Multichannel Routing

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Overview of Multichannel Services

When your system is integrated with multichannel features, you write routing scripts to route contacts that these features handle. Multichannel features include Enterprise Chat and Email, and third-party multichannel applications that use the Task Routing APIs.

Enterprise Chat and Email

You can configure CCE deployments with Enterprise Chat and Email to use independent media queues, in which an agent can handle tasks for a single media channel. You can also useTask Routing, in which an agent can handle tasks for several media channels.

Supported Route Requests for Enterprise Chat and Email

CCE supports the following types of multichannel route requests when integrated with Enterprise Chat and Email:

- **Web callback** - A web callback request is one that does not involve Enterprise Chat and Email. A customer clicks a button on a website that says, "Call me back." Then the caller and agent simply talk on the phone.
- **Text chat** - The caller and agent can conduct a text chat session when a telephone call is not desired or not possible. They can both chat and collaborate on the web.
- **E-mail message** - The customer and agent communicate using electronic mail.

Application Request Routing with Enterprise Chat and Email

Enterprise Chat and Email routes requests to the Media Routing Peripheral gateway (MR-PG). The Media Routing Peripheral Interface Manager (MR-PIM) on the MR-PG provides a generic interface to queue and route requests. The MR-PIM communicates with the CallRouter, which runs a routing script to determine how best to handle the request.

CCE uses a media class ID to identify the type of media or channel. A media class is a communication channel that is correlated to an application. Cisco_Voice is a predefined media class that is used for web and delayed callbacks requests and Packaged CCE inbound and outbound voice calls.

Each media class has at least one Media Routing Domain (MRD), which is a collection of skill groups associated with a medium. CCE uses the MRD to route a task to an agent who is associated with a skill group and a particular medium. Each MRD requires a Packaged CCE script, but it is possible to route requests from different MRDs using one script.

Synchronized Agents and Skill Groups for ECE

Agents are common across the multichannel software, but skill groups are application-specific. You can create agents using ECE or in contact center enterprise solutions and share the agents across applications. When agents or skill groups are created in ECE, they are simultaneously created in contact center enterprise solutions. If an agent is created in contact center enterprise solutions, you must enable the agent in ECE before the agent can work on those applications.

Only create, modify, or delete ECE skill groups in ECE. Skill groups are application-specific. When you create a skill group in ECE, the skill group is simultaneously created in the contact center enterprise solutions. But, you cannot enable that skill group in the core contact center enterprise applications.

Independent Media Queues for ECE

You can configure the multichannel software to route all media through independent queues that are defined by media class. You can configure agents to log in to only one media type to take either email, text chat, or voice. In this configuration, requests are queued only to agents who have signed in to the corresponding media application.

Task Routing

Task Routing describes the system's ability to route requests from different media channels to agents who work with customer contacts in multiple media. Routing scripts can send requests to agents based on business rules regardless of the media channel from which the request came. For example, based on an agent's skills

and current tasks, Unified CCE can route phone, chat, and email message requests to an agent who works with all these media. The agent can switch media on a task-by-task basis.

You can set up routing scripts so that multichannel tasks are assigned to the longest available agent in a skill group or precision queue in same Media Routing Domain as the task. You can also prioritize multichannel tasks using skill group and precision queue routing, as you would voice calls.

Media Routing Domains

Media Routing Domains (MRDs) organize how requests for each communication medium, such as voice and email, are routed to agents. For example, the Enterprise Chat and Email uses a Packaged CCE MRD to route a task to an agent who is associated with a skill group or precision queue and a particular channel.

For Enterprise Chat and Email, configure MRDs in Configuration Manager. For custom multichannel applications that use the Task Routing APIs, configure MRDs in Unified CCE Administration.

Media Routing Domains and Interruptibility

When you configure MRDs, you indicate whether tasks for the MRD are interruptible. If the MRD is not interruptible, an agent working on tasks for that MRD is not assigned tasks from other MRDs. If the MRD is interruptible, the agent may be assigned tasks from another MRD.

Typically, tasks in which the agent and customer interact synchronously, such as voice calls and chats, are not interruptible. Email messages are typically interruptible because contact with the customer is asynchronous. Therefore, an agent responding to an email message may be interrupted by a phone call or chat session.

Note Whenever there are changes to the MRD interruptibility settings, the agent must log out and then log in to the desktop for the changes to take effect.

Use Media Routing Domains to Categorize Contacts

You can categorize contacts based on the MRD of the route request.

For example, you can have different MRDs for email and chat. You can have a single script for both types of requests that branches so that it routes email messages and chats to different targets.

Note For multichannel tasks submitted by applications using the Task Routing APIs, Unified CCE determines the MRD based on the dialed number/script selector in the task request.

Use the **Media Routing Domain** node (in the Routing tab of the Palette).

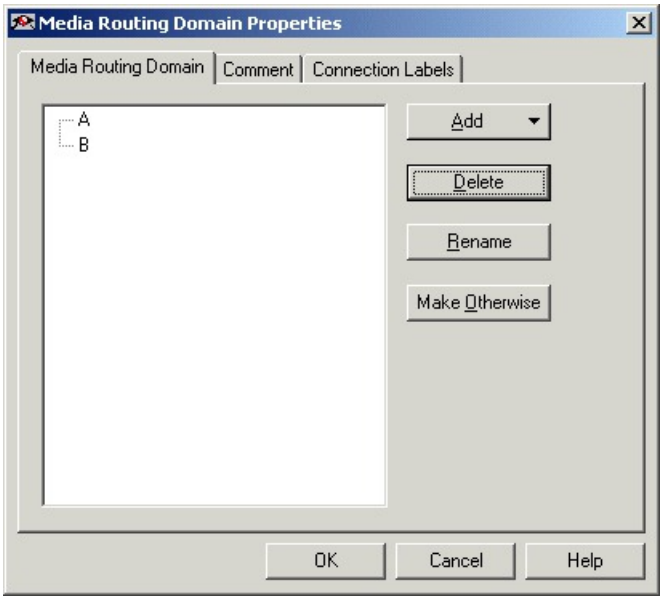
Figure 1: MRD Domain Icon

Insert targets and connections from the MRD node before you define the node's properties.

Note A branch can include multiple MRDs, but you can associate a single MRD with only one branch.

Following is the properties dialog box for the Media Routing Domain node:

Figure 2: Media Routing Domain Properties



Define Media Routing Domain node properties as follows:

Procedure

Step 1 To associate an MRD with a branch, select the branch:
a) Click **Add**.
b) Choose an MRD from the drop-down list.

Step 2 To delete a branch, select it and click **Delete**.

Step 3 To rename a branch, select it, click **Rename**, and type the new name.

Step 4 You can define a branch as Otherwise by selecting the branch and clicking **Make Otherwise**. Execution follows this branch if none of the specified time ranges apply. You can specify only one Otherwise branch for the node.

Pick / Pull Node

The **Pick / Pull** node

is available from the **Routing** tab **Object Palette**.

Pick / Pull node verifies that the route request is a valid pick or pull request for the specified MRD. The node checks that *serviceRequested* is one of the following:

- 4 = ROUTE_SERVICE_REQUEST_PICK_EXT_QUEUE
- 5 = ROUTE_SERVICE_REQUEST_PULL_EXT_QUEUE
- 6 = ROUTE_SERVICE_REQUEST_PICK_UCCE_AGENT
- 7 = ROUTE_SERVICE_REQUEST_TRANSFER_PICK

For these values, the script proceeds and terminates after the pick or pull is completed. For any other value of *serviceRequested*, the request flows through the node's failure branch. Check the error code in *VRUStatus*.

The node provides real-time monitoring of the following:

- Pick successes.
- Pull successes.
- Pick errors.
- Pull errors.

The following meters are applicable for the Pick/Pull node.

- Pick meter - Displays the number of nonvoice task pick requests that were successful.
- Pull meter - Displays the number of nonvoice task pull requests that were successful.
- Pick error meter - Displays the number of nonvoice task pick requests that failed.
- Pull error meter - Displays the number of nonvoice task pull requests that failed.

Note All **Pick / Pull** routing works for agents in the **Ready** or **Available** state. To be able to do this in **Not Ready** state, enable the Registry key. The Registry key that needs to be enabled on the CCE Router is EnablePickPullWhileInNotReady. This is located under the following registry hive on the CCE Router VM

```
HKEY_LOCAL_MACHINE\SOFTWARE\Cisco
Systems,Inc.\ICM\ucce\RouterA\Router\CurrentVersion\Configuration\Config.
```

The Registry key is dynamic and doesn't require a restart of the router, for changes to take effect. The default value is 0 or disabled. To enable the Registry key, set the value to 1.

Skill Group and Precision Queue Routing for Nonvoice Tasks

Routing to skill groups and precision queues is largely the same for voice calls and nonvoice tasks. However, the way that contact center enterprise distributes tasks has the following implications for agents who can handle multiple concurrent tasks:

- **Precision queues**—In precision queue routing, Unified CCE assigns tasks to agents in order of the precision queue steps. Unified CCE assigns tasks to agents who match the attributes for step one, up to their task limit, until all those agents are busy. Unified CCE then assigns tasks to agents who match attributes for step two, and so on. If you configure agents to handle three concurrent tasks, Unified CCE

assigns three tasks to each agent in the first step. It then moves on to the second step and assigns any remaining tasks to those agents.

- **Overflow skill groups**—Routing scripts can specify a preferred skill group and an overflow skill group. Unified CCE assigns tasks to all agents in the preferred skill group, up to their task limit, before assigning any tasks in the overflow skill group. If you configure agents to handle three concurrent tasks, Unified CCE assigns three tasks to each agent in the preferred skill group. It then moves on to the overflow skill group and assigns any remaining tasks to those agents.

Note The number of available slots is an important factor in the Longest Available Agent (LAA) calculation.

The number of available slots = The maximum concurrent task limit for the MRD that an Agent has logged into - Current tasks being handled by the Agent or routed to the Agent.

If there are multiple skill groups that are part of the queue node, then the skill group that has the higher LAA is picked. Then, the agents within the picked skill group (or the Precision Queue) who have the highest number of available slots for non-voice tasks get prioritised.

Agents with the same number of available slots get prioritized based on the time in the available state or the LAA mechanism.

Related Topics

Scripts for Precision Queues
Selection of Agents from Skill Groups, on page 11
Categorization by Media Routing Domain with Skill Groups, on page 12
Categorization by Media Routing Domain with Precision Queues, on page 13

Queue to Agent Node

You can queue a contact directly to an agent by using the **Queue to Agent** node (in the Queue tab of the Palette).

You can change the **Queue to Agent** type to:

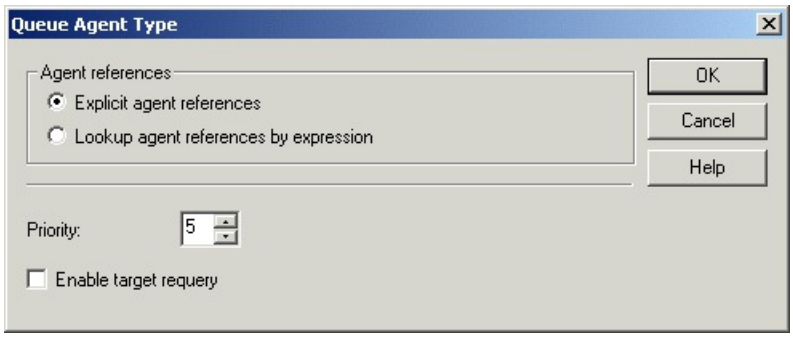
- Specify an agent directly
- Select an agent by expression

Change Queue to Agent Type

Procedure

Step 1 In the **Queue to Agent** properties dialog box, click **Change**. The **Queue Agent Type** dialog box opens:

Figure 3: Queue Agent Type



Step 2 To select a specific agent, select **Explicit agent references**.

Step 3 To select and agent by an expression, select **Lookup agent references by expression**.

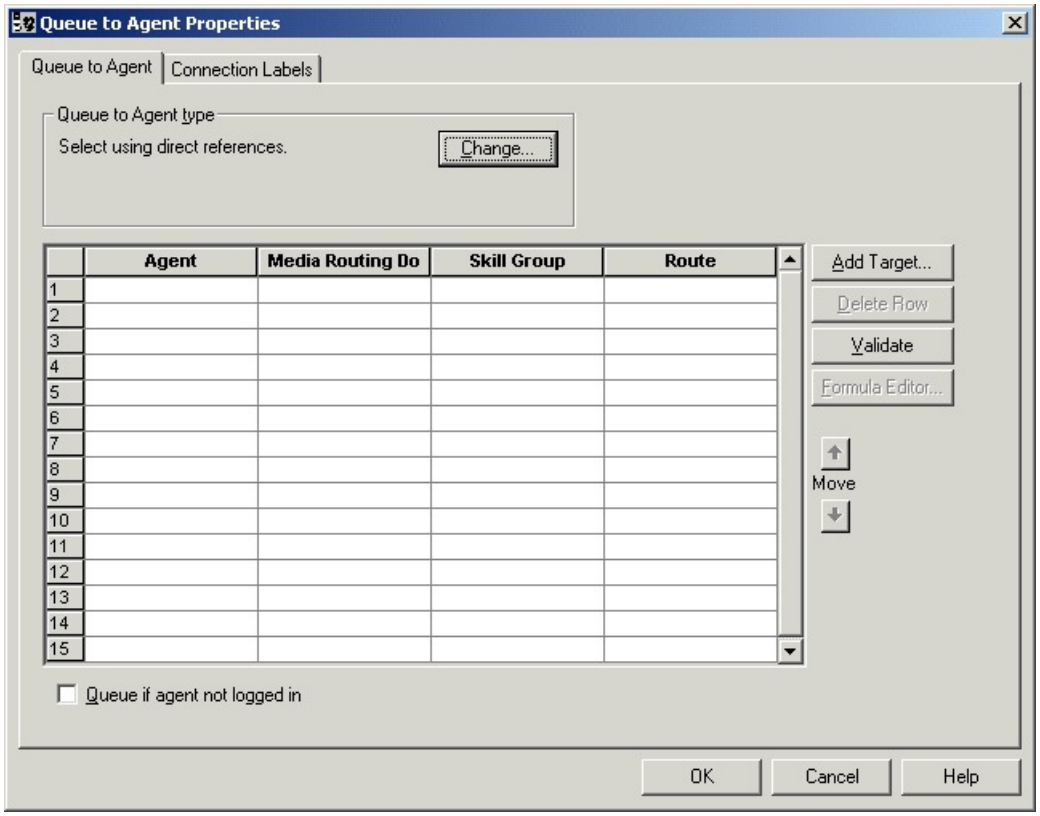
Step 4 Select a **Priority** between 1 (the highest) and 20 (the lowest).

Step 5 Optionally, select **Enable target requery**.

Specify an Agent Directly

Following is the properties dialog box of the **Queue to Agent** node when you select to specify agents directly:

Figure 4: Agent Direct Properties



To specify agents directly:

Procedure

Step 1 If necessary, change the Queue to Agent type to **Explicit agent references**.

Step 2 In the **Agent** column, select an agent.

Step 3 In the **Media Routing Domain** column, select the media routing domain for the selected agent.

Step 4 In the **Skill Group** column, select the skill group for the selected agent and media routing domain.

Step 5 In the **Route** column, select the route for the selected agent and media routing domain.

Step 6 Optionally, select **Queue if agent not logged in**, to have the contact queued to the agent even if the agent is not currently logged in.

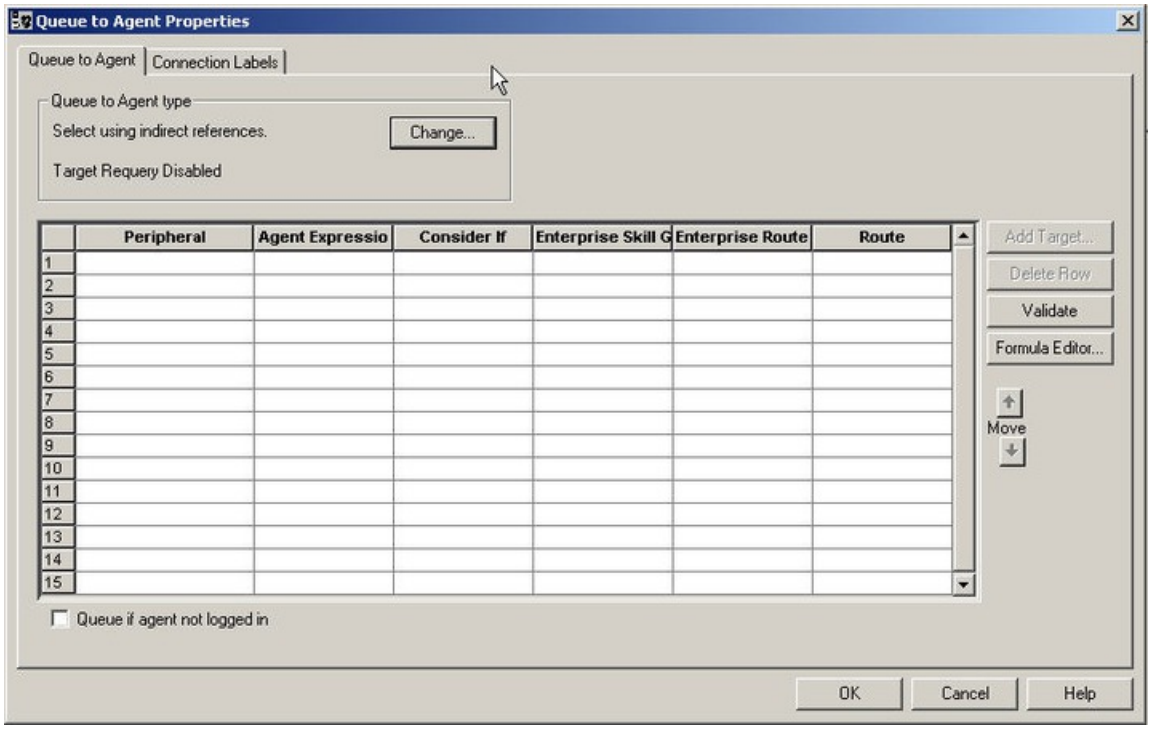
Step 7 To test the data you entered, click **Validate**.

Step 8 Optionally, modify **Connection Labels**.

Select an Agent by an Expression

Following is the properties dialog box of the **Queue to Agent** node when you select to use an expression:

Figure 5: Queue to Agent Properties



To specify agents by expression:

Procedure

Step 1 If necessary, change the **Queue to Agent** type to **Lookup agent references by expression**.

Step 2 In the **Peripheral** column, to choose an agent by Peripheral number, choose a peripheral and provide a formula in the Agent Expression that translates to the Agent's Peripheral number. If no peripheral is chosen, the agent expression should translate to the SkillTargetID or Enterprise Name of the agent.

Step 3 In the **Agent Expression** column, provide a formula using the formula editor that translates to the agent's Peripheral number or SkillTargetID or agent Enterprise Name. To choose a peripheral (in Peripheral) and provide a formula that translates to an agent's Peripheral number.

Note
The Peripheral column controls how the AgentExpression column is evaluated as an ICM ID. However, if you select a Peripheral from the Peripheral column, then the Agent Expression column is evaluated as an Agent Peripheral number.

Step 4 Optionally, in the **Consider if** column, enter the formula that evaluates to true for the target when the ICM system runs the Queue to Agent node, or that target will not be selected. For help in creating a formula, put the cursor in this field and then click the **Formula Editor** button.

Step 5 Optionally, select the **Enterprise Skill Group** that includes the appropriate skill groups to cover all media routing domain cases for the selected Agent.

Step 6 Optionally, select the **Enterprise Route** that has an appropriate collection of routes, or the **Route**, matching the agent and media routing domain.

Step 7 Optionally, select **Queue if agent not logged in**, to have the contact queued to the agent even if the agent is not currently logged in.

Step 8 To test the data you entered, click **Validate**.

Step 9 Optionally, modify connection labels.

RONA and Transfer Scripting for Task Routing

Note This section applies to tasks submitted by third-party multichannel applications that use the Task Routing APIs.

The *ServiceRequested* call variable is set when tasks are transferred or RONA. You can determine the value of the *ServiceRequested* call variable in an **If** node in the routing script. Based on the value of this field, the script can take different actions. For example, the script can raise the priority of the task so that it goes to the front of the queue.

The relevant *ServiceRequested* values are:

- 2: This value identifies a transferred task.
- 3: This value identifies a RONA task.

Related Topics

RONA and Transfer Script, on page 14

Estimated Wait Time Scripting for Task Routing

Note This section applies to tasks submitted by third-party multichannel applications that use the Task Routing APIs.

Customers submitting a task request might want to know approximately how long they will wait for an agent. You can configure the routing script to provide the customer with an estimate of the wait time. The estimated wait time is calculated once, when the task enters the queue. The time is not updated as the position in the queue changes.

The default estimated wait time algorithm is based on a running five minute window of the rate of tasks leaving the queue. Any tasks that are routed or abandoned during the previous 5 minutes are considered as part of the rate leaving queue. For Precision Queues, the rate leaving the queue represents the rate at which tasks are delivered or abandoned from the entire precision queue, not any individual Precision Queue steps. The algorithm computes the wait time for each of the queues against which the task is queued (Skill Groups or Precision Queues) and then returns the minimum estimated wait time.

Note Queue to Agent is not supported.

While the queue builds, the small number of tasks in the queue makes the estimated wait time less accurate and the value fluctuates rapidly. As the queue operates with more tasks over time, the estimated wait time is more accurate and consistent.

Scripts for estimated wait time include:

- A **Set Variable** node, `Call.EstimatedWaitTime` to set the estimated wait time.
- A **Run External Script** node to apply a Network VRU script that returns the estimated wait time to the customer.

Related Topics

Estimated Wait Time Script, on page 15

Example Universal Queue Scripts

You can design scripts to route contacts from different media in a Universal Queue environment.

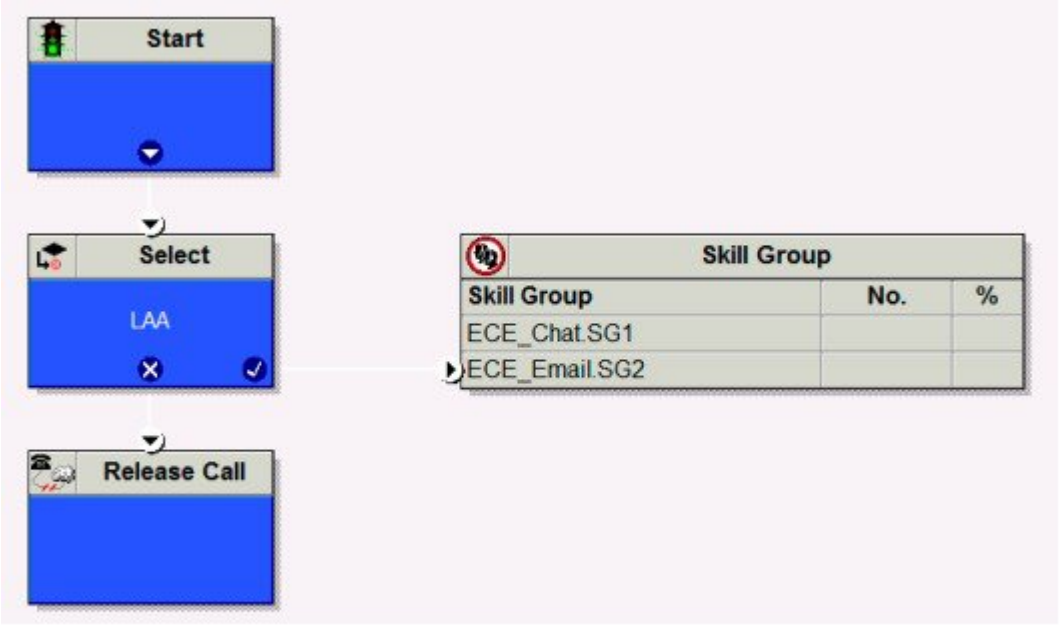
These scripts are only examples; your company's needs may differ.

For more information about Task Routing with third-party multichannel applications or Enterprise Chat and Email, see the *Cisco Packaged Contact Center Enterprise Features Guide* at https://www.cisco.com/c/en/us/support/customer-collaboration/packaged-contact-center-enterprise/products-maintenance-guides-list.html.

Selection of Agents from Skill Groups

The following script example shows how contacts from different channels can be routed to the Longest Available Agents in skill groups that are specific to the different channels:

Figure 6: Selecting Agents from Skill Groups

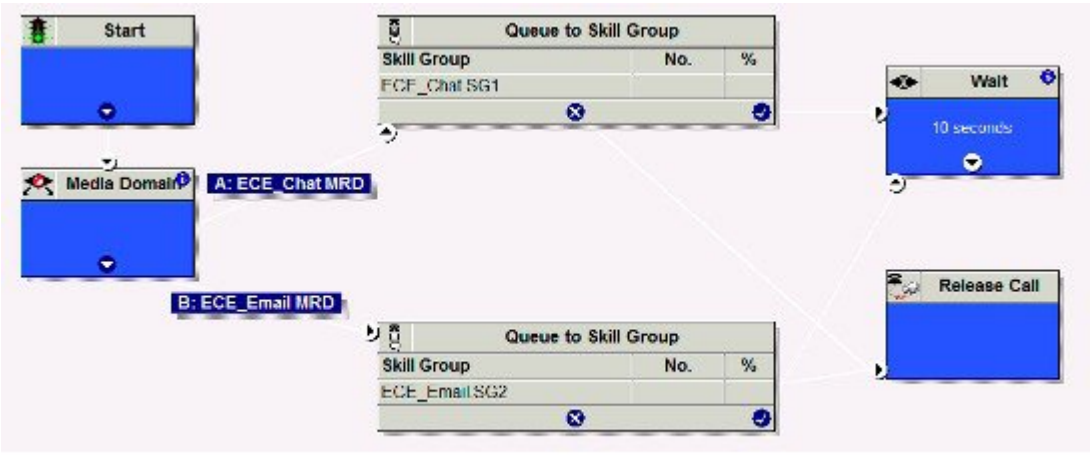


You schedule this script to run for Call Types associated with contacts from the different channels. The script then selects the Longest Available Agent from the skill group in the Media Routing Domain for that channel. The agents may be logged in to different Media Routing Domains and working with contacts from different channels; the Router determines an agent's availability across channels.

Categorization by Media Routing Domain with Skill Groups

The following script example shows how contacts can be categorized by Media Routing Domain, then queued to skill groups specific to that Media Routing Domain:

Figure 7: Categorizing by MRD with Skill Groups

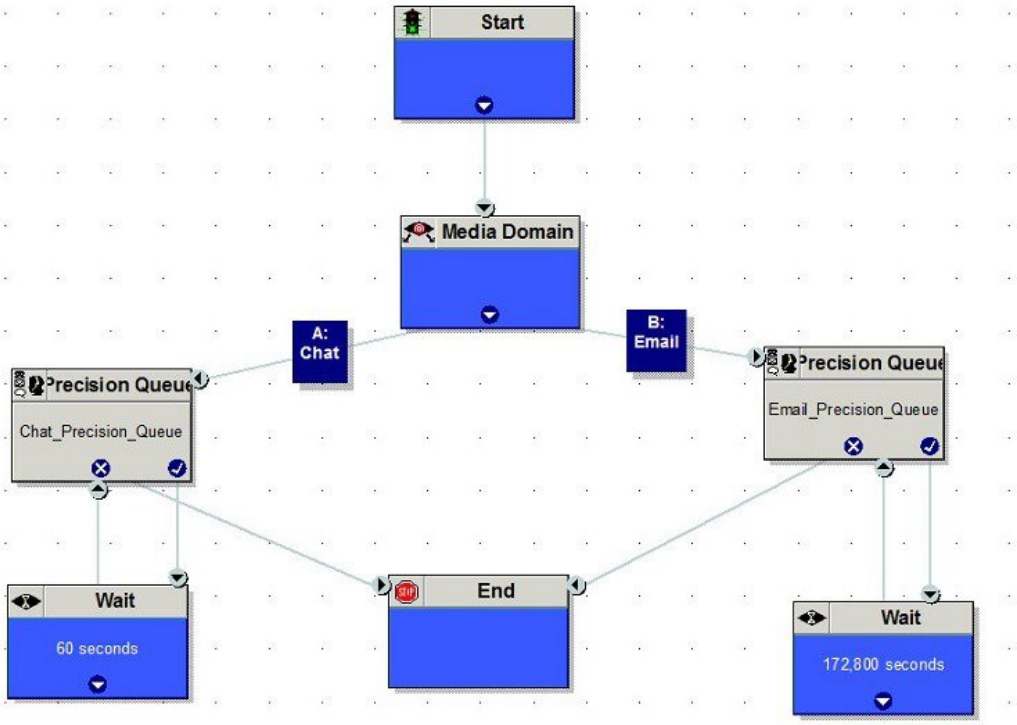


You would schedule this script to run for Call Types associated with contacts from the different channels. The script then uses the Media Routing Domain node to detect the MRD of the contact and branches to a Queue to Skill Group node that specifies skill groups specific to that MRD.

Categorization by Media Routing Domain with Precision Queues

The following script example shows how contacts can be categorized by Media Routing Domain, then queued to precision queues specific to that Media Routing Domain:

Figure 8: Categorizing by MRD with Precision Queues

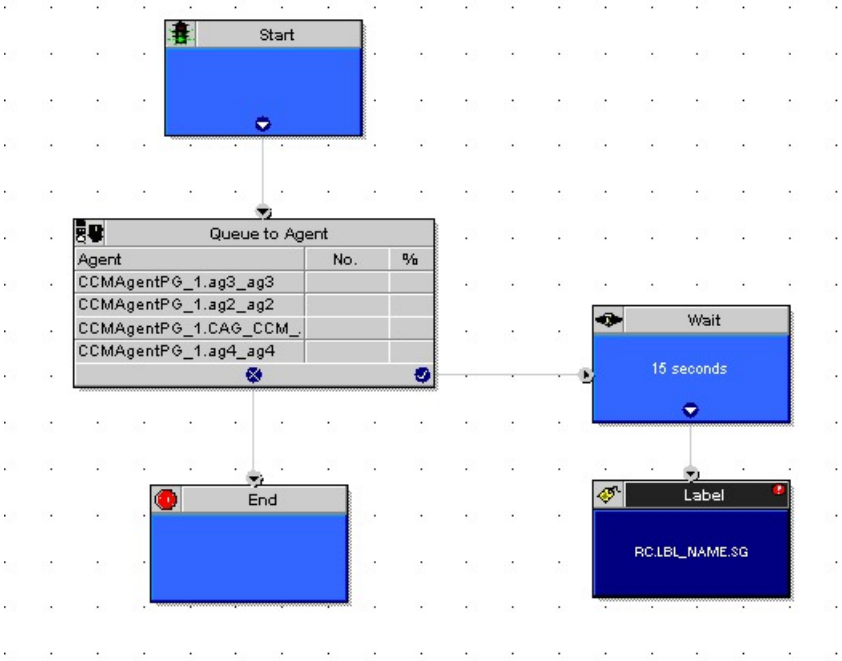


You would schedule this script to run for Call Types associated with contacts from the different channels. The script then uses the Media Routing Domain node to detect the MRD of the contact and branches to a Queue to Precision Queue node that a precision queue specific to that MRD.

Script That Queues to Agents

The following script example shows how contacts from different channels can be queued to agents:

Figure 9: Queuing to Agents

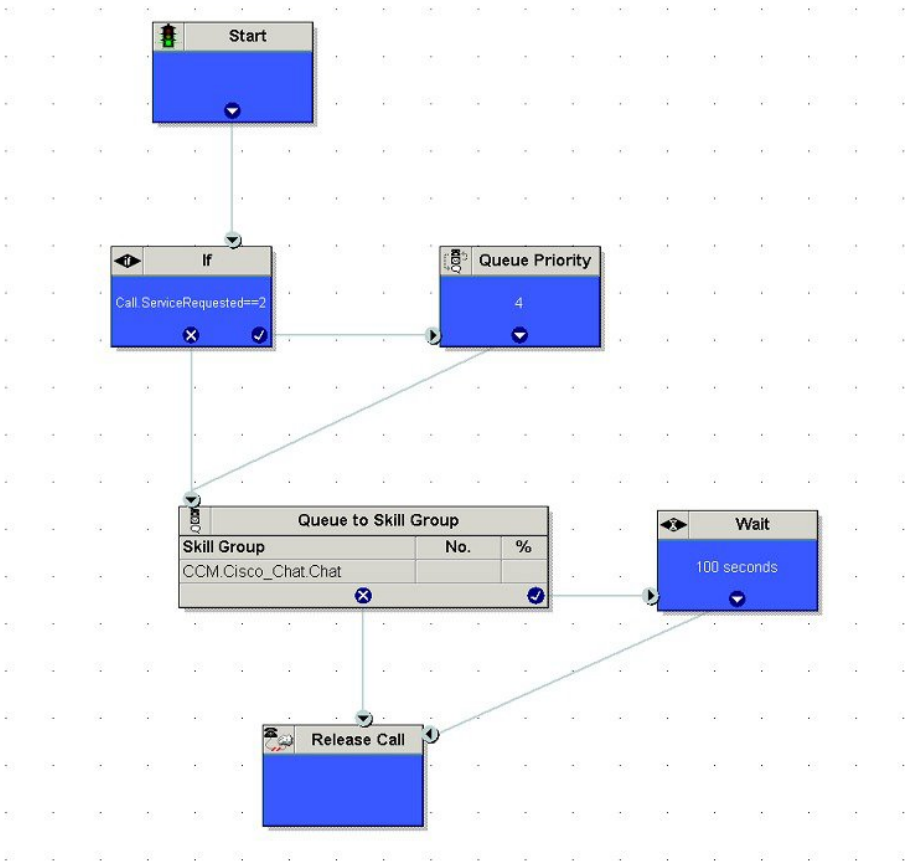


You would schedule this script to run for Call Types associated with contacts from the different channels. In the Queue to Agent node, each row defined for an agent also contains a Media Routing Domain selection. The script queues the contact to the agent with the selected MRD that matches the MRD of the contact.

RONA and Transfer Script

This example only applies to tasks submitted by third-party multichannel applications that use the Task Routing APIs. This example script shows the call priority increase if the service requested is 2 (TRANSFER).

Figure 10: Example RONA and Transfer Script



If the Call ServiceRequested call variable is set to 2 (TRANSFER) the call enters the Queue Priority node. The Queue Priority of the call is increased so that it is handled before any other calls in the queue. The Queue Priority node sends the call to the Queue to Skill Group node. If the Call ServiceRequested call variable is not set to 2 (TRANSFER), the call enters the Queue to Skill Group node.

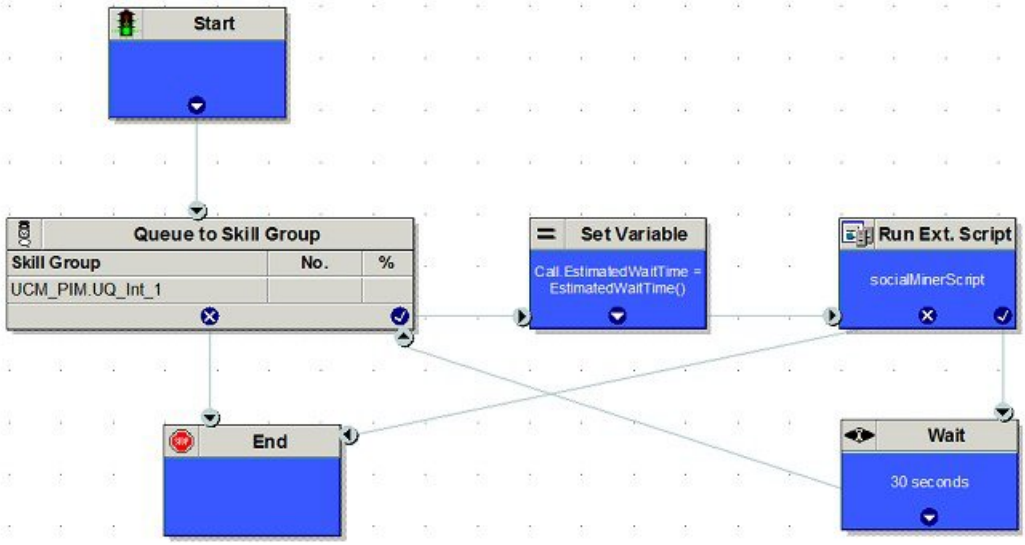
Estimated Wait Time Script

This example only applies to tasks submitted by third-party multichannel applications that use the Task Routing APIs.

Scripts for estimated wait time include:

- A Set Variable Node to set the estimated wait time.
- A Run External Script node to apply a Network VRU script that returns the estimated wait time to the customer.

Figure 11: Example Estimated Wait Time Script



Set Variable (Call.Estimated Wait Time) node: Set the estimated wait time as follows:

1. From the Set Variable node, select **Call** from the Object type drop-down menu.
2. From the Variable drop-down menu, choose **Estimated Wait Time()**.

   You can then work with the Formula Editor to use the default estimated wait value or create a formula and use your own value.
3. Click **Formula Editor**, and do either of the following:
   - To use the default estimated wait value, click the Built-In Functions tab and choose EstimatedWaitTime()
   - To create a formula and use your own value, click the Variables tab and choose an entry in the Object type list and an entry in the Object list. Then double-click a variable in the Variable list.

Run Ext Script node: Apply the Network VRU script as follows:

1. Click the Queue tab.
2. Click **Run External Script**.
3. Click inside the script. A Run External Script node appears.
4. Double-click the node and choose the Network VRU script from the list; then click **OK**.

   The call variable Estimated Wait Time now contains a value in the EstimatedWaitTime field and can be passed to peripherals.

   Note that a Run External Script node is required to send the EstimatedWaitTime to Customer Collaboration Platform.

Example Enterprise Chat and Email Scripts

For example Enterprise Chat and Email scripts, see the *Scripting and Media Routing Guide for Cisco Unified Contact Center Enterprise* at https://www.cisco.com/c/en/us/support/customer-collaboration/unified-contact-center-enterprise/products-user-guide-list.html.