Installation, Configuration, and Troubleshooting Guide for Avaya Distributed Office application enablement

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Chapter 1: About Avaya Distributed Office application enablement

What is Avaya Distributed Office application enablement?

Distributed Office application enablement provides computer telephony integration (CTI) for basic telephony at an Avaya Distributed Office location. It supports a subset of Microsoft Telephony Application Programming Interface (TAPI) services and events. It allows Distributed Office to enable CTI capabilities such as click-to-dial, call logging, and basic call control (transfer, conference, hold/unhold) used in common CTI-enabled, TAPI-enabled desktop applications. This CTI support does not depend on any other facilities outside the Distributed Office location.

Distributed Office application enablement supports configurations in which an application on an application computer controls and monitors the primary telephone of the user or another single telephone that is associated with that computer.

Distributed Office application enablement does not support controlling or monitoring multiple telephones. For example, an application on a single computer cannot simultaneously monitor more than one telephone at a Distributed Office location. It does not provide advanced CTI support for functionality that call centers and other complex applications require.

All Distributed Office telephones are supported for CTI except as noted in Limitations on page 10.

The core software for Distributed Office application enablement is already installed on the Distributed Office platform. You install and configure additional software (the Avaya Application Enablement Services TAPI Telephony Service Provider - Avaya TSP) on each application computer.

Which applications run with Distributed Office application enablement?

Appendix A: Tested applications on page 45 lists the popular TAPI-enabled applications that have been tested and found to work with Distributed Office. If you intend to use other applications, check Appendix B: Supported TAPI Services and Events on page 47 to see if that application uses only the supported TAPI services and events.
Who should use this book?

Use this book if you are:

- A technician who installs and configures the Avaya Application Enablement Services TAPI Telephony Service Provider software and/or configures the CTI User authentication for Distributed Office application enablement.
- A technician who troubleshoots CTI problems that arise during or after installation.
- A programmer who writes new TAPI-enabled applications or integrates existing applications with Distributed Office application enablement.
Chapter 2: Overview of Avaya Distributed Office application enablement

Architecture

Avaya Distributed Office application enablement software

Avaya Distributed Office application enablement software includes:

- Core (server) software that is preinstalled on the Avaya Distributed Office.
- The Avaya Application Enablement Services TAPI Telephony Service Provider, which you install on each CTI application computer.

This software is also referred to as the Avaya TSP.

Core software

The core software manages all the CTI connections between Avaya Distributed Office and the CTI application computers on which the Avaya TSP software is installed. It also authenticates each application computer before establishing a CTI session to ensure that only valid CTI Users gain access to CTI services. Even though this software is preinstalled, it must be configured properly (using the Avaya Distributed Office Local Manager) before it can be used.

Avaya TSP software

You must install the Avaya TSP software on each computer on which CTI-enabled applications will be run. (These are sometimes called application computers.) The Avaya TSP on each application computer establishes a CTI connection with Avaya Distributed Office and exchanges TAPI service requests and event messages with the CTI applications on the same computer.

Distributed Office application enablement supports these TAPI versions:

- TAPI 2.1
- TAPI 2.2
Overview of Avaya Distributed Office application enablement

Application computers

Application computers are the computers on which TAPI-enabled CTI applications are installed and run and on which you must install the Avaya TSP. The application computers must use the Windows XP Professional operating system with Service Pack 2 or later.

Application computers must be connected to the Distributed Office platform over a LAN. These computers receive communications services from components of Distributed Office application enablement that are installed on the Distributed Office platform.

Note:
Connections over a WAN are not supported.

Table 1: Resource requirements for application computer

<table>
<thead>
<tr>
<th>Resource</th>
<th>Minimum Required</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dynamic Memory</td>
<td>512 MB</td>
<td></td>
</tr>
<tr>
<td>Available Hard Disk Capacity</td>
<td>50 MB</td>
<td></td>
</tr>
<tr>
<td>Processor Performance</td>
<td>550 mHz Pentium III-class</td>
<td>Wired connectivity to the Distributed Office System. Wireless LAN may decrease security unless properly encrypted.</td>
</tr>
<tr>
<td>Ethernet LAN</td>
<td>10 mbps</td>
<td>Wired connectivity to the Distributed Office System. Wireless LAN may decrease security unless properly encrypted.</td>
</tr>
<tr>
<td>Network latency</td>
<td></td>
<td>Maximum average round trip time of 200 ms -- a maximum 200 millisecond (ms) average round trip packet delivery time as measured with ping over every one hour time period with no single spike exceeding five seconds. No unrecovered packet loss Avaya Services is not responsible for troubleshooting a customer LAN/WAN environment.</td>
</tr>
</tbody>
</table>
TAPI application support includes each of the following Microsoft-defined capability classes, although not all capabilities within each class are available. For a list of supported TAPI services and events, see Appendix B: Supported TAPI Services and Events on page 47.

- Assisted Telephony. A small set of TAPI services to support simple CTI interaction between two applications.
- Basic Telephony. A set of basic telephony services that includes Make Call, Answer Call, and Drop Call.
- Supplementary Telephony Services. A set of TAPI functions that includes Transfer, Hold, Retrieve, and Conference.

TAPI Extended Services are not supported.
Limitations

Distributed Office application enablement does not:

- Provide CTI support for SIP telephones.
  
  **Note:**
  
  Some Avaya telephones are capable of using either SIP or H.323 mode. Such telephones are supported when in H.323 mode.

- Provide CTI support for telephones that are configured to present line appearances. Such configurations have one or more buttons that are assigned as Line Appearance buttons.

- Provide CTI support for the following DECT wireless phones:
  - WT3701
  - WT3711 (US / EMEA models)

- Restrict access to specific CTI capabilities on a per-user basis. A CTI User that is authenticated to use CTI can access all CTI telephony services and events that Distributed Office application enablement provides. The TAPI-enabled applications on application computers can be designed to limit access. For example, a desktop application might require a user to enter an authorization code before the user can make a click-to-dial call. Such a requirement is managed by the application, not by Distributed Office application enablement.

- Restrict an application from accessing any specific device or invoking any specific service. For example, there is no way to restrict users from configuring their TSP so that an application can make calls from someone else’s telephone.

Capacities

Distributed Office application enablement allows a maximum of 50 concurrent CTI-enabled application sessions.

**Note:**

Although every CTI-enabled telephone on Distributed Office can potentially be monitored or controlled by a Distributed Office application enablement application, each application can control only one telephone at a time.
Chapter 3: CTI User authentication for Avaya Distributed Office application enablement

When a TAPI-enabled application initiates a CTI session with Avaya Distributed Office application enablement, the application provides credentials (a CTI User ID and password). Distributed Office application enablement uses this ID and password to ensure that the application is valid and permitted to use CTI.

**Note:**

Avaya recommends that CTI Users and passwords be configured before installing Avaya TSP software on application computers. This will allow each installation to be tested immediately for correct operation.

Use one of the following options to authenticate CTI User IDs and passwords:

- Local CTI User authentication. When this method is used, Distributed Office application enablement uses an internal file of CTI User IDs and passwords that is stored on the Distributed Office system to authenticate CTI Users. This method is the default method for CTI User authentication. See About local CTI User authentication on page 11.

- Windows Active Directory Services authentication. When this method is used, Distributed Office application enablement uses an external, customer-provided Active Directory server to perform the authentication. You must set up the Active Directory and configure Distributed Office application enablement to connect to the Active Directory server. See About Microsoft Active Directory Services for authentication on page 13.

---

**About local CTI User authentication**

Configuration and authentication of CTI Users are handled at each individual Distributed Office location. When local user authentication is used, CTI Users are authenticated against the accounts in the internal file that are created on the Distributed Office system. For security, only authenticated CTI User applications are granted access to the CTI services that Distributed Office application enablement provides.

A maximum of five CTI User accounts (that can be shared among all users) are configurable in the main CTI configuration screen.
Using local CTI User authentication

To use local CTI User authentication, use the CTI Configuration screen [Figure 1] in Distributed Office Local Manager to create up to five CTI User accounts. To go to this screen, from the Navigation pane on the main menu click Managed Objects > Configuration > Telephony > CTI Configuration.

Figure 1: CTI Configuration Screen

This screen allows you to add up to five local CTI User accounts. To add a CTI User account:

1. Click the Add User button once for each user account you want to add, up to five CTI User accounts.

   The bottom of the screen will display fields for adding one new user each time you click the button. For example, if you click the button twice, fields for adding two new users will be displayed, as shown in Figure 1 above.

2. Under Local CTI Users, check the Select button and fill in the following fields:
   - **User** - the User ID.
   - **Password** - the password
   - **Confirm** - retype the password

3. Click the Apply Changes button.

For more information, see CTI in the Avaya Distributed Office Local Manager Online Help.
About Microsoft Active Directory Services for authentication

When you use Microsoft Active Directory Services (ADS) for CTI User authentication, CTI Users are authenticated against an external, customer-provided Active Directory Domain Controller database. To use ADS for authentication, you must configure Distributed Office application enablement as an Active Directory Kerberos client.

**Important:**
When using Active Directory services for authentication, the clocks in the Distributed Office system and Active Directory server must always be maintained within two minutes of each other. The clock in the Distributed Office system is maintained on the **Date and Time** screen in the Avaya Distributed Office Local Manager. To go to this screen, from the navigation pane on the main menu click **Platform > Date and Time**. For more information, go to the Distributed Office Local Manager Online Help.

Using Microsoft Active Directory Services for authentication

To configure the system to use ADS for authentication, perform the following procedures:

1. Create an account on the Domain Controller.
2. Generate a keytab file for the account on the Domain Controller.
3. Install the keytab file and enable Active Directory authentication in Local Manager.

Creating an account on the Domain Controller

On the Domain Controller, follow this procedure to create a CTI User account where the Distributed Office application enablement is designated as an Active Directory user.

**Note:**
To perform this procedure, you must have administrator permissions on the Windows Domain Controller.

1. From your desktop, select **Start > Settings** and click **Control Panel**.
2. From **Control Panel**, double-click **Administrative Tools**.
3. From **Administrative Tools**, double-click **Active Directory Users and Computers**.

4. In the left pane, click **Users** to display the list of users. Move your cursor to the right pane and right-click. From the right-click menu, select **New > User**.

   Windows displays the **New Object - User** dialog box.

5. Complete the **New Object - User** dialog box as follows:

   a. In the **First Name** field, type a user name. For example, use the host name of the Distributed Office system.

   b. Leave the **Initials** and the **Last Name** fields blank.

   c. In the **Full Name** field, type exactly what you typed in as a user name in the **First Name** field.

   d. Complete the two-part **User logon name** field, as follows:

      - In the first field, type the user name.
      - In the next field, type the address (for example @dcserver1.xyz.com) of the Domain Controller.

   Click **Next**.

   Windows displays the **New Object - User** dialog box.

6. Complete the **New Object - User** dialog box as follows:

   a. In the **Password** field, type a password you have chosen.

   b. In the **Confirm password** field, retype the password.

7. Click **Next** and **Finish** on the remaining screens to complete the procedure.

---

### Generating a keytab file for the account on the Domain Controller

To perform this procedure, you must be on the Windows Domain Controller with administrator permissions. After you create the Distributed Office application enablement account on the Windows Domain Controller, generate a keytab file for the account.

**Note:**

This example uses a CTI User account name to generate a keytab file that is called **username.keytab**. This file will be created in the current directory. Make a note of this location as you will need this location during the installation procedure.

On the Domain Controller, start a command prompt and type:

```
Ktpass -princ host/hostname@NT-DNS-REALM-NAME -mapuser username -pass password -out host.keytab
```
where:

*host* is the Distributed Office host name  
*hostname* is the Distributed Office’s DNS name  
*NT-RDNS-REALM-NAME* is the Active Directory domain name you are using to authenticate  
*username* is the username that you created in Active Directory Services  
*password* is the password for the account.

---

**Installing the keytab file and enabling Active Directory authentication in Local Manager**

To install the keytab file and enable Active Directory authentication, use the CTI Configuration screen (Figure 2) in Distributed Office Local Manager. To go to this screen, from the Navigation pane on the main menu click **Managed Objects > Configuration > Telephony > CTI Configuration**.

**Figure 2: Local Manager CTI Configuration screen**

1. Under **Active Directory Server Configuration**, select **Server Enabled**.

2. Fill in the following fields:
   - **Server Address** - the IP address of the Active Directory server.
   - **Realm** - the Active Directory domain name you are using to authenticate. This should be the same Realm you used when running the command to generate the keytab file. See [Generating a keytab file for the account on the Domain Controller](#) on page 14
CTI User authentication for Avaya Distributed Office application enablement

**Note:**

The Port field is populated by a default value.

3. In the **Update Keytab File** area browse to the location of your generated keytab file and click **Update**.

   The keytab file that was generated on the Domain Controller is loaded into Distributed Office.

4. Click the **Apply Changes** button.

For more information, see the CTI page in the Avaya Distributed Office Local Manager Online Help.
Chapter 4: Installing and configuring the Avaya TSP on each application computer

You must set up each application computer to use Avaya Distributed Office application enablement services. To set up an application computer you must:

1. Install the Avaya TSP.
2. Configure the Avaya TSP.

Installing the Avaya TSP

Preinstallation tasks

- Verify:
  - that each application computer is running Windows XP Professional operating system with Service Pack 2 or later.
  - that Distributed Office application enablement is configured and running on the Distributed Office platform. See Monitoring CTI status on page 28 for information on how to verify this.
  - that the application computer meets the minimum hardware requirements. See Table 1: Resource requirements for application computer on page 8.

- Determine the IP address of the Avaya Distributed Office application enablement server.

- Configure your telephony dialing rules using the Phone and Modem Options of the Control Panel, per Microsoft documentation.

- Obtain the Avaya TSP software from the Avaya DevConnect site (http://www.devconnectprogram.com). To install the software you will need to download the zipped file to an available temporary directory on the installation computer and extract the files into this same directory. Optionally, you may now want to copy these files to an installation CD-ROM that you can use to install onto other application computers, rather than downloading the zipped file again on each computer.
Installing and configuring the Avaya TSP on each application computer

Installation procedure

**Note:**

TSAPI is an Avaya proprietary API for application enablement. The Avaya TSP uses some Avaya TSAPI components that are installed on each application computer. Because of this, TSAPI is referenced in some messages during the installation. However, TSAPI is not a supported API in Distributed Office.

1. Start the InstallShield Wizard by running the `setup.exe` application that is at the top of the directory structure of the extracted files that you obtained from the Avaya DevConnect site.

   The InstallShield Wizard starts. Click **Next** to continue.

2. Select the setup type (complete or custom) to install and click **Next**.

3. Specify a destination folder and click **Next**.

4. Type the domain name or the IP address of the Distributed Office application enablement server that you determined during the preinstallation tasks. Click **Next**.

5. You may receive a message about the installation of the TSAPI client. Click **OK** to proceed.

6. Review your settings and click **Next** to start the installation.

   A status bar shows you the progress of the installation.

7. Select whether to restart the application computer now or later and click **Finish**.

   We recommend that you select to restart later.

**Note:**

You must restart the application computer after configuring the Avaya TSP. To avoid having to restart the computer twice, Avaya recommends that you complete the configuration, see **Configuring the Avaya TSP** on page 19, and then restart the computer.
Configuring the Avaya TSP

Before you use the Avaya TSP with a TAPI-enabled application, you must configure the TSP on the application computer.

**Note:**
Make sure you have determined what the CTI User ID and password will be for this particular application computer. Also, the CTI User ID and password must be administered in Distributed Office application enablement before you will be able to test the installation.

To configure the Avaya TSP:
1. From your desktop, select **Start > Settings** and click **Control Panel**.
2. From **Control Panel**, double-click **Phone and Modem options**.
   **Note:**
   If telephony information is not yet set up for this computer, the system asks you for an area code and location. Provide this information and click **OK**. The system then displays the Phone and Modem options screen.
3. Click the **Advanced** tab.
4. From the list of available telephony providers, select **Avaya Application Enablement Services TAPI Service Provider** and click the **Configure** button.
The system displays the Avaya AES - TSP Configuration dialog box.

5. Complete the Avaya AES - TSP Configuration dialog box as follows:

- In the **Telephony server** field, select the telephony server to which you will connect. This server will be `AVAYA#LFS#CSTA#systemname` (where `systemname` is the name of the Distributed Office system).
- In the **User name** text box, type the CTI User ID as administered on Distributed Office.
- In the **Password** field, type the password that is associated with the CTI User ID.

**Note:**
In order to test the installation and configuration of the Avaya TSP, the CTI User ID and password will have to be administered on Distributed Office or in Active Directory Services as a valid user. See [About local CTI User authentication](#) on page 11 and [About Microsoft Active Directory Services for authentication](#) on page 13.

- In the **MY DN** field, type the extension of the telephone number with which CTI-enabled applications on this computer will be associated.
- If you want to change the default path for the storage location of the error log, click **Browse** and select a storage location for the error log.
Installing and configuring the Avaya TSP on each application computer

- In the **Error log level** field, accept the default error log level of **ERROR_MINOR** (this should be applicable for most situations), or select another:
  
  - **ERROR_FATAL**. Logs fatal error messages.
  - **ERROR_MAJOR**. Logs fatal and major error messages.
  - **ERROR_MINOR**. Logs fatal, major and minor error messages.
  - **ERROR_TRACE**. Logs fatal, major and minor errors and trace information.

  To save your configuration settings, click **OK**.

6. You will receive a warning message that your changes will not take affect until you have restarted the computer. Click **OK** to proceed.

**Note:**

With the Phone and Modem options, you can change the Avaya TSP configurations, even when telephony operations (sessions) are in progress. These changes, however, do not take effect until you shut down and restart the computer.

7. Restart the application computer.
Running the Avaya TSP installation test

You can test the installation after:

- the Avaya TSP has been configured for the application computer.
- the application computer has been restarted.
- the CTI User ID’s and passwords have been administered on Distributed Office.

To test the installation:

- Navigate to Start > All Programs > Avaya AE Services > TAPI Service Provider and select the TAPI Dialer application.
  The system displays the TAPI Dialer dialog box.

  ![TAPI Dialer dialog box]

  - Select the TAPI Line/Device number that corresponds to the TAPI LINE NAME: Avaya AES Line.
  - In the Enter Phone Number to Dial field, enter a known working local extension number other than your own.
  - Click the Dial button.
  Call progress messages will appear in the space provided.
Uninstalling the Avaya TSP

To completely uninstall Avaya TSP, you must uninstall the following separate components in the order shown.

- Avaya Application Enablement Services TAPI Service Provider
- Avaya Application Enablement Services TSAPI Client

To uninstall these components:

1. From your desktop, select **Start > Settings** and click **Control Panel**.
2. From **Control Panel**, double-click **Add or Remove Programs**.
3. From the list of currently installed programs, select **Avaya Application Enablement Services TAPI Service Provider**. Click **Change/Remove**.
4. Select **Remove** to remove all installed features and click **Next**.
5. The system provides messages that confirm that the selected software was removed and maintenance is complete. Click **OK** and **Finish** when requested.

   The system displays the **Add or Remove Programs** screen.

Remove the following component in a similar way:

- Avaya Application Enablement Services TSAPI Client
Reinstalling the Avaya TSP

To reinstall the Avaya TSP after you have installed and uninstalled at least once:

1. Start the InstallShield Wizard by running the setup.exe application that is at the top of the directory structure.

   The Modify, repair, or remove screen appears.

   Select **Remove** and click **Next**.

2. The system provides messages that confirm that the selected software was removed and maintenance is complete. Click **OK** and **Finish** when requested.

3. Restart the installation process. See Installing the Avaya TSP on page 17.
Installing and configuring the Avaya TSP on each application computer
Chapter 5: Managing Avaya Distributed Office application enablement

Logging errors and exceptions

Any errors and exceptions that the Avaya TSP detects are recorded in a specified log file that is stored on each application computer. You specify the location of this log file in Configuring the Avaya TSP on page 19.

Distributed Office application enablement does not send log files to centralized storage.

Adding and deleting local CTI User accounts

Distributed Office application enablement supports up to five unique CTI User accounts.

To add or delete local CTI User accounts, use the CTI Maintenance screen in the Avaya Distributed Office Local Manager. To go to this screen, from the Navigation pane on the main menu, click Managed Objects > Configuration > Telephony > CTI Configuration.

For instructions for adding CTI User accounts on this screen, see Using local CTI User authentication on page 12.

To delete a CTI User account on this screen, click the Remove User button.

Note:

You cannot edit a CTI User account. To change a password, you must delete that CTI User and then add that CTI User with the new password.
Monitoring CTI status

The CTI Maintenance screen in the Avaya Distributed Office Local Manager (Figure 3) provides status and maintenance for Distributed Office CTI objects (for example, CTI Users, CTI links, and CTI sessions). To go to this screen, from the Navigation pane on the main menu click Managed Objects > Maintenance & Monitoring > Telephony > CTI.

Figure 3: Local Manager CTI Maintenance screen

This screen provides:

- A Restart Service button to restart the CTI services.
- Status data for the switch and the CTI links. This data includes:
  - Whether Distributed Office application enablement is configured and running on the Distributed Office. If this is the case, both Switch and CTI Link are listed as talking.
  - The amount of time that the links are in service.
  - Message counts in the last half hour.
  - The number of associations (active CTI sessions).
- A table that shows the CTI User connections. This data includes:
  - The CTI User name that was used to authenticate.
  - The IP address of the application computer.
  - The time that the application session began.

For information about using this screen, see the CTI page in the Avaya Distributed Office Local Manager Online Help.
Chapter 6: Security considerations

Enhancing LAN security

The link between the application computer and the Distributed Office platform is not encrypted. However, the link is encoded in a binary format that is not readable without special processing. For additional security, ensure that the LAN that is used for this link is not externally accessible.
Security considerations
Chapter 7: Troubleshooting CTI problems

This section can be used to troubleshoot CTI problems on Distributed Office. If your problem falls into one of the three high level descriptions below, follow the troubleshooting steps in that section to resolve your problem. Use care to follow each step in order without skipping steps to be sure the problem can be diagnosed properly.

- **CTI TAPI-enabled applications are not functioning** on page 33
- **CTI TAPI-enabled applications respond slowly to TAPI requests** on page 42
- **CTI TAPI-enabled applications exhibit a specific telephony feature failure** on page 43

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**CTI TAPI-enabled applications are not functioning**

Use the following steps to troubleshoot a CTI TAPI-enabled application that is not functioning:

1. Can you call out and receive calls from the telephone that you are trying to control?
   - Yes: Go to step 2.
   - No: This is not an application problem. For information on how to troubleshoot this problem, see *Maintenance and Troubleshooting for Avaya Distributed Office* (03-602039).

2. Does the application function on another PC?
   - Yes: Go to step 5.
   - No: Go to step 3.

3. Log on to Avaya Distributed Office Local Manager and click **CTI** under **Managed Objects > Maintenance**.
   The CTI Maintenance screen appears as shown in example **Figure 4**.
Are the **Switch** and the **CTI Link** both in a **Talking** state?

- Yes: Continue to step 4.
- No: Click **Restart Service**. Allow approximately one minute for the restart to complete and then refresh the screen. After the restart, verify that both the **Switch** and the **CTI link** are:
  - Talking: go to step 4.
  - Not talking: Contact your support organization.

4. From the Avaya Distributed Office Local Manager interface, click **System Summary** under **Maintenance and Monitoring**. The **System Summary** screen appears as shown in example Figure 5. Record the IP address of Distributed Office in the **IP Address** field and the system name in the **Name** field.
From a Windows command prompt on the application computer, execute the ping utility using the Distributed Office IP address that you just recorded from the System Summary screen.

Was ping successful?

- Yes: Continue to step 5.
- No: Resolve the network issues between the application computer and Distributed Office.

5. From the Windows Start menu on the application computer, click Start > All programs > Avaya AE Services > TSAPI Client > TSAPI Test. The TSAPI Test Application screen appears as shown in example Figure 6.
In the TSAPI Test Application screen, verify that AVAYA#LFS#CSTA#systemname (where systemname is the name of the Distributed Office system) appears in the Server field or is available in the drop-down list.

Note:
If you do not know the system name, click System Summary under Maintenance and Monitoring on the Avaya Distributed Office Local Manager interface. The System Summary screen appears as shown in example Figure 5. The system name displays in the Name field.

Does AVAYA#LFS#CSTA#systemname appear?

● Yes: Go to step 6.

● No: On the application computer, click Start > all programs > Avaya AE Services > TSAPI Client > Edit TSLIB.INI. The TSLIB.INI notepad appears as shown in Figure 7.
Is there a line in the **Telephony Servers** section containing the recorded IP address of Distributed Office with \( =450 \) on the end?

- Yes: Contact your support organization.

- No: Then add a line containing the IP address and \( =450 \) to the **TSLIB.INI** file under the **Telephony Servers** heading similar to the example in Figure 7. Save and close the **TSLIB.INI** file. Close the TSAPI Test Application. Repeat this procedure starting with step to verify that you successfully added the line to the **TSLIB.INI** file.

6. In the TSAPI Test Application, select the Distributed Office server from the drop-down list and enter a valid CTI User and password. In the **Make a Telephone Call** section, enter your telephone extension in the **From** field and enter another working extension number in the **To** field. Click **dial**. If the call was successful the following window appears:

---

**Figure 7: TSLIB.INI Notepad**

---

**Figure 8: TSAPI Test Application window**

---
Troubleshooting CTI problems

Did the call complete and the **TSAPI Test Application** window appear?

- Yes: Close the **TSAPI Test Application window** by clicking **OK** and go to step 7.
- No: Find the error message that you received in **Table 2** and follow the suggested resolution.

**Note:**

If you do not find the error in **Table 2**, contact your support organization.

**Table 2: TSAPI Test Application error messages**

<table>
<thead>
<tr>
<th>Error message</th>
<th>Meaning of Error Message</th>
<th>Resolution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expecting Open Stream Conf, Received ACS Failure Conf: Bad Login or Password (25)</td>
<td>This error indicates that the login or user you have entered is not a valid CTI User.</td>
<td>Verify that you entered the proper login or user name when you executed the TSAPI test and that it was properly administered on Distributed Office or the Active Directory Server.</td>
</tr>
<tr>
<td>Expecting Make Call Conf, received CSTA Failure Conf: invalid csta device identifier (12)</td>
<td>This error indicates that you have attempted to call from or to an invalid extension number.</td>
<td>Verify the extension numbers that you are using.</td>
</tr>
<tr>
<td>Expecting Make Call Conf, received CSTA Failure Conf: resource busy (33)</td>
<td>This error indicates that you have attempted to call from an extension that is already on an active call.</td>
<td>Clear the call from the extension and try again.</td>
</tr>
<tr>
<td>Expecting Make Call Conf, received CSTA Failure Conf: generic state incompatibility (21)</td>
<td>This error indicates that you have attempted to call from an extension that cannot go off hook to originate calls. It may be an analog phone or a phone administered without speakerphone capabilities.</td>
<td>Take the handset off the hook and wait for the dial tone to time-out and then try again.</td>
</tr>
</tbody>
</table>

7. From the application computer, click

   **Start > all programs > Avaya AE Services > TAPI Service Provider > TAPI Dialer.**

   The **TAPI Dialer** window appears as shown in example **Figure 9**.
Try different selections for the Select TAPI Line/Device number drop-down list until you find the TAPI Line with the TAPI Line Name of Avaya AES Line (see Figure 9 for an example). Did you find the line number with the TAPI Line Name of Avaya AES Line?

- Yes: Enter a known working local extension number other than your own in the Enter Phone Number to Dial box and click Dial.

  Did the call complete and the Hang Up button become active?

    - Yes: The Avaya TSP appears to be configured and functioning properly. If your application problem still exists, contact your third-party application vendor for assistance.
    - No: Go to step 8.

- No: Go to step 8.

8. From the Windows start menu, click Settings > Control Panel > Phone and Modem Options. Select the Advanced tab. The Advanced options tab displays as shown in example Figure 10.
Troubleshooting CTI problems

Figure 10: Phone and Modem Options window

Does the Avaya TSP appear on the list?

● Yes: Highlight the name and click **Configure**. The TSP Configuration window appears as shown in example Figure 11. Follow the instructions that appear after Figure 11.

● No: Click **Add**. If the Avaya TSP appears on the list, highlight it, click **Add** and proceed. If you are unable to add the provider, un-install and then re-install the Avaya TSP.

Can you add the provider?

- Yes: If the provider appears on the list, highlight the name and click **Configure**. The **TSP Configuration** window appears as shown in example Figure 11. Follow the instructions that appear after Figure 11.

- No: Call your support organization for help.
Verify that the:

- **Telephony Server** field contains `AVAYA#LFS#CSTA#systemname` (where `systemname` is the name of the Distributed Office system recorded earlier from the Avaya Distributed Office Local Manager *System Summary* screen).

- **CTI Username** and **Password** fields contain valid information.

- **My DN** field contains a phone extension that your TAPI-enabled application is attempting to control.

If the above settings are correct, reboot the application computer. After the reboot, repeat step 7 and attempt to make a call with the TAPI Dialer application.

Where you able to make a call using the TAPI Dialer application?

- **Yes**: The Avaya TSP appears to be configured and functioning properly. If your application problem still exists, contact your third party application vendor for assistance.

- **No**: Contact your support organization.
CTI TAPI-enabled applications respond slowly to TAPI requests

Use the following steps to troubleshoot a CTI TAPI-enabled application with slow response to TAPI requests:

1. Check the application computer hardware requirements against the minimum system requirements for the installed operating system, third party TAPI application, and the Avaya TSP.
   - Does the application computer meet the minimum hardware requirements?
     - Yes: Go to step 2.
     - No: Modify or replace the application computer to meet the minimum requirements.

2. Check the performance of the LAN between the application computer and Distributed Office.
   - Is the network performing acceptably?
     - Yes: Go to step 3.
     - No: Troubleshoot and correct LAN problems.

3. Use Windows Performance Monitor to check for excessive processor usage on the application computer.
   - Do you observe a sustained computer resource level of 70% or higher for more than five seconds?
     - Yes: Go to step 4.
     - No: Contact your support organization for assistance.

4. If you still have excessive processor usage, shut down the TAPI-enabled application. Using Windows Performance Monitor, check again for excessive processor usage on the application computer.
   - Do you still observe excessive computer resources being used without the TAPI-enabled application running?
     - Yes: The excessive usage appears to be related to something other than the application. Troubleshoot and eliminate the reason for the excessive processor usage.
     - No: Contact your third-party application vendor for assistance.
CTI TAPI-enabled applications exhibit a specific telephony feature failure

Use this section to troubleshoot a CTI TAPI-enabled application that is working but has a specific feature failure such as can’t transfer, can’t answer, etc.

1. Does the problem occur when you use the phone to manually perform the same function as the application?
   - Yes: The issue with the feature is not an application enablement problem. For information on Distributed Office troubleshooting, see *Maintenance and Troubleshooting for Avaya Distributed Office* (03-602039).
   - No: Go to step 2.

2. Does the TAPI-enabled application exhibit the same problem on other application computers in the office?
   - Yes: Go to step 3.
   - No: Contact your third-party application vendor for assistance.

3. Consult the list of tested TAPI-enabled applications and their known functional outages in Appendix A: Tested applications on page 45.
   Is the problem on the list?
   - Yes: The application functionality is not supported at this time.
   - No: Go to step 4.

4. Contact your third-party application vendor for assistance.
Troubleshooting CTI problems
Appendix A: Tested applications

Avaya Distributed Office application enablement has been tested and works with the applications listed in Table 3: Tested applications. This is not a complete list of supported applications, other applications may work with Distributed Office application enablement depending on which individual TAPI services and events are needed. See Appendix B: Supported TAPI Services and Events for guidance. Further information may be obtained from the DevConnect team.

Table 3: Tested applications

<table>
<thead>
<tr>
<th>Application</th>
<th>Versions</th>
<th>Observed Limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Act!</td>
<td>2006</td>
<td>Features not supported: Transfer, Conference.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Application does not detect existing calls on startup.</td>
</tr>
<tr>
<td>Act! with Act!Tapi.Net</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GoldMine</td>
<td>6.7</td>
<td></td>
</tr>
<tr>
<td>Goldmine with Tapi Link</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximizer</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>Microsoft Outlook</td>
<td>2000 and later</td>
<td></td>
</tr>
<tr>
<td>Microsoft Phone Dialer</td>
<td>1.5</td>
<td></td>
</tr>
</tbody>
</table>
Tested applications
Appendix B: Supported TAPI Services and Events

TAPI-enabled applications can invoke each of the TAPI 2.1 and 2.2 services shown in Table 4: Supported TAPI services.

Table 4: Supported TAPI services

<table>
<thead>
<tr>
<th>Service</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>tapiGetLocationInfo</td>
<td>This function returns the country code and city (area) code that the user has set in the current location parameters in the Telephony Control Panel. The application can use this information to assist the user in forming proper canonical telephone numbers, such as by offering these as defaults when new numbers are entered in a phone book entry or database record.</td>
</tr>
<tr>
<td>tapiRequestMakeCall</td>
<td>This function requests the establishment of a voice call. A call-manager application is responsible for establishing the call on behalf of the requesting application, which is then controlled by the user’s call-manager application.</td>
</tr>
<tr>
<td>lineAddProvider</td>
<td>This function installs a telephony service provider.</td>
</tr>
<tr>
<td>lineAddToConference</td>
<td>This function adds the call specified by the hConsultCall parameter to the conference call specified by the hConfCall parameter.</td>
</tr>
<tr>
<td>lineAnswer</td>
<td>This function answers the specified offering call.</td>
</tr>
<tr>
<td>lineBlindTransfer</td>
<td>This function performs a blind or single-step transfer of the specified call to the specified destination address.</td>
</tr>
<tr>
<td>lineClose</td>
<td>This function closes the specified open line device.</td>
</tr>
<tr>
<td>lineCompleteTransfer</td>
<td>This function completes the transfer of the specified call to the party connected in the consultation call.</td>
</tr>
<tr>
<td>lineDrop</td>
<td>This function drops or disconnects the specified call. The application has the option to specify user-to-user data to be transmitted as part of the call disconnect.</td>
</tr>
</tbody>
</table>

1 of 3
# Supported TAPI Services and Events

## Table 4: Supported TAPI services (continued)

<table>
<thead>
<tr>
<th>Service</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>lineForward</td>
<td>This function forwards calls destined for the specified address on the specified line, according to the specified forwarding instructions. When an originating address (dsAddressID) is forwarded, the specified incoming calls for that address are deflected to the other number by the switch. This function provides a combination of forward and do-not-disturb features. This function can also cancel forwarding currently in effect.</td>
</tr>
<tr>
<td>lineGetAddressCaps</td>
<td>This function queries the specified address on the specified line device to determine its telephony capabilities.</td>
</tr>
<tr>
<td>lineGetAddressStatus</td>
<td>This function allows an application to query the specified address for its current status.</td>
</tr>
<tr>
<td>lineGetCallInfo</td>
<td>This function enables an application to obtain fixed information about the specified call.</td>
</tr>
<tr>
<td>lineGetCallStatus</td>
<td>This function returns the current status of the specified call.</td>
</tr>
<tr>
<td>lineGetDevCaps</td>
<td>This function queries a specified line device to determine its telephony capabilities. The returned data is valid for all addresses on the line device.</td>
</tr>
<tr>
<td>LineGetID</td>
<td>This function returns a device identifier for the specified device class associated with the selected line, address, or call.</td>
</tr>
<tr>
<td>lineGetLineDevStatus</td>
<td>This function enables an application to query the specified open line device for its current status.</td>
</tr>
<tr>
<td>lineHold</td>
<td>This function places the specified call on hold.</td>
</tr>
<tr>
<td>lineInitializeEx</td>
<td>This function initializes the application’s use of TAPI for subsequent use of the line abstraction. It registers the application’s specified notification mechanism and returns the number of line devices available to the application. A line device is any device that provides an implementation for the line-prefixed functions in the Telephony API.</td>
</tr>
<tr>
<td>lineMakeCall</td>
<td>This function places a call on the specified line to the specified destination address. Optionally, call parameters can be specified if anything but default call setup parameters are requested.</td>
</tr>
</tbody>
</table>
Table 4: Supported TAPI services (continued)

<table>
<thead>
<tr>
<th>Service</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>lineNegotiateAPIVersion</td>
<td>This function enables an application to negotiate a TAPI version to use.</td>
</tr>
<tr>
<td>LineOpen</td>
<td>This function opens the line device specified by its device identifier and returns a line handle for the corresponding opened line device. This line handle is used in subsequent operations on the line device.</td>
</tr>
<tr>
<td>lineSetStatusMessages</td>
<td>This function enables an application to specify which notification messages the application wants to receive for events related to status changes for the specified line or any of its addresses.</td>
</tr>
<tr>
<td>lineSetupConference</td>
<td>This function sets up a conference call for the addition of the third party.</td>
</tr>
<tr>
<td>lineSetupTransfer</td>
<td>This function initiates a transfer of the call specified by the hCall parameter. It establishes a consultation call, lphConsultCall, on which the party can be dialed that can become the destination of the transfer. The application acquires owner privilege to the lphConsultCall parameter.</td>
</tr>
<tr>
<td>lineShutdown</td>
<td>This function shuts down the application’s usage of the line abstraction of the API.</td>
</tr>
<tr>
<td>lineSwapHold</td>
<td>This function swaps the specified active call with the specified call on consultation hold.</td>
</tr>
<tr>
<td>lineTranslateAddress</td>
<td>This function translates the specified address into a dialable string format.</td>
</tr>
<tr>
<td>lineUnhold</td>
<td>This function retrieves the specified held call.</td>
</tr>
</tbody>
</table>
TAPI-enabled applications can receive all the TAPI 2.1 and 2.2 events shown in Table 5: Supported TAPI Events with all data values populated.

**Table 5: Supported TAPI Events**

<table>
<thead>
<tr>
<th>Event</th>
<th>Description</th>
<th>Constants Provided</th>
</tr>
</thead>
<tbody>
<tr>
<td>LINE_CALLSTATE</td>
<td>Informs the application that the status of the specified call has changed. Typically, several such messages are received during the lifetime of a call. Also informs the application of new incoming calls in the offering state. The application can use <code>lineGetCallStatus</code> to retrieve more information about the current status of the call.</td>
<td>LINECALLSTATE_OFFERING&lt;br&gt;LINECALLSTATE_CONNECTED&lt;br&gt;LINECALLSTATE_DIALED&lt;br&gt;LINECALLSTATE_DIALTONE&lt;br&gt;LINECALLSTATE_DISCONNECTED&lt;br&gt;LINECALLSTATE_IDLE&lt;br&gt;LINECALLSTATE_PROCEEDING&lt;br&gt;LINECALLSTATE_RINGBACK&lt;br&gt;LINECALLSTATE_ONHOLD&lt;br&gt;LINECALLSTATE_BUSY&lt;br&gt;LINECALLSTATE_CONFERENCED</td>
</tr>
<tr>
<td>LINE_CLOSE</td>
<td>Informs the application that the specified line device has been forcibly closed. The line device handle or any call handles for call on the line are no longer valid.</td>
<td></td>
</tr>
<tr>
<td>LINE_CREATE</td>
<td>Informs the application of the creation of a new line device.</td>
<td></td>
</tr>
<tr>
<td>LINE_LINEDEVSTATE</td>
<td>Informs the application that the state of a line device has changed. The application can invoke <code>lineGetLineDevStatus</code> to learn the line's new status.</td>
<td>LINEDEVSTATE_CLOSE&lt;br&gt;LINEDEVSTATE_CONNECTED&lt;br&gt;LINEDEVSTATE_DISCONNECTED&lt;br&gt;LINEDEVSTATE_REINIT&lt;br&gt;LINEDEVSTATE_REMOVED&lt;br&gt;LINEDEVSTATE_RINGING</td>
</tr>
</tbody>
</table>

1 of 2
**Table 5: Supported TAPI Events (continued)**

<table>
<thead>
<tr>
<th>Event</th>
<th>Description</th>
<th>Constants Provided</th>
</tr>
</thead>
<tbody>
<tr>
<td>LINE_REMOVE</td>
<td>Informs the application that a line device has been removed (deleted) from the system. Generally, this is not used for temporary removals, such as extraction of PCMCIA devices, but for permanent removals in which the device would no longer be reported by the service provider if TAPI were re-initialized.</td>
<td></td>
</tr>
<tr>
<td>LINE_CALLINFO</td>
<td>The TAPI <code>LINE_CALLINFO</code> message is sent when the call information about the specified call has changed. The application can invoke <code>lineGetCallInfo</code> to determine the current call information. <code>CallerID</code> (originating party of an incoming call) and <code>CalledID</code> are available immediately after the call is offered to the application. Applications should not necessarily wait for the <code>LINE_CALLINFO</code> message before trying to retrieve this information.</td>
<td></td>
</tr>
<tr>
<td>LINE_REPLY</td>
<td>Informs the application about the results of function calls that were completed asynchronously.</td>
<td></td>
</tr>
</tbody>
</table>
# Glossary

<table>
<thead>
<tr>
<th>A</th>
<th>API</th>
<th>Application Programming Interface</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>application computer</td>
<td>For Distributed Office application enablement, the computer that runs the TAPI-enabled application and the Avaya Application Enablement Services TAPI Telephony Service Provider.</td>
</tr>
<tr>
<td>Avaya Application Enablement Services TAPI Telephony Service Provider</td>
<td>A complete set of Distributed Office CTI software components that expose Distributed Office CTI services to TAPI over the Avaya TSP interface. This software allows TAPI-enabled applications to run on an application computer connected to Distributed Office.</td>
<td></td>
</tr>
<tr>
<td>Avaya Distributed Office</td>
<td>See Distributed Office</td>
<td></td>
</tr>
<tr>
<td>Avaya Distributed Office application enablement</td>
<td>See Distributed Office application enablement</td>
<td></td>
</tr>
<tr>
<td>Avaya TSP</td>
<td>See Avaya Application Enablement Services TAPI Telephony Service Provider</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>C</th>
<th>CTI</th>
<th>Computer Telephony Integration</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CTI User</td>
<td>An external computer that connects to Distributed Office via a LAN to receive CTI services. Each CTI User provides a CTI User ID (or name) when connecting to Distributed Office, and this is used by Distributed Office to authenticate the &quot;identity&quot; of computers that attempt to establish CTI sessions.</td>
</tr>
</tbody>
</table>

<p>| D              | Distributed Office                                                   | A highly-distributed solution for branch offices that develops telephony and communications applications at a low cost. Distributed Office can be used in individual locations, as well as in corporate enterprises with up to 1000 satellite locations. |</p>
<table>
<thead>
<tr>
<th><strong>Contents</strong></th>
</tr>
</thead>
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<tr>
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</tr>
</tbody>
</table>
| **S** | **SIP** | Session Initiation Protocol.  
An application-layer control (signaling) protocol for creating, modifying, and terminating sessions with one or more participants. These sessions include Internet telephone calls, multimedia distribution, and multimedia conferences. |
| **T** | **TAPI** | Telephony Application Programming Language.  
A Microsoft-created API that enables computers running Microsoft Windows to use telephone services. |
| **TAPI Service Provider** | A driver that allows TAPI-enabled applications to communicate with different types of TAPI hardware. |
| **TSAPI** | Telephony Services Application Programming Language.  
An Avaya-proprietary API that integrates server-based telephony control with desktop or server applications on enterprise-wide networks. Although you may see references to TSAPI in some of the Distributed Office application enablement components, TSAPI is not a supported API for Distributed Office application enablement. |
| **TSP** | See [TAPI Service Provider](#) |
| **V** | **VoIP** | Voice over IP.  
A set of facilities that use the Internet Protocol (IP) to manage the delivery of voice information. In general, VoIP means to send voice information in digital form in discrete packets instead of in the traditional circuit-committed protocols of the public switched telephone network (PSTN). |
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