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Avaya DevConnect eBook:

Mastering Device, Media and Call Control using Avaya DMCC Dashboard

Addendum: issued March 2011

Introduction

The Avaya DevConnect eBook, *Mastering Device, Media and Call Control*, was publish in 2009 and is based on the edition of the Device, Media and Call Control (DMCC) Dashboard issued with Avaya Aura® Application Enablement Services (AE Services) Release 4.2. Since publication, there have been two major releases of AE Services (5.2 and 6.1), each of which introduced significant enhancements to the DMCC Service that have been reflected in new versions of the DMCC Dashboard.

This Addendum covers the DMCC Service enhancements and how they can be exercised using the DMCC Dashboard issued with AE Services Release 6.1. The Addendum should be read in conjunction with the eBook, which is available for download from the DevConnect Web portal.

The enhancements covered in the Addendum fall into the following categories:

- Enhanced application session and device capabilities
- Enhanced monitoring capabilities
- New and enhanced third party call control capabilities
- New call routing capabilities

Enhanced Application Session and Device Capabilities

AE Services Release 5.2 introduced a number of enhancements for setting applications session characteristics, getting first party Device IDs and getting physical device information.

Setting Application Session Characteristics

eBook Chapter 4: Sessions, Monitors and Device Registration; Starting and Stopping Application Sessions (p41)

Note: New **Requested Protocol** values are available for selection for the AE Services 5.2 and 6.1 releases. Throughout this Addendum it is assumed that the 6.1 protocol is being used.

Once an application session has been started, it is possible to change certain characteristics of that session, namely:

- **Device ID Type:** can be set to "DMCC" or "TelURI". "DMCC" corresponds to legacy behavior and is set by client applications that expect telephone extensions to be in a format recognized by Communication Manager; "TelURI" is set by client applications that expect extensions to be in E.164 format. "TelURI" only works with Call Control Services, Logical Device Feature Services and Monitoring Services when establishing monitors for those events.
- **Event Filter Mode:** can be changed to "None" or "Desktop Call". "None" corresponds to standard DMCC behavior; "Desktop Call" is set by client applications that directly represent call state to end-users.

To demonstrate changing application session characteristics for an existing application session, using the DMCC Dashboard:

1. Select the application session in the **Session IDs** list box on the **Main** tab.
2. Select the required **Device ID Type** and **Event Filter Mode** (see **Figure A1-1**).
3. Click **Set Session Characteristics**.

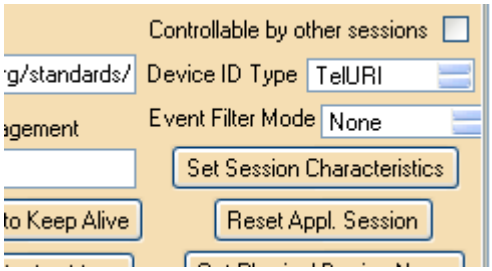

Figure A1-1: Setting Application Session Characteristics

Getting First Party Device IDs for Specified Device Instances

eBook Chapter 4: Sessions, Monitors and Device Registration; Getting First-party Device IDs (p48)

Once an application session has been started, the next step is usually to get the *first party* Device ID of a device associated with the extension or station it wishes to monitor and control. It is now possible to get the Device IDs of up to three devices at a single station. Prior to AE Services 5.2, separate AE Services systems were required for each device at the station.

To get the Device ID of a particular device at a station, using the DMCC Dashboard:

1. Select the instance number in the **Device Instance** field on the **Main** tab: "Default", "0", "1" or "2". "Default" corresponds to legacy behaviour and is equivalent to selecting the "0" device instance.
2. Enter the station's **Extension**, and **Switch Name** or **Switch IP Interface**, and set the required Controllable **by other sessions** value.
3. Click **Get Dev. ID**.

Getting Physical Device Information

eBook Chapter 4: Sessions, Monitors and Device Registration; Getting First-party Device IDs (p48)

Once an application has retrieved the Device IDs associated with the extensions it wishes to monitor and control, it can get additional information about the physical element of a specified device:

- **Physical Device Name:** the name of a specified device retrieved from the Communication Manager Integrated Directory Database. Use of this service allows client applications to identify the names administered in Communication Manager without maintaining its own database.
- **Physical Device Information:** the characteristics and capabilities associated with the physical element of a specified device including the device category (station, Automatic Call Distribution (ACD) device or other), group device attributes, and the list of Device IDs of other devices with logical elements that are associated with this device.

To get information about the physical element associated with a specified device, using the DMCC Dashboard:

1. Select the device in the **Device IDs** list box.
2. Click **Get Physical Device Name** or **Get Physical Device Info.** on the **Main** tab, as required.

Enhanced Monitoring Capabilities

AE Service Release 6.1 introduced a number of enhanced Monitoring capabilities, including:

- The ability to change the list of events listened for by a Phone, Media or Call Control monitor after it has been started.
- The ability to monitor additional Call Control events.
- The ability to monitor events for a specified call or for a specified ACD device.

Changing Monitored Events

eBook Chapter 4: Sessions, Monitors and Device Registration; Starting and Managing Event Monitors (p51)

Once a Phone, Media or Call Control monitor has been started at an extension, it is now possible to amend the list of events listened for by that monitor without having to stop and restart it. Note that Call Information and Session Management monitors cannot be changed after they have been started.

To change the events listened for by an existing Phone, Media or Call Control monitor at a specified extension, using the DMCC Dashboard:

1. Select the extension's Monitor ID in the **Monitor IDs** list box on the **Main** tab.
2. Select the appropriate **Event Registration** tab: **Phone**, **Media** or **Call Control**.
3. Select additional events and/or deselect currently monitored events, as required.
4. Click **Change Monitor**.

Monitoring additional Call Control Events

eBook Chapter 4: Sessions, Monitors and Device Registration; Table 4-1 Monitored Events (p54)

It is now possible to listen for and be notified of additional call control events at a specified device. Some of these events apply only to Automatic Call Distribution (ACD) devices, also known as ACD splits. An ACD split is a hunt group that is designed to receive a high volume of similar calls. Calls to a specific ACD split, identified by its Device ID, are automatically distributed amongst the ACD agents assigned to that split. Incoming calls are put in a queue until an agent becomes available.

- **Agent Logged Off:** indicates that an ACD agent has logged off from an ACD split or an ACD group.
- **Agent Logged On:** indicates that an ACD agent has logged into an ACD split or an ACD group.
- **Agent Login Extension:** indicates that an ACD agent has logged into an ACD split. Multiple events may be generated, each containing a list of up to 10 agents logged into the ACD split.
- **Network Reached:** indicates that a call has cut through the switching sub-domain boundary to another network. The event includes information about the outbound connection, network interface, calling device, called device and the cause of the event.
- **Queued:** indicates that a call has been added to the queue at an ACD split. The event includes information about the queued connection, the queue device, calling device, called device, last redirection device and the total number of calls in the queue.
- **Service Initiated:** indicates that a telephony service has been initiated at the monitored device, such as the device going off-hook or being prompted to go off-hook. The event including information about the connection at which service was initiated and the initiating device.

The new events are available on the **Call Control** tab under **Event Registration** on the **Main** tab, as shown in **Figure A1-2**.

Figure A1-2: Event Registration, **Call Control** tab

Monitoring Specific Calls and Calls via ACD Splits

eBook Chapter 5: Third Party Call Control (p71)

AE Services Release 6.1 introduced the ability for client applications to monitor specified call control events for a particular call (Per Call monitor) or for all devices on all calls that involve a specified Vector Directory Number (VDN) or ACD split (Calls Via Device monitor).

Per Call and Calls Via Device monitors can listen for the following call events: Call Cleared, Conferenced, Connection Cleared, Delivered, Diverted, Established, Failed, Held, Network Reached, Originated, Queued, Retrieved, Service Initiated and Transferred. These events are described in the eBook and in the section *Monitoring Additional Call Control Events* above in this Addendum. In addition, Calls Via Device monitors can listen for Entered Digits events.

Once a Per Call or Calls Via Device monitor has been started, a client application can change the list of events it listens for and stop the monitor when it is no longer required.

To start a Per Call monitor, using the DMCC Dashboard:

1. Go to the **Call Control** tab and select the **Monitor** tab, as shown in **Figure A1-3**.
2. Select the **PerCall** radio button.
3. Enter the **Device ID** and **Call ID** of the call you want to monitor in the **Active Call** fields.
4. Select the **Call Events** you want to monitor.
5. Click **Monitor Call Start**: the monitor's unique identifier is added to the **Monitor IDs** list box.

To start a Calls Via Device monitor:

1. Go to the **Call Control** tab and select the **Monitor** tab.
2. Select the **CallsViaDevice** radio button.
3. Enter the Device ID of the VDN or ACD split you want to monitor in the **Third Party Device ID** field.
4. Select the **Call Events** and **CallsViaDevice Private Data** you want to monitor.
5. Click **Monitor Call Start**: the monitor unique identifier is added to the **Monitor IDs** list box.

To change the events listened for by a specified monitor:

1. Select the monitor's identifier in the **Monitor IDs** list box.
2. Select additional events and/or deselect currently monitored events, as required.
3. Click **Monitor Call Change**.

To stop a monitor:

1. Select the monitor's identifier in the **Monitor IDs** list box.
2. Click **Monitor Call Stop**.

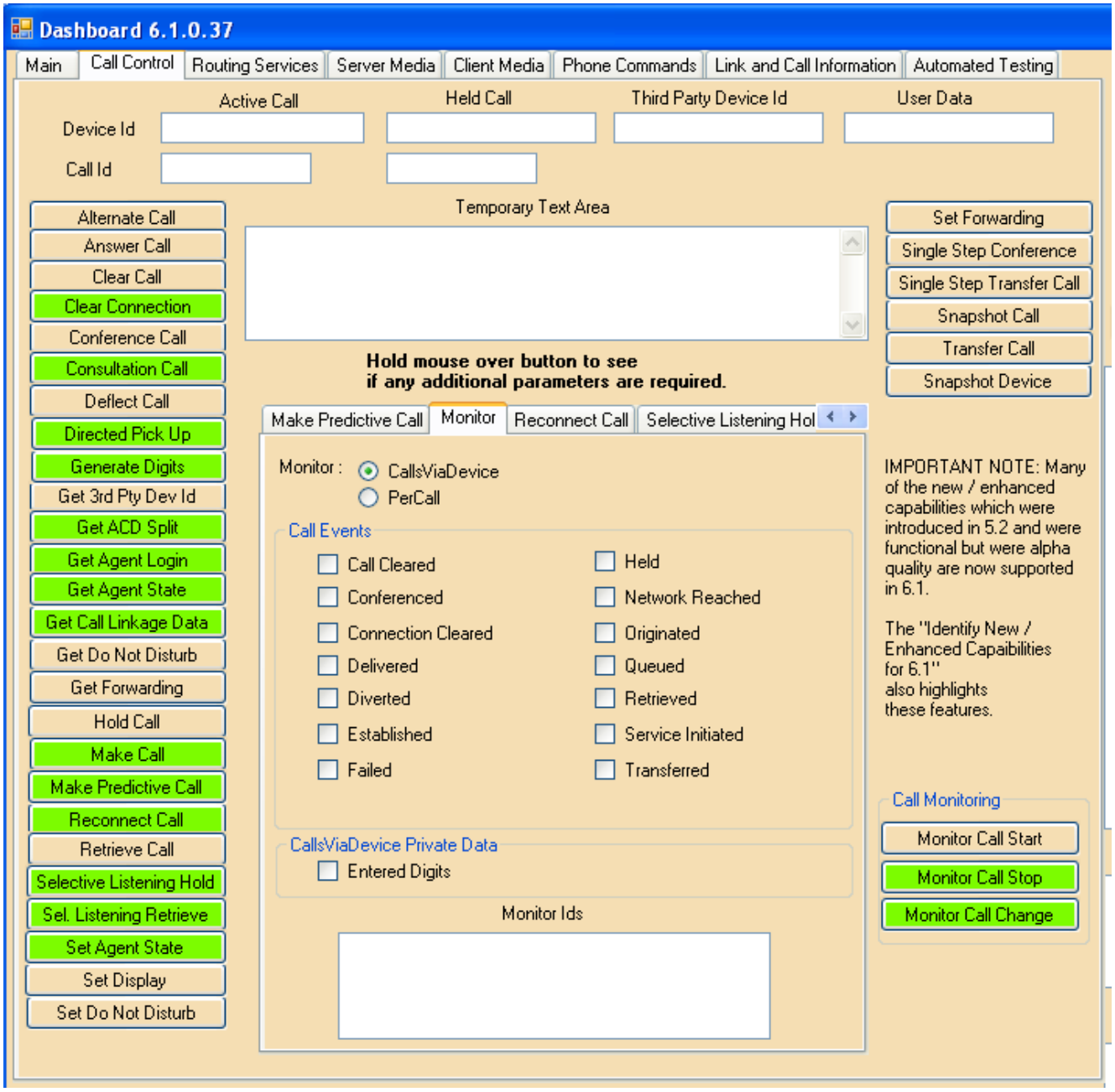

Figure A1-3: Starting Per Call and Call Via Device Monitors

Advanced Third-party Call Control

Perhaps the most significant enhancement to the AE Services APIs since the eBook was published is the introduction of the unified DMCC Service in AE Services Release 6.1. DMCC has always provided device, media and basic third-party call control, but developers who needed to include advanced third-party call control capabilities in their applications were forced to use DMCC in combination with another AE Services API, such as TSAPI or JTAPI. AE Services Release 6.1 introduced an extensive set of new and enhanced third-party call control capabilities into the DMCC Service. Each of the DMCC APIs (Java, .Net and XML) now provides a single, unified interface for the development of advanced CTI applications.

The new and enhanced third party call control capabilities are accessed from the **Call Control** tab on the DMCC Dashboard, as shown in **Figure A1-3**, above.

Making Calls

eBook Chapter 5: Third Party Call Control; Making Calls (p76)

The DMCC Make Call option has been enhanced with the ability to send User Data with a call, to designate a call as being high priority, and to make Direct Agent and Supervisor Assist calls:

- **User Data** can optionally be appended to a make call request to send caller information with the call, such as a credit card number or customer identifier. User data is sent as an array of bytes.
- **High Priority Call parameter:** A call can be designated and tagged as a high priority call. If the called device is "on-PBX" a high priority call will be attempted. High priority calls are not supported at certain types of extensions, such as VDNs.
- **Direct Agent calls** are made between a calling party and an ACD agent logged into a split. To make a Direct Agent call, the application appends Private Data to the call which defines the Call Type and the Device ID of the ACD split to which the call is being made.
- **Supervisor Assist calls** are made between an ACD Agent's extension and another extension, which is typically a supervisor's extension. To make a Supervisor Assist call, the application appends Private Data to the call which defines the Call Type and the Device ID of the ACD split from which the call is being made.

The DMCC Dashboard includes new fields that allow you to exercise the new Make Call capabilities, as shown in **Figure A1-4**. Normal calls can still be made as described in the eBook, without appending User Data, setting the High Priority flag or sending Private Data.

Exercising new Make Call capabilities on the DMCC Dashboard:

To append User Data to a call, enter the required string in the **User Data** field. The Dashboard converts the string to an array of bytes for sending with the Make Call request.

To indicate that a call should be treated as a high priority call, select the **Priority Call** checkbox.

To make a Direct Agent call:

1. Deselect the **Do not send Private Data to AES** checkbox.
2. Select "Direct Agent" in the **Type of Call** field.
3. Enter the calling party's Device ID in the **Third-party Device ID** field.
4. Enter the Agent's Device ID in the **Destination Device ID** field.

5. Enter the ACD split Device ID in the **ACD Group** field.
6. Click **Make Call**.

To make a Supervisor Assist call:

1. Deselect the **Do not send Private Data to AES** checkbox.
2. Select "Supervisor Assist" in the **Type of Call** field.
3. Enter the ACD agent's Device ID in the **Third Party Device ID** field.
4. Enter the called party's Device ID in the **Destination Device ID** field.
5. Enter the agent's ACD split Device ID in the **ACD Group** field.
6. Click **Make Call**.

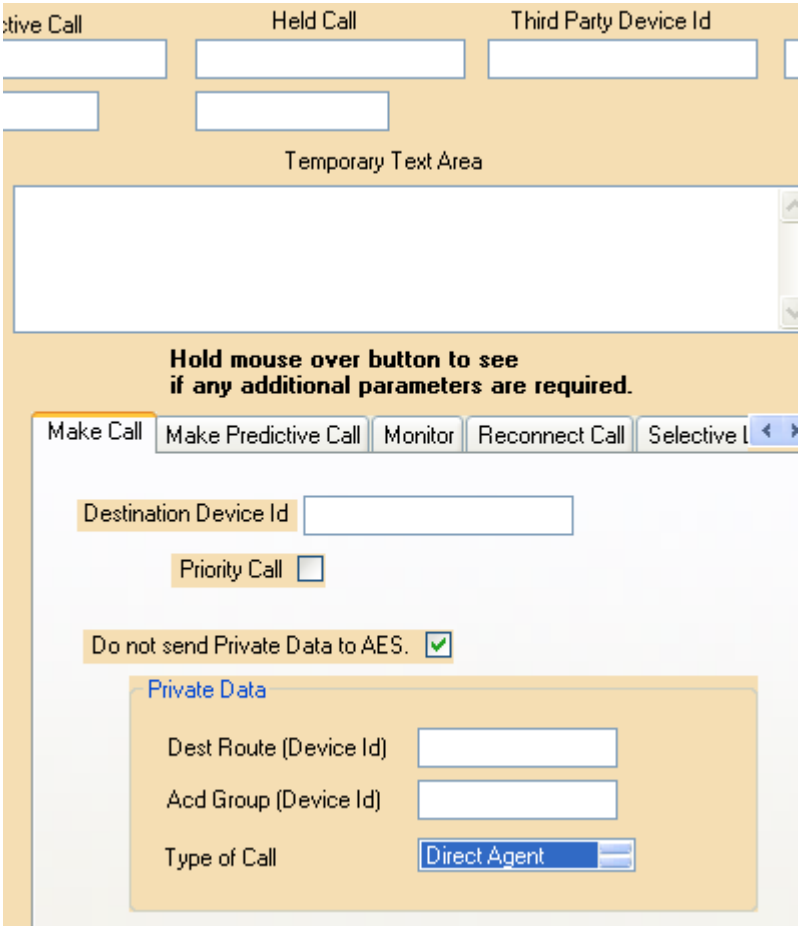

Figure A1-4: Make Call fields

Third-party Call Control Options

eBook Chapter 5: Third Party Call Control; Table 5-1 (p81)

The table below is an updated version of **Table 5-1** in the eBook. The table provides descriptions of all third-party call control options, including new and enhanced advanced call control options.

Third-party Call Control Options

Alternate Call	If there is an active call and one or more held calls at an extension, the active call is put on hold and the specified held call made active. When demonstrating this option on the DMCC Dashboard, the Device IDs in the **Active Call** and **Held Call** fields are the same because the active and held calls are at the same extension. However, the Call IDs are different. **Example:** extension 32129 is in an active call with extension 40010 (Call ID 7216) and has a call with extension 40011on hold (Call ID 6371). Using this option puts call 7216 on hold and makes call 6371 active.
Answer Call	If a call is ringing at or being offered to an extension, the call is answered. On the DMCC Dashboard, the call is identified by the **Device ID** and **Call ID** of the extension's connection, in the **Active Call** field.
Clear Call	Releases all connections from a specified call. On the DMCC Dashboard, the call is identified by the **Device ID** and **Call ID** of any one of its connections, in the **Active Call** field.
Clear Connection	Releases the extension specified in the **Active Call**, **Device ID** field from the call specified in the **Active Call**, **Call ID** field. If there are only two connections in a call, the effect is the same as Clear Call, above. **User Data** can optionally be appended to the request. User Data is propagated with the call when the call is dropped and passed to the application in a Connection Cleared Event Report. It is also possible to specify that a resource to be dropped from a call by selecting the required value in the **Drop Resource** field: either Call Classifier or Tone Generator. The Call Classifier resource detects tones from a device and determines whether the call is, for example, a fax or data modem call. The Tone Generator is any Communication Manager applied denial tone that is timed by the switch.
Conference Call	If there is an active call plus one or more held calls at an extension, the option merges the active and specified held call into a conference call. The Device IDs in the **Active Call** and **Held Call** fields are the same, but the Call IDs are different.
Consultation Call	If there is an active call at an extension, it is put on hold and an outgoing call is made to the extension specified in the **Third Party Device ID** field. The option effectively compounds a Hold Call and Make Call action. User Data can optionally be appended to the outgoing call. The outgoing call can also be tagged as a high priority call or specified as a Direct Agent or Supervisor Assist call.
Deflect Call	If an incoming call (specified in the **Active Call** fields) is not yet established it is redirected to the extension specified in the **Third Party Device ID** field.
Directed Pick Up	If there is an alerting call at the extension identified by the **Active Call, Device ID** field it is redirected to the extension specified in the **Third Party Device ID** field. The call at the alerting extension is dropped after a successful redirection.
Generate Digits	Sends DTMF or rotary digits, entered in the **Digits to send** field, to the all other connections in a specified call as though from connection specified in the **Active Call** fields. The duration of the tone for each digit, and the duration of the pause between tones, can optionally be specified.
Get ACD Split	Returns information about then ACD split extension specified in the **Third Party Device ID** field. Information includes the number of ACD agents available to receive calls through the specified split, the number of calls in queue and the number of ACD agents logged in.
Get Agent Login	Returns the extension of each ACD agent logged into the ACD split extension specified in the **Third Party Device ID** field.
Get Agent State	Returns the current state of the agent at the extension specified in the **Third Party Device ID** field or with the logical agent ID specified in the **Agent Acd** field. Possible states include null (not logged in), not ready, work not ready and ready.
Get Call Linkage Data	Returns the Universal Call ID (UCID) for the call specified in **Active Call** fields. Unlike the Call ID, the UCID is unique across all switches in network.
Hold Call	If there is an active call at an extension (specified in the **Active Call** fields) it is placed on hold.

Third-Party Call Control Options (continued)

Make Call	Initiates a call from the extension specified in the **Third Party Device ID** field to the extension specified in the **Destination Device ID** field. User Data can optionally be appended to the call, the call can be tagged as high priority, or the call can be specified as a Direct Agent or Supervisor Assist call.
Make Predictive Call	Initiates a call from the extension specified in the **Third Party Device ID** field to the extension specified in the **Called Directory Number** field, by first creating a connection to the called extension. The client application can optionally append User Data to the call and tag it as a high priority call. In addition, the client can optionally specify what action will be taken if the call is answered at the called extension: for example, clear the call if it is answered by an answering or fax machine, but to continue if it is answered by a person. It is also possible to set the Alert Time which defines how long, in seconds, the called device will ring before the call is cleared.
Reconnect Call	If there are held calls at an extension, this option makes the specified held call active. If there was an active call at the extension when the option was selected, it is either cleared or put on hold depending on the station settings. When demonstrating this option, the Device IDs in the **Active Call** and **Held Call** fields are the same but, the Call IDs are different. The client application can optionally append User Data to the reconnected call and drop the Call Classifier or Tone Generator resource from the cleared call.
Retrieve Call	If there are held calls at an extension, the held call specified in the **Held Call** fields is made active.
Sel Listening Hold	The client application can prevent a party in a call (Connection ID specified in the **Active Call** fields) from hearing anything said by another party on the call (Connection ID specified in the **Selected Party** fields) or by **All Parties** on the call. The specified party's listening path to the selected party or to all parties is put on listen-hold.
Sel Listening Retrieve	The client application can allow a party on a call (Connection ID specified in the **Active Call** fields) whose listening path to a selected party (Connection ID specified in the **Selected Party** fields), or to **All Parties,** is currently on listen-hold to hear audio from the selected party or all parties.
Set Agent State	The client application can log an ACD Agent at a device defined in the **Third Party Device ID** field, into or out of the ACD Split device defined in the **Group Device ID** field, or set a change of readiness to work state. In addition, the client application can set optional parameters including the agent's Work Mode, Reason Code for changing the Work Mode, and the agent's Log In ID and Password to be used if logging into the ACD Split. If Enable Pending is set to true, the certain state changes will not be applied until the agent completes their current call.
Single Step Conference	The option adds the extension specified in the **Third Party Device ID** field to an existing call specified in the **Active Call** fields. The new extension is forced off hook on speakerphone. Unlike the **Conference Call** option, there is no point at which there are two calls so there is no merging, the new extension never goes into ringing state and there is no opportunity for consultation.
Single Step Transfer Call	Transfers the call specified in the **Active Call** fields to the extension specified in the **Third Party Device ID** field. The extension the call is transferred to is forced off hook on speakerphone. Unlike the **Transfer Call** option, there is no point at which there are two calls and there is no opportunity for consultation.
Transfer Call	If there is an active call plus one or more held calls at an extension, this option transfers the specified held call to the destination extension of the active call. **Example:** Extension 32129 is in an active call with extension 40010 (Call ID 7217). To begin transferring the call, the connection to extension 40010 is put on hold and a call made from extension 32129 to extension 40012 (Call ID 6372). When the Transfer Call option is used, call 7217 is transferred from extension 32129 to extension 40012, so that extensions 40010 and 40012 are connected in a call.

Call Routing Applications

eBook: new functionality, no existing content

The DMCC Service was enhanced in AE Services Release 6.1 to support the development of third party call routing applications that can act as the routing server for a specified device, known as a Vector Directory Number (VDN), or for all devices within a specified switch sub-domain. When a call is made to a VDN, the actual destination of the call is determined by the routing application at call time. The controls and fields on the DMCC Dashboard that are used to demonstrate the DMCC Service's call routing capabilities are grouped under the **Routing Services** tab, as shown in **Figure A1-5**.

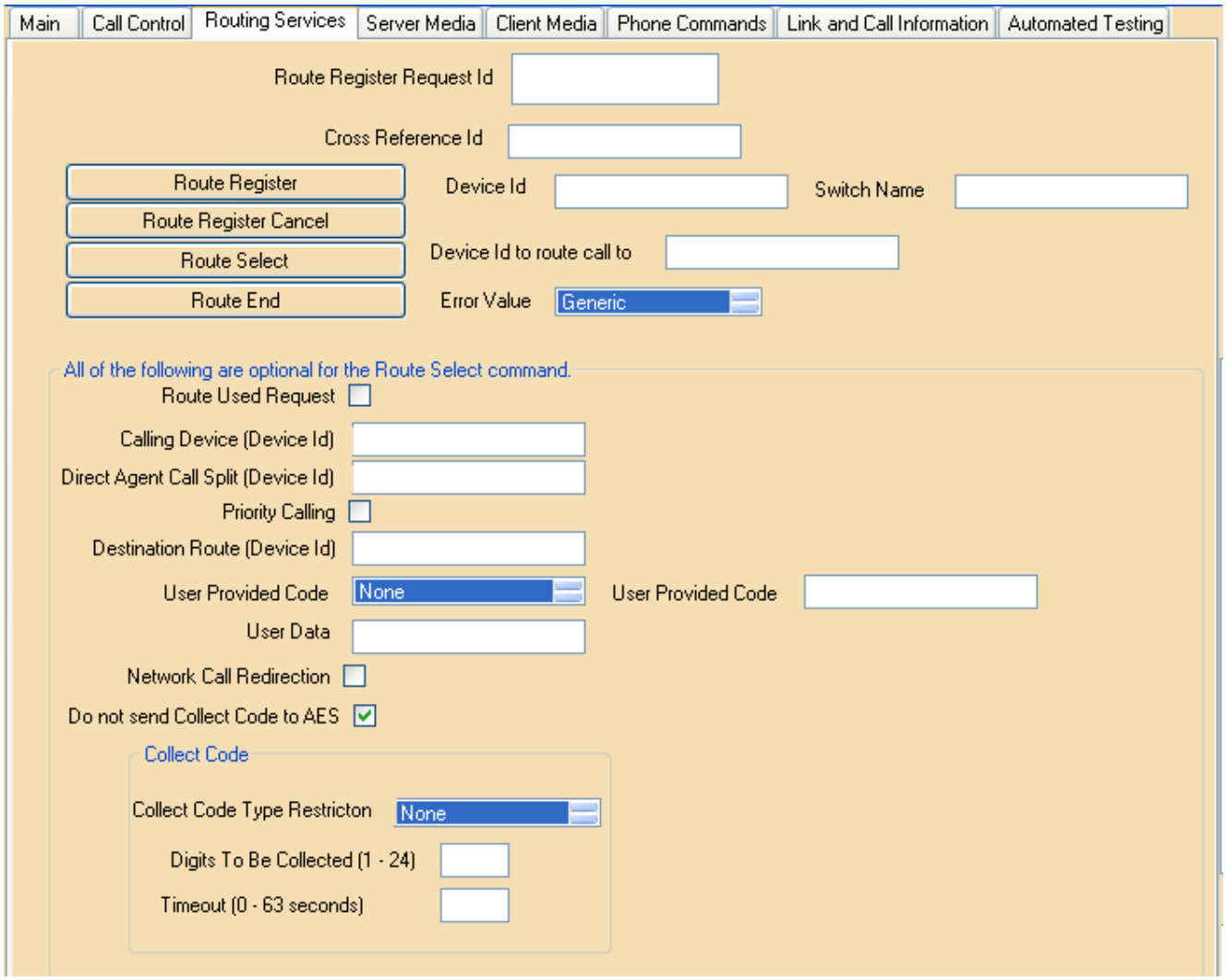

Figure A1-5: The Routing Services tab

Here's how call routing works:

1. The routing application registers itself with the DMCC Routing Services as the routing server for the VDN. With the DMCC Dashboard acting as the routing application, this involves specifying the Device ID of the VDN in the **Device ID** field and its switch in the **Switch Name** field, and clicking **Route Register**. Assuming all goes well, the DMCC Routing Services return a unique identifier for this registration request, which is displayed in the **Route Register Request ID** list box.
2. The routing application implements a listener for Route Request Events generated by the DMCC Routing Services.
3. When a call is made to a VDN, the DMCC Routing Services generate a Route Request Event carrying information about the call, such as the Route Register Request ID, the Routing Cross Reference ID that identifies the dialog to be routed, the VDN extension number, the calling device identifier, etc. The routing application can use this information to determine to where it wants the call routed. To demonstrate receiving Route Request Events at the Dashboard, make a call to a VDN against which the Dashboard was registered in step 1: the Dashboard receives a Route Request Event and displays the **Routing Cross Reference ID**.
4. The routing application sends instructions to the DMCC Routing Services defining where the dialog should be routed. With the Dashboard acting as the routing application, this involves selecting the appropriate **Route Register Request ID** and **Cross Reference ID** to uniquely identify the dialog, specifying the destination to which the dialog should be routed in the **Device ID to Route Call To** field, and clicking **Route Select**. In addition, optional Private Data can be attached to the routing instructions, which are used by the switch to determine how the call is handled; see the *Dashboard User Guide* and on-line help for definitions of the available Private Data fields.
5. Alternatively, if the routing application cannot or does not wish to supply a destination for the call, it can send a Route End request (click **Route End** on the Dashboard) and the switch will provide the default routing.
6. Assuming the routing application does supply routing instructions, the DMCC Routing Services route the dialog to the specified destination and, if requested (**Route Used Request** selected on the Dashboard), return information about the actual destination of the call to the routing application.

To stop receiving notifications of calls to a VDN, the routing application sends a Route Register Cancel Request to the DMCC Routing Services: to demonstrate this on the Dashboard, select the **Route Register Request ID** that you want to cancel and click **Route Register Cancel**.