



NetVanta Unified Communications Technical Note

Cisco CallManager Integration using TAPI/Wave

Overview

The NetVanta Unified Communications Server works with an integrated messaging client, Microsoft Exchange, Lotus Notes, and other IMAP-compliant email systems to provide users with a single storage and access point for voice, fax, and/or email messages. The UC server provides full fax server capabilities, including managing incoming and outgoing faxes.

Users can retrieve and manage messages either over the telephone or directly from the desktop. The UC server is designed to allow users to access Personal Assistant and Personal Business Assistant mode. Clients will be able to route specific callers to one-time messages and to filter calls to their extensions by activating call transfer, active message delivery, and pager notification based on Caller ID, Outlook® Contact or Contact Group, and/or Time of Day.

In addition to unified communications features, the UC server provides seamless Active Directory (AD) integration for user management. UC server users can be linked to AD users via the UC server administration user interface or via an MMC snap-in visible in the AD user dialog. User details, like first/last/display name and state (enabled/disabled), are synchronized automatically with AD on a continual basis, and the plug-in also provides mechanisms for modifying UC server-specific details like extensions and message store. AD linked users are automatically authenticated when they log into the UC server using the UC client.

The UC server can also act as a centralized voicemail system within a networked Cisco CallManager environment.

Integration Overview

The UC server integrates with Cisco CallManager using TAPI/Wave integration.

Cisco CallManager TAPI Overview

The UC server uses Cisco's TAPI/Wave integration to gather caller and called telephone number information as well as call reason information. The call reason gives the UC server the ability to determine how it answers incoming calls. For example, whether it acts as an Automated Attendant, prompts for a mailbox password, or prompts the callers to leave a message in a mailbox all depend on the call reason received from the CallManager.

System Requirements

The following table describes the minimum requirements for the different integration types of the UC server.

	TAPI/Wave ⁽¹⁾
NetVanta Unified Communications Server Hardware Requirements	
Platform Requirements	P4 – 3.0 GHz 1 GB RAM 80 GB Hard Drive
NetVanta Unified Communications Server Software Requirements	
Operating System	Windows® XP, 2003 Server
NetVanta UC Server release	NetVanta UC Server release 4.0 or higher
Cisco Software Requirements	<ul style="list-style-type: none">• Cisco Unified CallManager Telephony Service Provider• Cisco Wave Driver(1)
Cisco Software Release	CM 3.3 and Higher

Remote Access Considerations for WAVE Audio Devices

NOTE: Mapping remote computer sound to a local computer when using Windows Remote Desktop may cause WAVE audio devices to stop working.

Ensure that the remote audio mapping is disabled for a client computer that wishes to manage the UC server using a Windows Remote Desktop connection if you are integrating with IP Office using TAPI/Wave.

To configure Remote Desktop connections to leave sound at remote computer:

1. Launch remote desktop connection using **Start > All Programs > Accessories > Remote Desktop Connection**.
2. Select **Options**.
3. Select the **Local Resources** tab.

Change the Remote computer sound configuration is set to Leave at remote computer.

Supported Features

The following are the features supported with this Integration:

- Call coverage to personal greeting
 - Busy

- Ring-no-answer
- Unconditional
- Automated Attendant
- Return-to-operator
- Personal greeting of original-called party on double-call forward using call coverage
- Direct Call
- Message Waiting
- Caller ID
- Direct to Voicemail
- Active Message Delivery
- Pager Notification
- Centralized UC server

NOTE: *Incoming and Outgoing Fax is not supported on Wave Media resources. Incoming and outgoing faxes can be supported through the following mechanisms:*

- Install and configure Intel Dialogic analog hardware directly connected to the central office
- The UC server can be upgraded to support SIP endpoints. SIP PSTN gateways can support incoming faxes using T.38 – Real Time faxing capabilities

Cisco CallManager Programming

The following tasks are required to integrate the UC server with Cisco CallManager:

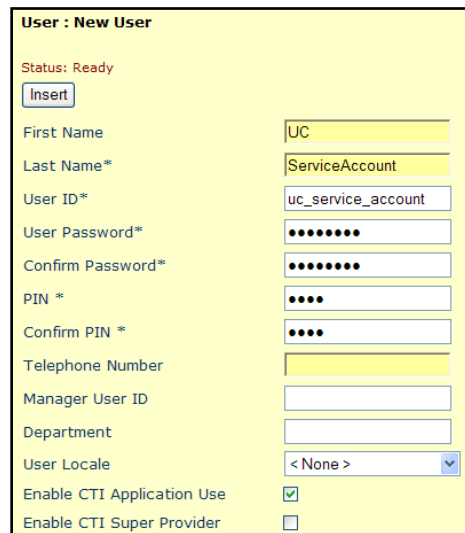
1. Create a Cisco CallManager user.
2. Create a CTI Port for each TAPI/Wave port.
3. Create an associated directory number for each TAPI/Wave port.
4. Create a voicemail port.
5. Create a voicemail profile.
6. Associate with individual user.
7. Configure CTI Routing Point for incoming automated attendants.

Creating a Cisco CallManager User for Unified Communications Services

A Cisco CallManager User and user ID will be created to associate with a TAPI Service Provider. The new user id and password will be required when configuring TAPI/Wave devices on the UC server platform.

To add a new user:

1. From the Cisco CallManager Admin Web UI, navigate to **User > Add a New User**.
2. Configure the First Name, Last Name, User ID, User Password, and PIN fields.
3. Ensure the *Enable CTI Application Use* is enabled.
4. Click **Insert** to complete adding the new user.



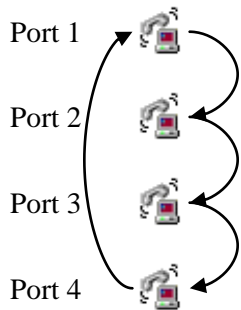
User : New User	
Status: Ready	
<input type="button" value="Insert"/>	
First Name	UC
Last Name*	ServiceAccount
User ID*	uc_service_account
User Password*	••••••••
Confirm Password*	••••••••
PIN *	••••
Confirm PIN *	••••
Telephone Number	
Manager User ID	
Department	
User Locale	<None >
Enable CTI Application Use	<input checked="" type="checkbox"/>
Enable CTI Super Provider	<input type="checkbox"/>

Assigning and Configuring NetVanta UC Server Ports

The following are instructions about how to configure TAPI/Wave ports for Cisco CallManager system integration with the UC server.

This section will detail how to configure the TAPI/Wave ports to be part of a virtual hunt group. The virtual hunt group will be created by setting call forward busy and no answer from one port to another.

In this example, we have 4 TAPI/Wave ports that have a directory number of 1020, 1021, 1022 and 1023 respectively. A call that is directed via an Automated Attendant configuration or forwarded from an extension will terminate on x1020. If x1020 is available that call will be answered on that port. If x1020 is busy, the call will be forwarded to the next available port and so on. The picture below gives an illustration on the expected behavior.



All incoming calls to the UC server are presented to the first port in the virtual group. If that port is busy it will automatically forward to the next port.

- Port 1 forwards to Port 2
- Port 2 forwards to Port 3
- Port 3 forwards to Port 4
- Port 4 forwards to Port 1

To create a new device for use with the UC Server:

1. Navigate in the Web browser to **Device > Phone**.
2. Click on **Add a new phone**.
3. Select **CTI Port** as the phone type and select **Next**.
4. Configure the Device Name, Owner User ID, and Calling Search Space parameters.
5. Click **Insert** to add the new CTI device.
6. On the dialog box prompting to add a directory number, select **OK**. This can also be done at a later time by selecting **Add New DN** from the **Directory numbers** pane.

Phone Configuration

[Add a new phone](#)
[Dependency Records](#)
[Back to Find/List Phones](#)

Directory Numbers

Base Phone

Line 1 - 1021 in ObjectworldPartition

Line 2 - Add new DN

Phone: UC-PORT-01 (Objectworld Unified Communications)

Registration: Registered with Cisco Unified CallManager CALLMANAGER

IP Address: 192.168.8.28

Status: Update completed

Phone Configuration (Model = CTI Port)

Device Information

Device Name* UC-PORT-01

Description Objectworld Unified Communications

Owner User ID uc_service_account [\(Select User ID\)](#)

Device Pool* Default [\(View Details\)](#)

Common Profile MigratedCommonProfile1 [\(View Details\)](#)

Calling Search Space ObjectworldPartitionSearchSpace

AAR Calling Search Space <None >

Media Resource Group List <None >

User Hold Audio Source <None >

Network Hold Audio Source <None >

Location CiscoLand

AAR Group <None >

Device Mobility Mode Default [\(View Current Settings\)](#)

Ignore Presentation Indicators (internal calls only)
 Logged into Hunt Group
 Remote Device

Multilevel Precedence and Preemption (MLPP) Information

Directory Number Configuration

To configure the Directory number:

1. Configure the **Directory Number Configuration** to associate a telephone number to the CTI port.
2. Enter a unique **Directory Number** (i.e., 1020, 1021, 1022 and 1023 respectively).
3. Ensure the **Voicemail Profile** is set to **<None>**.
4. Configure the **Partition, Calling Search Space** and **Audio Sources**, as required.
5. Configure the **Call Forward** settings to forward the current port to the next UC Port in the list. Set the following parameters to the next UC Port in the virtual hunt group:
 - Forward Busy Internal
 - Forward Busy External
 - Forward No Answer Internal
 - Forward No Answer External
 - Forward Unregistered Internal
 - Forward Unregistered External
 - Forward on Failure Ext/Int
6. Configure the last port in the virtual group to forward back to the first port.
7. Configure the **Multiple Call** settings as follows:
 - a. **Maximum Number of Calls** = 1
 - b. **Busy Trigger** = 1
8. Ensure that the following Forwarded Call Information Display options are enabled:
 - Caller Name = Enabled
 - Caller Number = Enabled
 - Redirected Number = Enabled
 - Dialed Number = Enabled

Configure Device (UC-PORT-01)
Dependency Records

Directory Number Configuration

Associated With
UC-PORT-01 (Line 1)

Directory Number: 1020 (ObjectworldPartition)
Status: Update completed
Note: Any update to this Directory Number automatically resets the associated devices

Update Remove from Device Reset Devices

Directory Number
Directory Number* 1020
Partition ObjectworldPartition

Directory Number Settings
Voice Mail Profile <None >
(Choose <None> to use default)
Calling Search Space ObjectworldPartitionSearchSpace
User Hold Audio Source 1 - SampleAudioSource
Network Hold Audio Source 1 - SampleAudioSource
Auto Answer Not available on this device.

AAR Settings

AAR	Voice Mail	AAR Destination Mask	AAR Group
<input type="checkbox"/>	<input type="checkbox"/>		<None >

Remove this destination from the call forwarding history
 Retain this destination in the call forwarding history

Call Forward and Pickup Settings

	Voice Mail	Coverage/ Destination	Calling Search Space
Forward All	<input type="checkbox"/>		ObjectworldPartitionSearchSpace
Forward Busy Internal	<input type="checkbox"/>	1021	ObjectworldPartitionSearchSpace
Forward Busy External	<input type="checkbox"/>	1021	ObjectworldPartitionSearchSpace
Forward No Answer Internal	<input type="checkbox"/>	1021	ObjectworldPartitionSearchSpace
Forward No Answer External	<input type="checkbox"/>	1021	ObjectworldPartitionSearchSpace
Forward No Coverage Internal	<input type="checkbox"/>		<None >
Forward No Coverage External	<input type="checkbox"/>		<None >
Forward Unregistered Internal	<input type="checkbox"/>	1021	ObjectworldPartitionSearchSpace
Forward Unregistered External	<input type="checkbox"/>	1021	ObjectworldPartitionSearchSpace
Forward On Failure Ext/Int	<input type="checkbox"/>	1021	ObjectworldPartitionSearchSpace
No Answer Ring Duration		3 (seconds)	
Call Pickup Group		<None >	(View Details)

MLPP Alternate Party Settings

Target (Destination)
Calling Search Space <None >
No Answer Ring Duration (seconds)

Line Settings for all Devices

Alerting Name 1021
Hold Reversion Duration (seconds)
Hold Reversion Notification Interval (seconds)

Line Settings for this Device

Display (Internal Caller ID) 1021
Line Text Label UC-Port
External Phone Number Mask
Message Waiting Lamp Policy None
Ring Setting (Phone Idle) Not available on this device.
Ring Setting (Phone Active)** Not available on this device.
Call Pickup Group Audio Alert Setting(Phone Idle) Not available on this device.
Call Pickup Group Audio Alert Setting(Phone Active) Not available on this device.

Multiple Call / Call Waiting Settings

Maximum Number of Calls* 1 (1 - 200)
Busy Trigger* 1 (<= Max. Calls)

Forwarded Call Information Display

Caller Name Caller Number
 Redirected Number Dialed Number

* indicates required item; changes to Line or Directory Number settings require restart.
Note:
If you are using a language other than English for Display (Internal Caller ID) or Line Text Label text, make sure the correct character set (shown below) is selected. Text displays incorrectly if the wrong character set is selected. (English characters are included in all character sets.)

Character Set Western European (Latin 1)

Creating the Voicemail Pilot

A Cisco CallManager voicemail pilot and voicemail profile will be associated with user devices so that incoming calls can be forwarded to voicemail.

To create a voicemail pilot:

1. Navigate in the Cisco Administrator Web Management page and select **Feature > Voicemail > Voicemail Pilot**.
2. In the upper, right corner of the window, select the **Add a New Voicemail Pilot** link.
3. Enter the Hunt Group Pilot Number that was created in a previous step into the **Voicemail Pilot Number** field.
4. Enter a description of the voicemail pilot in the Description field.
5. Select the appropriate Calling Search Space from the list.
6. If this is the only voicemail system or if you wish to make this the default voicemail pilot, enable **Make this the default Voicemail Pilot for the system**.
7. To add the new voicemail pilot number, select **Insert**, or to update the settings for an existing voicemail pilot number, select **Update**.

To create a voicemail profile:

1. Navigate in the Cisco Administrator Web Management page and select **Feature > Voicemail > Voicemail Profile**.
2. Choose a voicemail profile or select the **Add a New Voicemail Profile** link.
3. Enter a **Voicemail Profile Name** and **Description** in their respective fields.
4. Select from the list the **Voicemail Pilot** that was created in a previous step.
5. To add the new voicemail profile, select **Insert**, or to update the settings for an existing voicemail profile, select **Update**.

Associating a Voicemail Profile to User Directory Numbers

Each phone device must be configured to use either a default or a specific voicemail profile. The voicemail profile defines the call forwarding behavior.

To associate the UC server as the voice messaging system:

1. Navigate in the Cisco Administrator Web Management page and select **Device > Phone**.
2. Enter search criteria to locate a specific phone.
3. Click the name of the phone to update.
4. From the Directory Numbers list, select **the line** that you want to update.
5. Select the **Voicemail Profile** created in a previous step or set to use the default voicemail profile.
6. Configure the **Call Forward and Pickup Settings** as appropriate. To finish, select **Update**.

Configuring Cisco CallManager for Incoming Auto Attendant

The UC server can answer calls directly and play defined greetings/announcements, or route the calls to the defined destinations. Applications that can benefit from this ability are company auto attendants and Direct Inward Dialing (DID) Services.

The general premise is to create a CTI Route point that redirects calls to the UC server voicemail pilot number. Multiple auto attendant behaviors can be created by associating unique Directory Numbers under the same CTI Route point.

To create a CTI Route Point:

1. In the Cisco Administrator Web Management page, select **Device > CTI Route Point**.
2. Configure a **Device Name** and **Description** (i.e., Incoming_AA and Incoming Auto attendants).
3. Configure the remaining parameters as required.
4. To add the new CTI route point, select **Insert**

To add a new directory number and have it answered directly:

1. In the Cisco Administrator Web Management page, select **Device > CTI Route Point**.
2. Navigate to the specific CTI Route Point created in an earlier step.
3. In the Directory Numbers list, select **Add DN** for an unassigned line, such as Line 1 or Line 2.
4. Configure the **Directory Number** field with a unique number that corresponds to the incoming called number being presented by the phone company.
5. Configure the **Voicemail Profile** to correspond to the UC server voicemail profile created in an earlier step.
6. Enable the **Voicemail** checkbox for the **Forward All** condition in the **Call Forward and Pickup Settings**.

[Configure Device \(Incoming_AA\)](#)
[Dependency Records](#)

Directory Number Configuration

Associated With
Incoming_AA (Line 1)

Directory Number: 7001 (ObjectworldPartition)
Status: Ready
Note: Any update to this Directory Number automatically resets the associated devices

Directory Number

Directory Number*
Partition

Directory Number Settings

Voice Mail Profile
(Choose <None> to use default)

Calling Search Space

User Hold Audio Source

Network Hold Audio Source

Auto Answer Not available on this device.

AAR Settings

	Voice Mail	AAR Destination Mask	AAR Group
AAR	<input type="checkbox"/>	<input type="text"/>	<None >

Remove this destination from the call forwarding history
 Retain this destination in the call forwarding history

Call Forward and Pickup Settings

	Voice Mail	Coverage/ Destination	Calling Search Space
Forward All	<input checked="" type="checkbox"/>	<input type="text"/>	<None >
Forward Busy Internal	<input type="checkbox"/>	<input type="text"/>	<None >

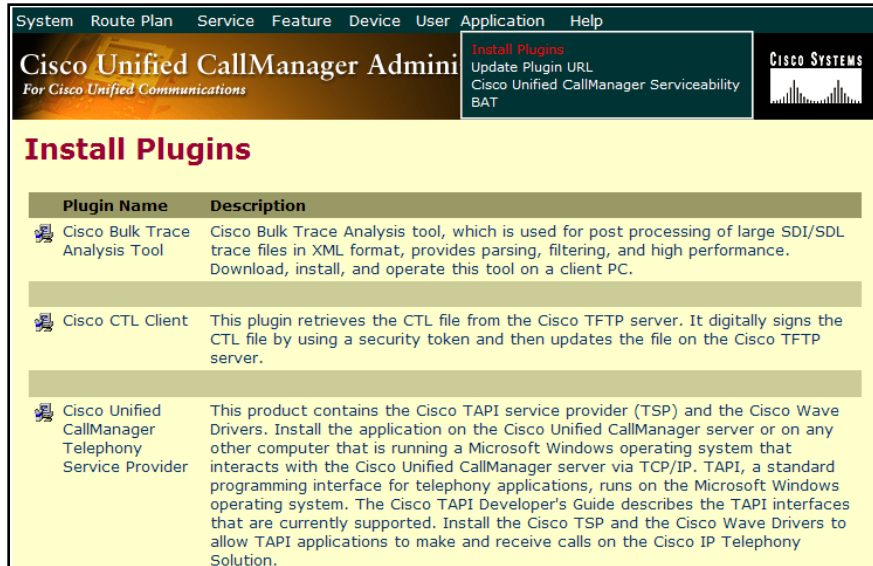
CISCO CallManager TAPI/Wave Installation and Configuration

This section includes instructions on how to install and configure Cisco's TAPI/Wave drivers. Consult Cisco installation instructions for more information on TAPI.

Obtaining the TAPI Driver for Cisco CallManager

To obtain the TAPI Driver:

1. Login to the CallManager main administration window using a Web browser.
2. From the **Application** menu, select **Install Plugins**.

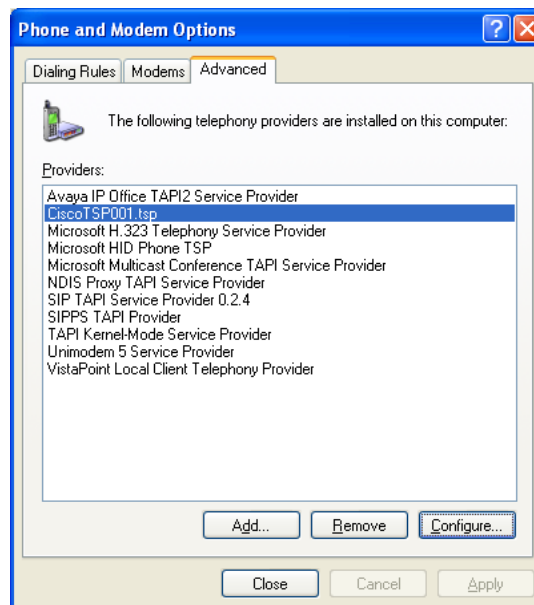


3. Scroll down to the bottom of the page and select **Cisco Unified CallManager Telephony Service Provider**.
4. Save this file (i.e., CiscoTSP.exe) and perform the installation on the CallAttendant platform.

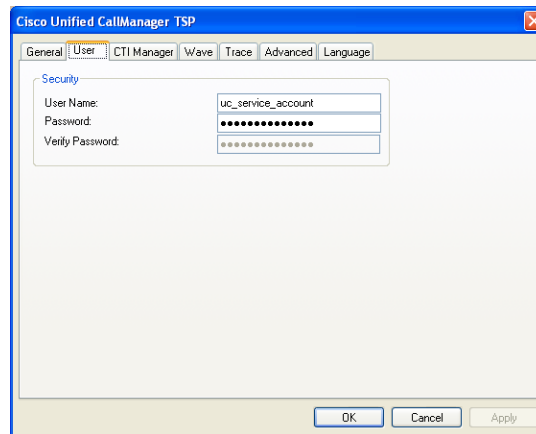
Install and Configure Cisco CallManager TAPI Software

To install the TAPI driver on the UC server platform:

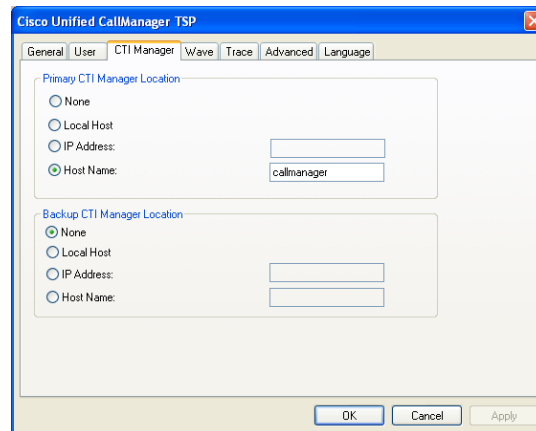
1. Launch the **CiscoTSP.exe** and follow the instructions to install the CISCO TAPI driver.
2. After the installation of the TAPI driver, navigate to **Phone and Modem Options** to complete the configuration.



3. Click **Configure**, select the **User** tab, and enter the user name and the password of the Cisco User that has permission to monitor and control the CTI Ports that were created in a previous step.



4. Click the **CTI Manager** tab, and complete either the **IP address** or the **Host Name** information of the Cisco CallManager platform.



Installing the Cisco CallManager Wave Audio Driver

The installation of the audio wave driver allows the UC server to interact with the caller with capabilities such as play greetings, play announcements and record messages.

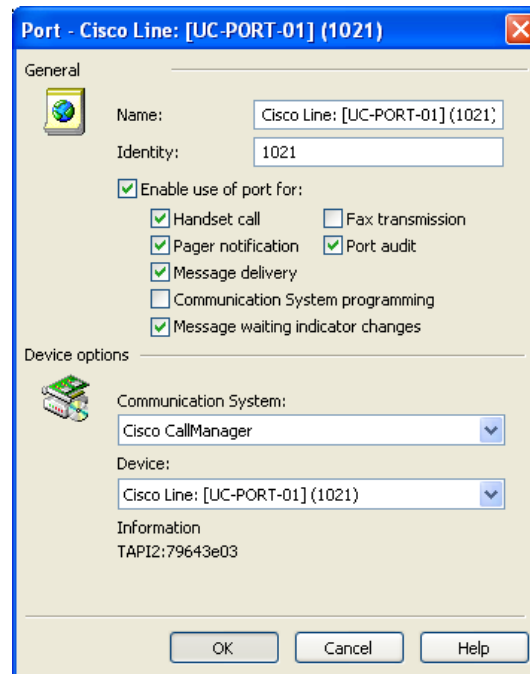
1. Open the **Control Panel**, and double-click on **Add New Hardware**.
2. Click on **Next** and select **Yes, I have already connected the hardware**. Click **Next**.
3. Scroll down to the bottom of the list and select **Add a new hardware device**. Click **Next**.
4. Select **Install the hardware...** and select **Next**.
5. Select **Sound, Video, and Game Controller**. Click **Next**.
6. Click **Have Disk** and browse to **C:\Program files\CISCO\WaveDrivers**.

7. Click **Open**. Click **OK**. Click **Continue Anyway** to bypass the Windows Driver signing warning, and select **Next**
8. Click **Next**. Click on **Continue Anyway** to bypass the Windows Driver signing warning.
9. Click **Browse** and browse to **C:\Program files\CISCO\WaveDrivers**. Click **OK**.
10. Click **Finish** and restart your server.

Configure Cisco CallManager Ports in the NetVanta UC Server

To configure Cisco CallManager Ports in the UC server, consult the *NetVanta Unified Communications Server Administrator Guide*, available online at <http://kb.adtran.com>. You may either run the Server Configuration wizard on the UC server platform or manually create them in the UC client application.

When configuring the Cisco CallManager ports, ensure that you disable Fax transmission and Communications System programming from the list of capabilities. The following picture illustrates the view of the Cisco CallManager port as seen in the UC client application.



Configuring the NetVanta UC Server for Direct Answering

The UC server can be configured to answer calls directly and play a defined greeting/announcement, or route them to the defined destinations. Applications that can benefit from this ability are auto attendants and DID fax services.

Company Auto Attendants

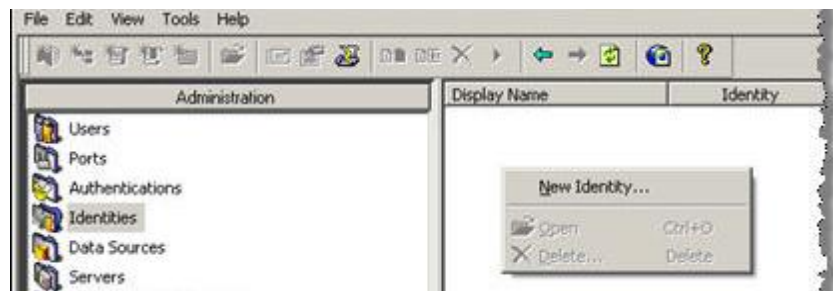
To have the UC server answer trunks/lines directly as an auto attendant, you must first create an auto attendant service and link it to an incoming extension or DID number.

To create an auto attendant Service:

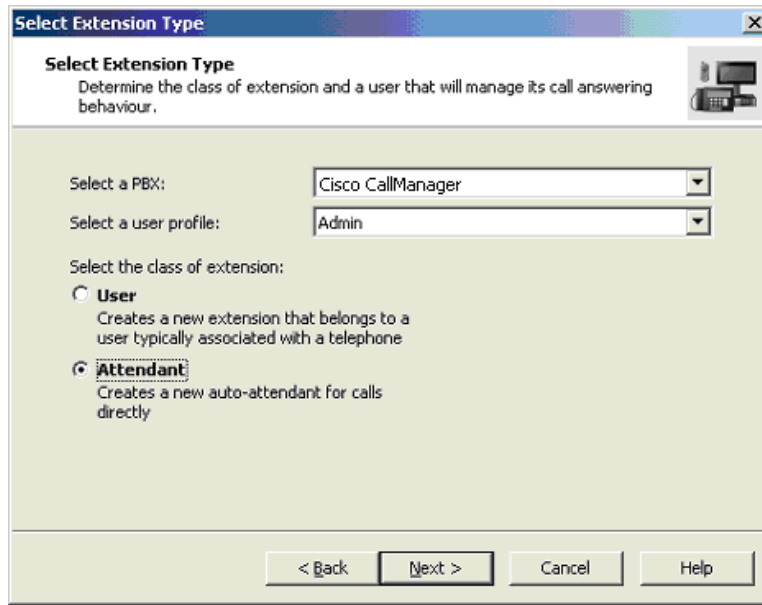
1. Launch the UC server administrator application and select the **Services** tab.
2. Right-click in the content view and select **New > Service**.
3. Type an appropriate name for the auto attendant service, for example, **Company XYZ Main Auto Attendant**.
4. Double-click the new service that you created in step 3. This launches the **Service Editor**. Build the auto attendant service as per instructions in the the *NetVanta Unified Communications Server Administrator Guide*, available online at <http://kb.adtran.com>.

To create an Auto attendant Extension:

1. From the UC server administrator user interface, select the **Identities** view from the **Administration** tab.
2. Create a new dialed number/ DID trunk by right-clicking in the Identities contents view (right hand pane) and select **New Identity**.



3. Select **Cisco Call Manager** for the PBX.
4. Select a user profile to associate with the extension. Auto attendants are typically associated with the Admin user profile unless you want specific service execution based on a user's profile and/or mailbox.
5. Select **Attendant** as the class of extension.
6. Click **Next**.



7. On the new page, type a name for the auto attendant.
8. Enter the extension number, which is the extension of the CTI Routing Point Directory Number created in [Configuring Cisco CallManager for Incoming Auto Attendant on page 8](#).
9. Select a valid service.
10. Click **Next**, and then **Finish** on the following page.

NOTE: *If the associated user for this new extension is in **Personal Assistant** mode, then no service selection is possible. The behavior section instead presents two options: Voicemail and Receive Fax behavior. Receive Fax is not supported on TAPI/Wave devices.*

