agent Logout tool removes an agent from all categories. The Interaction Dialer application assigns agents to categories without using this tool.

Priority

Customer Interaction Center can assign each interaction a priority. You could use priority to give some customers faster service, or you could assign emergency interactions a high priority. Assign an interaction a priority with the ACD Process Item tool. Then configure the interaction score formula to assign high scores to priority interactions. Assigning Weight for Priority a higher value than the other weights tends to assign interactions with high scores to available agents.

Time in Queue and Time in System

If you are concerned about the number of times interactions go unanswered, then you can increase an interaction's score based on the amount of time it has been in the queue or in the system. By increasing the weight of Time in Queue or Time in System element of the Interaction Score formula, you can increase the score for an interaction the longer it waits.

Time in Queue records the amount of time an interaction is waiting in this particular queue. If the interaction is transferred to another ACD queue, or even transferred back to the original queue, the Time in Queue value resets.

Time in System is a little different. ACD records the time when an interaction is created. As long as the interaction remains in the system, its timer never resets. Therefore, as the interaction is transferred around the system, its score continues to increase. Use Time in System if you want interactions to have higher scores the longer they remain in Customer Interaction Center.

The In-Queue Time Interval is the number of seconds before the Time in Queue value increases by one. This increase causes a call's score and the likelihood of it being assigned to an agent to increase.

Tie Breakers

If two interactions have the same score, a tiebreaker selects one. The tiebreaker is the amount of time the interaction is in the queue. The interaction that has been in the queue longer goes to the available agent.

When configuring your ACD handlers, using the default values for the ACD Select Item tool results in the use of the tie breakers to determine which interaction goes to which agent. In other words, if you use the ACD defaults, the interactions that are in the queue the longest go to the next available agent.

Required Attributes

Each workgroup requires the following attributes. You can find these attributes in the ACD Initiate Processing tool in the ACD handlers and you can set and modify them with Interaction Designer.

> **Note:**
> The following attributes pertain to custom ACD only. Select **ACD Workgroup: Custom** and **Active** in the workgroup's properties page to use of these attributes.

Attribute Name	Values	Default Value
Weight for Agent Skill Level	Any real value	1.0
Weight for Agent Cost	Any real value	1.0
Weight for Agent Available Time	Any real value	1.0
Weight for Agent Attribute 1	Any real value	0.0
Weight for Agent Attribute 2	Any real value	0.0
Weight for Agent Attribute 3	Any real value	0.0
Agent Available Time Interval (seconds)	Integer > 0	30
Weight for Skills	Any real value	1.0
Weight for Priority	Any real value	1.0
Weight for Time in Queue	Any real value	1.0
Weight for Time in System	Any real value	0.0
Priority Level	Integer, 0 <= n <= 1000	50
In-Queue Time Interval (seconds)	Integer > 0	30
In-Queue Time Limit (seconds) (0: none)	Integer >= 0	0
In-System Time Interval (seconds)	Integer > 0	30
Weight for Utilization	Any real value	0.0

Required Skills

Any workgroup queue which has Custom ACD Processing selected can have zero or more instances of Required Skills specified:

| Attribute Name	Values	Default Value
Minimum Proficiency Level	1 - 100	1
Maximum Proficiency Level	1 - 100	100
Weight for Proficiency Level	Any real value	1.0
Minimum Desire To Use Level	0 - 100	0
Maximum Desire To Use Level	0 - 100	100
Weight for Desire To Use Level	Any real value	0.0

Other ACD Specifications

Agent Utilization

CIC allows agents to handle multiple phone calls, emails, and chats simultaneously, in any combination. You can set percentages for each type of interaction in Interaction Administrator (Figure 4). An agent is considered available as long as the sum of the percentage utilizations is less than 100. Suppose the system configuration indicates that phone calls have a percentage utilization of 51%, chats 25%, and emails 10%, then an agent could simultaneously process four chats, or one phone call and up to four emails, or two chats and five emails, and so on.

You can also set a maximum number of each interaction type. This number indicates the maximum number of that type of interaction that an agent can receive. Suppose that the system configuration indicates that chats have a percent utilization of 25 and a max. assign. of 2, then each agent could only have a maximum of two chat interactions at any given time, even though that would still leave the agent's total utilization at 50%.
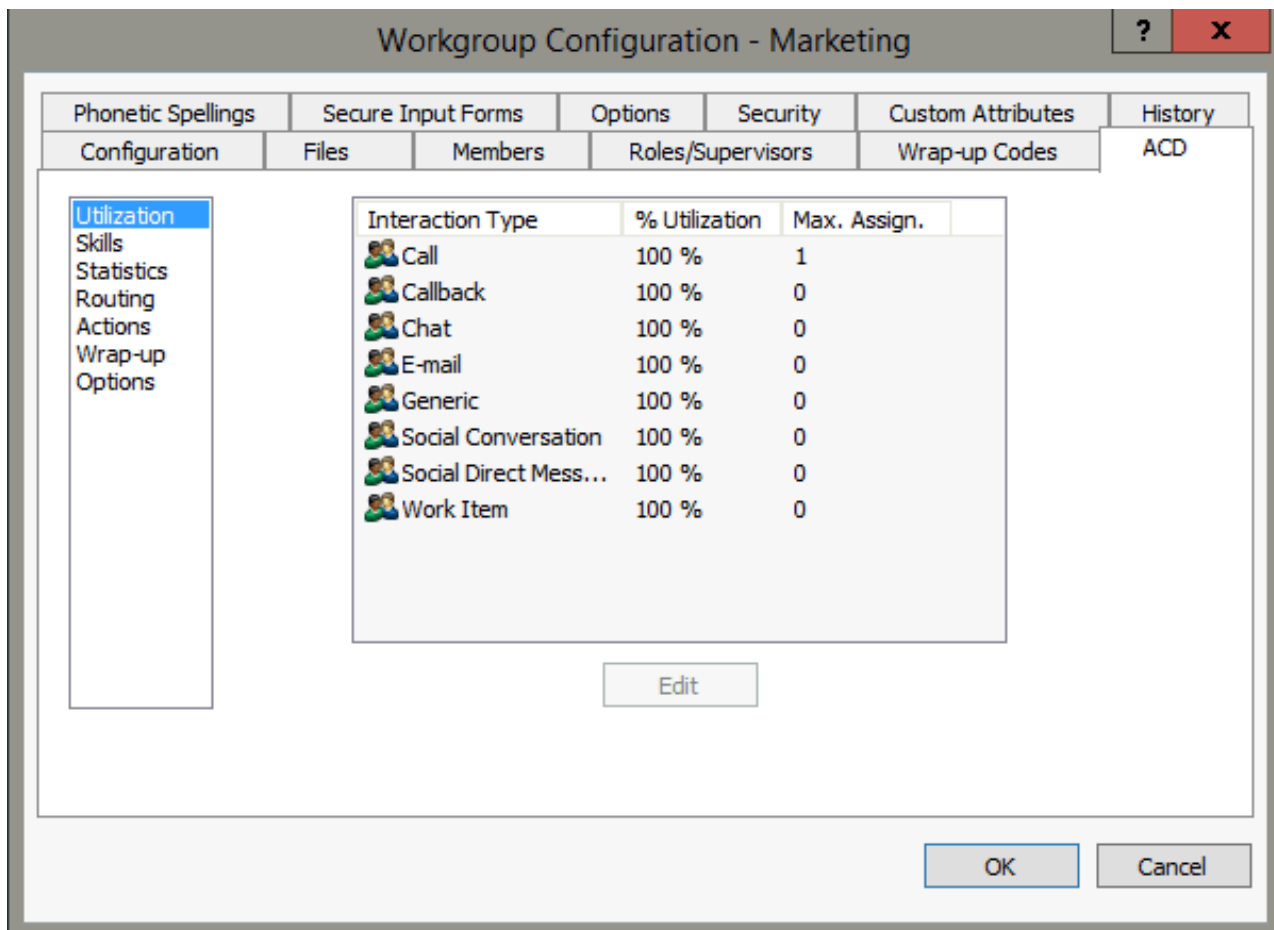
You can use Percent Utilization and Maximum Assignment together to allow utilization of agents at their maximum efficiency, while avoiding the confusion that could be caused by having an agent assigned too many of a particular interaction type. For example, you could decide that one phone call might only occupy 30% of your agents' total resources. However, it is unreasonable to expect them to be able to field more than one phone call at any given time by setting the Percent Utilization for calls to 30 and the Max. Assign. to 1. An agent with one phone call is still be 70% available for emails, chats, and so on, but is not available for any other phone calls.

The default value for each type of interaction is the Agent Utilization value specified for the media type in the Media Types Configuration. Any interaction type not assigned a utilization percentage and/or maximum assigned number in the user's configuration page uses the value set in the workgroup configuration. Values assigned in a user's configuration always overrides the values set in any workgroups to which that user belongs. The icon to the left of each interaction type indicates whether that value was set in the user's configuration page or inherited from a workgroup. On the ACD tab of the **User Configuration** dialog, under Utilization, the Inherited column indicates the workgroup from which values are inherited.

Any agent that is under 100% utilization is still considered available for any further interactions (except interactions that have already met their maximum assigned limit), as long as the newest interaction would not put the agent *over* 100%. However, an agent's time available is reset each time a new interaction is assigned.

For example, two agents, Agent A and Agent B, are each about to begin their shift. Both agents have identical settings and percent utilizations as follows: calls 51%, chats 25%, and emails 10%. For simplicity's sake, assume that these two agents will only receive chats. Agent A logs on and has no interactions. Shortly afterward, Agent B logs on and also has no interactions. A new chat comes in and goes to Agent A because Agent A has been available the longest. A second new chat comes in and goes to Agent B. Even though Agent A is still 75% available, the second chat goes to Agent B because Agent A's time available was reset when the first chat was assigned to him or her. That means that Agent B now has the longer time available. When a third incoming chat is routed, it goes to Agent A since Agent A's last interaction came in before Agent B's.

Utilization is no longer honored once an interaction enters a conference or enters an ACD queue as the consult segment of a consult transfer. If an interaction is transferred to an ACD queue, utilization is only honored if the interaction is blind transferred to the ACD queue.

> **Note:**
> An agent who receives interactions from multiple workgroups is limited to the highest maximum assignable value for the workgroups, even if not at maximum utilization. For example, suppose an agent receives email interactions from Workgroup A and Workgroup B. The maximum assignable value for email interactions in Workgroup A is 20, while the maximum assignable value for Workgroup B is 15. The agent cannot receive more than 20 total email interactions.

Wrap-up Time

Wrap-up time indicates the number of seconds between when an interaction ends and the agent is available to receive a new interaction. A value of 180 seconds allows call agents three minutes between the time they end a call and the time they are available to take a new call. You can set the grace period in the Wrap-up section of the **ACD Actions** page of the **Workgroup Configuration** container by selecting **Wrap Up** in the **Status** field and entering the desired number of seconds in the **Time (sec)** field. If you don't specify a time, then each workgroup member is available to receive interactions as soon as the current interaction disconnects.

Exempt Held Interactions

Checking this box allows an agent to go back to available status after placing an interaction on hold. By default, this option is disabled and the options beneath it box are not available. When you use the option with the Agent Utilization feature, then a set number of interactions (see "Max Number of exempt interactions" below) placed on hold does not count toward the agent's total utilization.

> **Note:**
> However, held calls still count toward the maximum number of interactions that an agent can have.
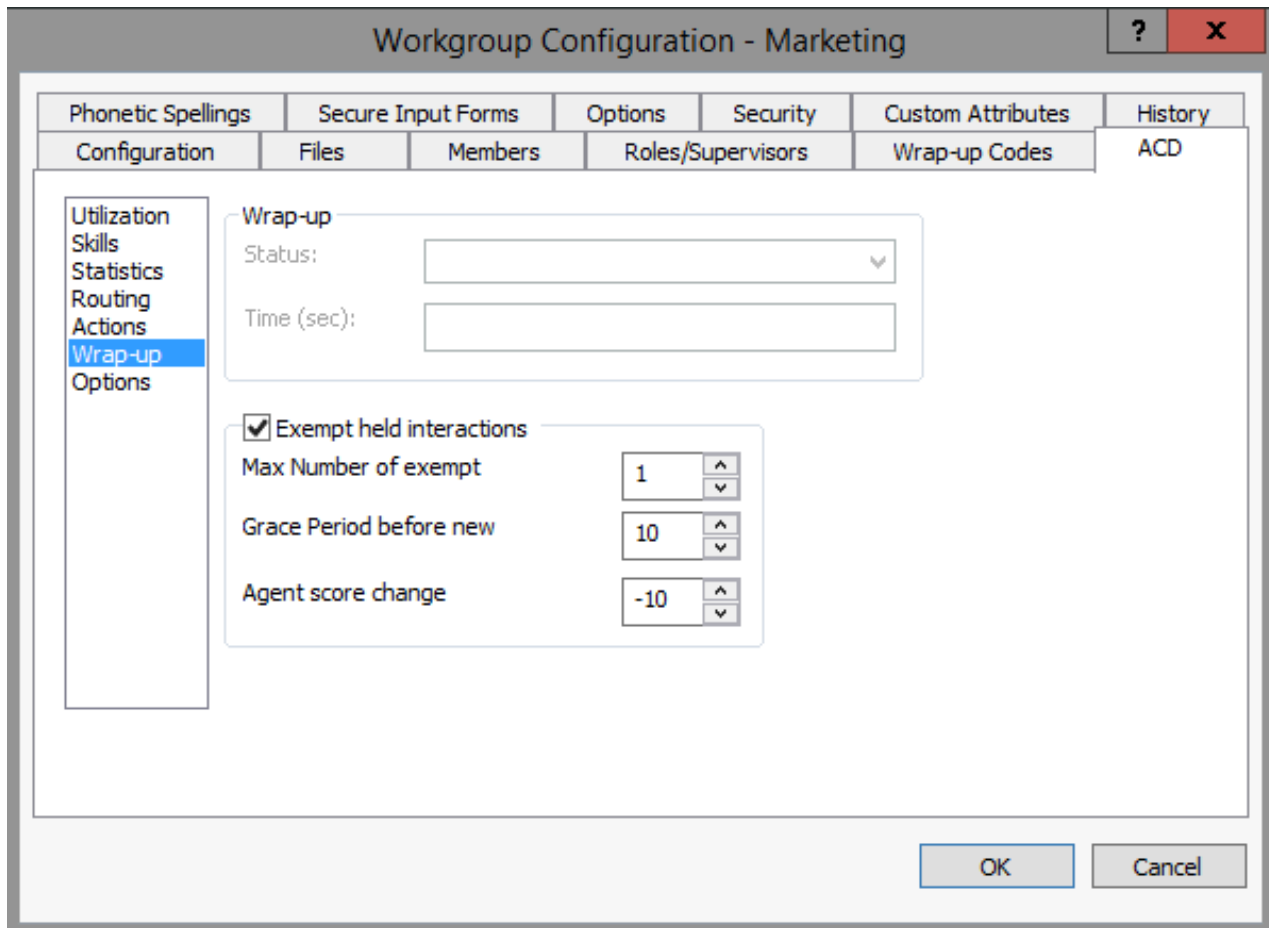
Allowing an agent to receive new calls after he or she places a call on hold has the potential to bog down agents in certain circumstances. To prevent this situation from happening, three fields become available when on hold activity is selected to ensure smooth call activity:

Max Number of exempt interactions

indicates the total number of held calls that do not count toward the agent's percent utilization. More calls can still be placed on hold after this number is reached, but they *will* count toward the agent's total utilization.

For example, consider an agent configured so that calls count as 50% of his or her total utilization and his or her Max Number of exempt interactions is 1. This agent receives one call, which raises his or her utilization to 50%, then a second call raises it to 100%. He or she is not available now to receive any further interactions. After he or she places the first call on hold, agent utilization drops back to 50% and the agent is able to receive a third call, raising utilization back up to 100%. The agent then places the second call on hold, and now has two held calls and one active call. However, because his or her Max Number of exempt interactions is 1, and this is the second held call, the percent utilization is not calibrated and the total utilization remains at 100%.

Grace period before new interaction

is the number of seconds that will elapse before the agent's availability is reset after the interaction is placed on hold. This operates similar to *Wrap Up Time* described above except that there is no visible status change.

Agent score change per interaction

lowers the agent's priority by a set amount for each interaction placed on hold. This option is useful for allowing agents with no interactions on hold to receive interactions before agents with interactions on hold.

> **Note:**
> You can enable this functionality for all interaction types *except* calls so that calls placed on hold still count toward the agent's total utilization, but any other type of held interaction does not count. To enable the functionality, go to the System Parameters container under System Configuration. Add the parameter `ACDDisableOnHoldProcessingForCalls` and assign it any non-blank value.

Overflow Queues and In-Queue Time Limit

In the ACD Select Item tool, you can configure the In-Queue Time Limit. If an interaction is waiting for an amount of time greater than the In-Queue Time Limit, an event is generated. What happens to that interaction after that is up to you. One of the initiators that Customer Interaction Center includes is the ACD Queue Item Timeout initiator. Any handler containing this initiator starts when an interaction goes unanswered longer than the In-Queue Time Limit.

You could decide to move that interaction into an ACD queue with many agents spanning multiple queues. You could also decide to send an email message to someone, indicating that an interaction has been waiting longer than the In-Queue Time Limit. You could even use the event to alert a call center manager. Customer Interaction Center is flexible in allowing you to customize what happens when an interaction reaches the In-Queue Time Limit.

> **Note:**
> The ACD Server has no default behavior to deal with interactions that have timed out. If you want to use In-Queue Time Limit, you must be sure that something is in place to handle the timed-out interactions.

Estimating Hold Times

Two useful ACD tools are ACD Statistics (Interaction) and ACD Statistics (Queue). These tools return statistics pertinent to the interaction or queue, including estimated hold times, each interaction's position in the queue, and the number of agents available to answer an interaction. What you do with this information is limited only by the handler you build. For example, you could use this information to play recorded messages telling callers their wait time. You could also use the information for reporting purposes to track your call center's performance. You could also use the information to alert a call center manager when estimated hold times exceed an amount of time you configure.

ACD Wait Reason

ACD Wait Reason is a call attribute (Eic_ACDWaitReason) that indicates why an interaction is waiting for an agent.

When ACDServer processes an interaction but cannot handle it right away, the interaction goes into an ACD-Wait Agent state. The value of this attribute could change each time ACDServer considers the interaction. For example, when the call is first considered, there might not be available agents. The second time the call is considered, perhaps no agents have the appropriate skill, and so on. The value of this attribute is updated each time the interaction is considered but not routed to an agent.

The possible reasons are:
- No available agents
- No agents with necessary utilization
- No available agents for this media type
- No available agents in category
- No available agents with skill
- No available agents for skill and min/max proficiency
- No available agents for skill and min/max desire

In Interaction Supervisor, the SupSystem Supervisor plug-in can display the value of ACD Wait Reason as a column in the **Call Activity View**. For details, see "Call Activity View" in the *System Monitoring Guide* (`sys.chm`).

Other ACD Functionality

The following information describes optional CIC tools and parameters that you can use to enable automatic recording without modifying handlers, create an ACD call center without client PCs, activate and deactivate agents on a per queue basis without regard to the agent's Customer Interaction Center status or state, record a greeting played to callers before the call is connected to that agent, and configure a message or tone to play to an agent before a call connects.

ACD Recorded Workgroups

ACD Recorded Workgroups is an optional feature that allows you to enable automatic recording without modifying the handlers. The parameter value is a semicolon-delimited list of workgroup names (not the fully qualified queue ID, only the queue name). For example, if the workgroups Marketing, Support, and Sales exist, then a parameter value of `Marketing;Sales` would turn on automatic recording for the Marketing and Sales workgroups, but Support would remain off. Automatic recording is off by default for workgroups configured as ACD by the Call Management Type on the workgroup's Configuration tab in Interaction Administrator. This does not apply to workgroups configured as Custom.

Phone-only ACD

Phone-only ACD is the ability to create an ACD call center without client PCs. Agents log on and off workgroups through an IVR, and then they begin receiving calls on that workgroup. All the agent needs is a telephone connected to the CIC server.

The two tools that enable this functionality are Agent Login and Agent Logout. These tools accept an agent and workgroup name, allowing agents to enter workgroups and receive calls. For more information about these tools, see the Interaction Designer documentation.

A workgroup can contain a mix of phone-only agents and agents using a CIC client.

The last page of this document contains instructions for phone-only agents. You can copy this page and distribute it to your phone-only agents.

> **Note:**
> You cannot assign chats, emails, generic objects, callbacks, social media conversations, and SMS messages to phone-only agents. Phone-only ACD only functions with telephone calls. Also, note that you can use Exempt Held Interactions with phone-only ACD, however it is not recommended.

Queue Activation

CIC administrators, supervisors, and users with the appropriate administrative access controls can activate and deactivate agents on a per queue basis without regard for the agent's CIC status or state. For example, this feature enables authorized agents monitoring multiple queues to deactivate themselves from inactive or lower priority queues to monitor busy or high priority queues without changing their status or logging out of the inactive queue. It also enables supervisors and administrators to activate or deactivate other agents in queues without regard for that agent's state or logon state. This feature is configurable in Interaction Supervisor and Interaction Administrator.

The activation and deactivation event criteria include:
- When an agent activates or deactivates himself or herself in the **Workgroup Activation** dialog in the CIC client. This requires that the agent's user account be given **Activate Self** Access Control in Interaction Administrator.
- When a supervisor activates or deactivates an agent in Interaction Supervisor. This requires that the supervisor's user account have **Activate Others** access control in Interaction Administrator.
- When an administrator adds or removes a user from an ACD or Custom workgroup in Interaction Administrator. By default, users added to workgroups are in an **Activated** state.
- When an administrator creates or deletes an ACD or Custom workgroup in Interaction Administrator. By default, users in new workgroups have an **Activated** state.

Smile

Smile is an agent's pre-recorded greeting played to callers before the call connects to that agent. Agents can record smiles in the CIC client (Record Agent Greeting button on the Personal Prompts configuration page). Phone-only agents and CIC client users can record smiles over the phone (this menu option is available to agents who have logged on over the phone-only agents.)

Whisper

Whisper is a message or tone played to an agent before a call connects. This feature is for use with agents configured for auto-connect in Interaction Administrator. Users configured for auto-connect receive connected calls automatically, preceded by a configurable whisper tone, .WAV file, or both. For more information about configuring whisper, see the Alert tool documentation in the Interaction Designer help.

ACD Server Parameters

The following information describes CIC server parameters that you can use to change agent availability for ACD interactions, unlock interactions and agents, and route specific interaction types to an agent.

Change Agent Availability for ACD Interactions

In Customer Interaction Center, agents are unavailable for ACD interactions when on non-ACD interactions, by default. For example, an agent that makes an outbound call or receives an inbound DID or extension call cannot receive an ACD interaction.

To change this default behavior and not allow non-ACD activity to affect an agent's ability to receive an ACD interaction, add the `ACDAvailableOnNon-ACD` server parameter to Interaction Administrator. The absence or presence of this server parameter controls this behavior, so if you enter a parameter value, that value is ignored.

If this parameter is present, agents must set their status to a non-ACD status to be unavailable for ACD interactions. To return to the default behavior, remove the parameter.

Unlock Interactions and Agents

By default, Customer Interaction Center uses **Select Item** and **Select Agent** tools to send ACD interactions to agents. If any customizations have been made to the ACD handlers that result in these tools not being called, then an interaction or agent may be locked (waiting for processing to complete).

To prevent an interaction or agent from being locked indefinitely, **Release Interaction Lock** and **Release Agent Lock** tools were created to unlock the interaction or agent. In the case that the **Release Interaction Lock** and the **Release Agent Lock** tools are not called due to ACD handler customization, the `ACDInteractionLockTimeout` and `ACDAgentLockTimeout` server parameters are available.

The `ACDInteractionLockTimeout` server parameter determines how long the interaction is locked if the **Select Item** tool or the **Release Interaction Lock** tool is not called for the interaction. If this server parameter is not created, then the interaction lock timeout defaults to 10 seconds.

The `ACDAgentLockTimeout` server parameter determines how long the agent is locked if the **Select Agent** tool or the **Release Agent Lock** tool is not called for the agent. If this server parameter is not created, then the default value of 10 seconds will be used for the agent lock timeout.

Route a Specific Interaction Type to an Agent

CIC can route a particular interaction type to an agent, even if the agent is unavailable due to being on other interaction types or being on a non-ACD interaction. To compare the agent %available to the %utilization for an interaction type, use the `ACDConsiderSingleTypeForEWTAvailable` parameter for **ACD Queue Statistics**. To route this type of interaction to an agent when the agent would otherwise be unavailable, set the value of the parameter to one interaction type.

Possible parameter values are:
- `call`
- `chat`
- `callback`
- `SMS message`
- `email`
- `generic`
- `social conversation`
- `social direct message`

Add an ACD Category to Each User on Startup

The `AutoAddUsernameCategory` server parameter automatically adds an ACD category to each user when starting ACD.

Possible parameter values are:

0

> The feature is off

1

The feature is on and the suffix `-auto` is added to the user name

<value>

The feature is on and a suffix of *<value>* is added to the CIC user name.

For example, if set to 1, user JeffS results in JeffS-auto. If set to the value `-Director`, user JeffS results in the category JeffS-Director.

For more information on ACD categories, see ACD Categories in "Interaction Score".

This parameter must be present at ACD startup to take effect. Blank or <null> values are not supported. Changes do not dynamically update in ACD Server, so adding this parameter or changing the value of the parameter requires a restart of the ACD Server.

ACD Processing Conclusion

Customer Interaction Center's ACD system is powerful because it unifies the distribution of interactions - calls, web chats, and so on. It is flexible because it allows full control of the configuration and handling required by the distribution process. This power and flexibility delivers truly intelligent interaction distribution.

Appendix A: Using Customer Interaction Center's Phone-Only ACD

The Phone-only ACD allows agents to receive ACD calls without a computer. Once agents log on using a standard station phone, they receive phone calls just like agents running a CIC client on a computer. Phone-only ACD does not work for remote agents; the phone must be a station connected to Customer Interaction Center.

To log on, agents should pick up their telephone handset and dial *98 + their extension + their CIC password + #.

Write your extension and CIC password in the following table for quick reference. If you don't know your extension or password, ask your system administrator.

Start by pressing…	Extension	CIC Password	…and finish by pressing…
*98			#

After an agent logs on, he or she sees several options:

Options	Explanation
Press 1	Log on to this station. The agent's status is available and the agent begins receiving calls.
Press 2	Log off of this station. The agent's status is Available, No ACD and the agent no longer receives ACD calls. The agent can still receive non-ACD calls.
Press 3	Log on to a different station. The agent is prompted to enter the other station's extension.
Press 4	Change status. The agent is prompted to enter another status.
Press 5	Change personal greeting. The agent is prompted to record a new personal greeting that CIC plays to a caller when a call is assigned to the agent. This personal greeting is known as a "smile."
Press 6	Log on or log off of a queue.

Once an agent has logged on, that agent can manage calls using switchhook flash. For information about managing calls from a station, see the *Phone Features Guide* quick reference card.

Appendix B: A Note on ACD Logging

The trace log shows a line-by-line breakdown of what the ACD processor does as it handles each interaction. Support and development groups use the log to troubleshoot ACD systems. In the trace log, you can you can see processes described in this document, such as calculating agent score. In order for the trace log to contain complete information, there are minimum settings that the **ACD Specify Interaction Skill** tool must contain:

- Minimum Proficiency Level >=1
- Maximum Proficiency Level <= 100
- Weight for Proficiency Level >=1
- Minimum Desire to Use Level >=1
- Maximum Desire to Use Level <= 100
- Weight for Desire to Use >=1

If any of the input fields do not meet the listed requirement (such as being `NULL`), then the logs generated for ACD interactions do not contain information on agent scoring and normalization.

ACD Processing Sample Log

```
08:17:44.762[122]Acd:Acd.cpp(848):EICDingoAdmin skills: 19.333333 * 1.000000 = 19.333333
[19.333333]
```

```
08:17:44.762[122]Acd:Acd.cpp(854):EICDingoAdmin cost: 0.000000 * 1.000000 = 0.000000 [19.333333]
```

```
08:17:44.762[122]Acd:Acd.cpp(933):GeorgeJ EIC level: 19 * 1.000000 = 19.000000 [19.000000] for
item 88900005
```

```
08:17:44.762[122]Acd:Acd.cpp(943):GeorgeJ EIC desire: 20 * 2.000000 = 40.000000 [59.000000] for
item 88900005
```

```
08:17:44.762[122]Acd:Acd.cpp(950):skill score 59.000000 normalized to 19.666667
```

```
08:17:44.762[122]Acd:Acd.cpp(848):GeorgeJ skills: 19.666667 * 1.000000 = 19.666667 [19.666667]
```

Each line breaks down as follows:
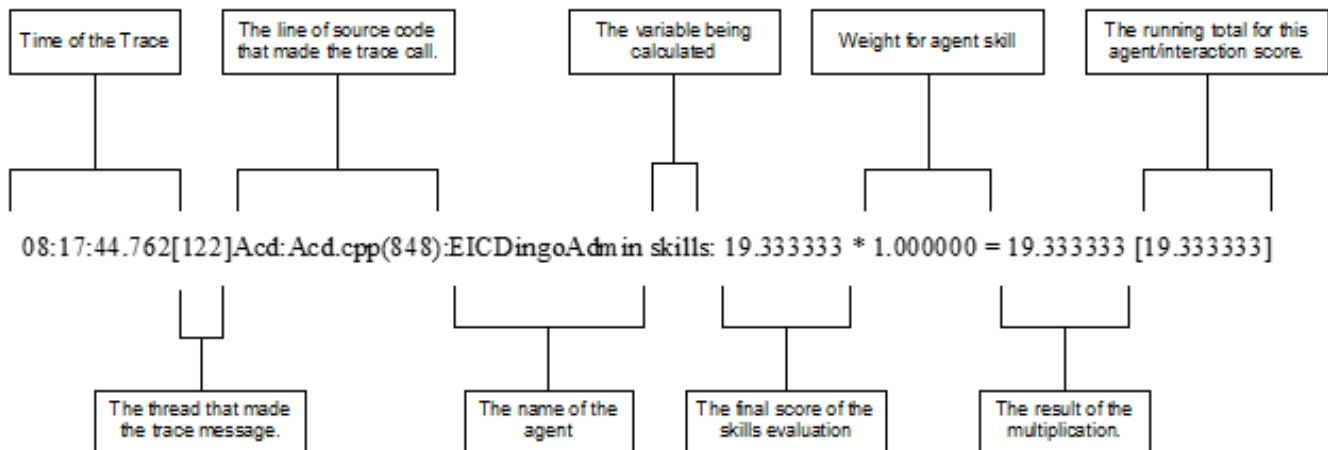
- **Time of the trace**. The time stamp taken from the server at the time the trace is made.
- **The thread that made the trace message**. This number has no real meaning in ACD logging as the ACD server is single-threaded.
- **The line of source code that made the trace call**. Identifies the specific location in the code that created this line in the trace log.
- **The name of the agent**. This section of the log contains the ID of the agent or workgroup whose skill, desire, cost, and so on, is evaluated.
- **The variable being calculated**. This could be skill, desire to use, level, or cost. In this example, skill is being calculated.
- **The final score of the skills evaluation**. This calculations that generated this number should appear in previous lines in the trace log.
- **Weight**. This is the weight assigned to the agent or workgroup's skill, level, or desire to use in Interaction Administrator. In the example, this is the weight given to the agent's skill.
- **The result of the multiplication**. The rating for the agent or workgroup's skill, level, or desire to use multiplied by the appropriate weight.
- **The running total for this agent/interaction score**. The agent or interaction's current score, calculated by combining the results of this calculation with any preceding calculations for this agent/interaction.

Change Log

The following table lists the changes to the *ACD Processing Technical Reference* since its initial release.

Date	Change
01-November-2011	4.0 GA Release
01-December-2011	Fixed typo.
08-January-2013	• Updated to reflect change where ACD treats a callback as a call for licensing purposes. • Added note about agent utilization in conferences and consult transfers.
13-September-2014	Updated documentation to reflect changes required in the transition from version 4.0 SU# to CIC 2015 R1, such as updates to product version numbers, system requirements, installation procedures, references to Product Information site URLs, and copyright and trademark information.
15-September-2015	• Rebranded cover page, removed references to Interaction Client, added Interaction Desktop, and made many minor edits. • Clarified that composite skill scores and normalization scores are two terms for the same thing. • Added a note about maximum assignable values when receiving interactions from multiple workgroups. • Added a section about manipulating ACD email for a custom workgroup.
31-August-2017	Rebranded.
14-May-2018	Rebranded from Interactive Intelligence to Genesys.
25-June-2018	Add Weight for Utilization to Agent Score formula. Added example for using Weight for Utilization.
28-August-2018	Added support for Facebook and Twitter direct messages.
11-June-2019	Reorganized the content only, which included combining some topics and deleting others that just had an introductory sentence such as, "In this section...".
30-October-2019	• Added ACD and Email Concurrent Handler Limit Considerations. • Modified Composite Scores for Interactions with Skills.

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