



## **Integrating CAD Into a Citrix MetaFrame Presentation Server or Microsoft Terminal Services Environment**

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## Revision History

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Revision Date	Description
20-Jun-06	First release.
07-Nov-06	Updated for CAD 7.1(2).
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# Integrating CAD Into a Citrix MetaFrame Presentation Server or Microsoft Terminal Services Environment

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## 1.0 Introduction

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The following versions of CAD support the running of Cisco Agent Desktop within a Citrix MetaFrame Presentation Server (“Citrix”) or Microsoft Server 2003 Terminal Services (“MTS”) environment:

<b>CAD Version</b>	<b>Cisco Unified Contact Center Version</b>
6.0(x)	Enterprise 6.0(1)
6.1(4)	Express 4.0(4)
6.2(x)	Express 4.5(x)
6.3(x)	Express 4.1(x)
6.4(x)	Express 5.0(x)
7.0(x)	Enterprise 7.0(x)
7.1(x)	Enterprise 7.1(x)
7.2(x)	Enterprise 7.2(x)

See “Supported Citrix and MTS Versions” on page 9 for more information.

Citrix and MTS permit the hosting of several client applications simultaneously. This hosted environment reduces the deployment and software maintenance burden on CAD administrators and corporate information technology teams.

This document is intended to guide an administrator through the installation and configuration of CAD in a Citrix or MTS environment.

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## 2.0 Important Note About CAD Deployment

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Cisco's CAD solution consists of a number of Cisco products. These products are thoroughly tested and documented to ensure that the solution has extremely high availability and can be supported easily and quickly.

Deploying platforms, configurations, or third party applications that are not explicitly identified in Cisco product documentation as supported will significantly impact the performance and capacity of the CAD solution. Using such non-standard components may contribute to extensive outages that could seriously impact your business and your customers. It will also greatly hinder the ability of the Cisco Technical Assistance Center (TAC) organization to diagnose and resolve issues, to the extent that resolution of issues may not be possible.

Cisco TAC will support Cisco products and documented third party applications and configurations that are part of your CAD deployment. However, Cisco TAC cannot and will not guarantee the overall stability of platforms that use non-supported components or configurations. Cisco TAC will not be able to assist in troubleshooting any problems that exist for the agent desktops on unsupported platforms or configurations. In addition, Cisco TAC may be unable to provide assistance of any type if initial analysis suggests that unsupported platforms might be contributing to the issue. In such cases, Cisco TAC will provide best effort support and will only be able to troubleshoot the supported applications and components of your CAD solution, and not the overall solution environment.

For these reasons, Cisco strongly recommends that the CAD solution be deployed in accordance with Cisco's published solution design guidelines. If you have questions about these guidelines or about supported CAD solution components, consult the hardware and software system specifications (bill of materials) and Cisco documentation set for your Cisco Unified CC Enterprise and Hosted Edition or Cisco Unified CC Express Edition solution.

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## 3.0 Limitations

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The following limitations apply to CAD integration with Citrix or MTS.

- Cisco Supervisor Desktop, Cisco Agent Desktop—Browser Edition, and Cisco Desktop Administrator are not supported in a Citrix or MTS environment.

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## Supported Platforms

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- Cisco Agent Desktop 6.0(x) media termination is not supported in a Citrix environment.
- True Update is disabled in a Citrix/MTS environment. Since only one copy of Cisco Agent Desktop is installed on the Citrix/MTS server, there is no need for it.
- The login ID and extension that appear in the login dialog box when Cisco Agent Desktop is started are those associated with the last login by *any* user, not necessarily the user who is currently logging in.
- Only one Citrix user name is supported per CAD application login.
- Desktop monitoring and recording are not supported. SPAN port-based monitoring and recording, however, are supported.
- Macros work only if they involve applications running on the Citrix/MTS server, and not those running on the client PC.

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### 4.0 Supported Platforms

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The following server platforms are supported:

- Windows Server 2000 SP4
- Windows Server 2003 SP1

The following client platforms are supported:

- Windows 2000 Professional SP4
- Windows XP Professional SP1 and SP2

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### 5.0 Supported Citrix and MTS Versions

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CAD can be run in the following Citrix and/or MTS environments.

MTS is always required when Citrix is installed. The MTS column in Table 1 represents the testing and support of CAD in an MTS-only environment, without the presence of Citrix.

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**TABLE 1.**

Supported Citrix and MTS versions

CAD	Cisco Unified CC	Citrix/MTS	MTS Only
6.0(x)	Enterprise 6.0(x)	Citrix 3.0 2000 Server	—

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## Supported Citrix ICA Clients

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**TABLE 1.**

Supported Citrix and MTS versions

CAD	Cisco Unified CC	Citrix/MTS	MTS Only
6.1(4)	Express 4.0(4)	Citrix 4.0 2000 Server 2003 Server	2003 Server
6.2(x)	Express 4.5(x)	Citrix 4.0 2000 Server 2003 Server	2003 Server
6.3(x)	Express 4.1(x)	Citrix 4.0 2000 Server 2003 Server	2003 Server
6.4(x)	Express 5.0(x)	Citrix 4.0 2000 Server 2003 Server	2003 Server
7.0(x)	Enterprise 7.0(x)	Citrix 4.0 2000 Server 2003 Server	2003 Server
7.1(x)	Enterprise 7.1(x)	Citrix 4.0 2000 Server 2003 Server	2003 Server
7.2(x)	Enterprise 7.2(x)	Citrix 4.0 2000 Server 2003 Server	2003 Server

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## 6.0 Supported Citrix ICA Clients

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CAD clients published in a Citrix MetaFrame Presentation Server can be accessed using the following Citrix Independent Computing Architecture (ICA) clients:

- ICA Win32 Program Neighborhood
- ICA Win32 Program Neighborhood Agent

**NOTE:** Citrix Web Client is not supported at this time.

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## 7.0 Configuration

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The configuration shown in Figure 1 is supported.

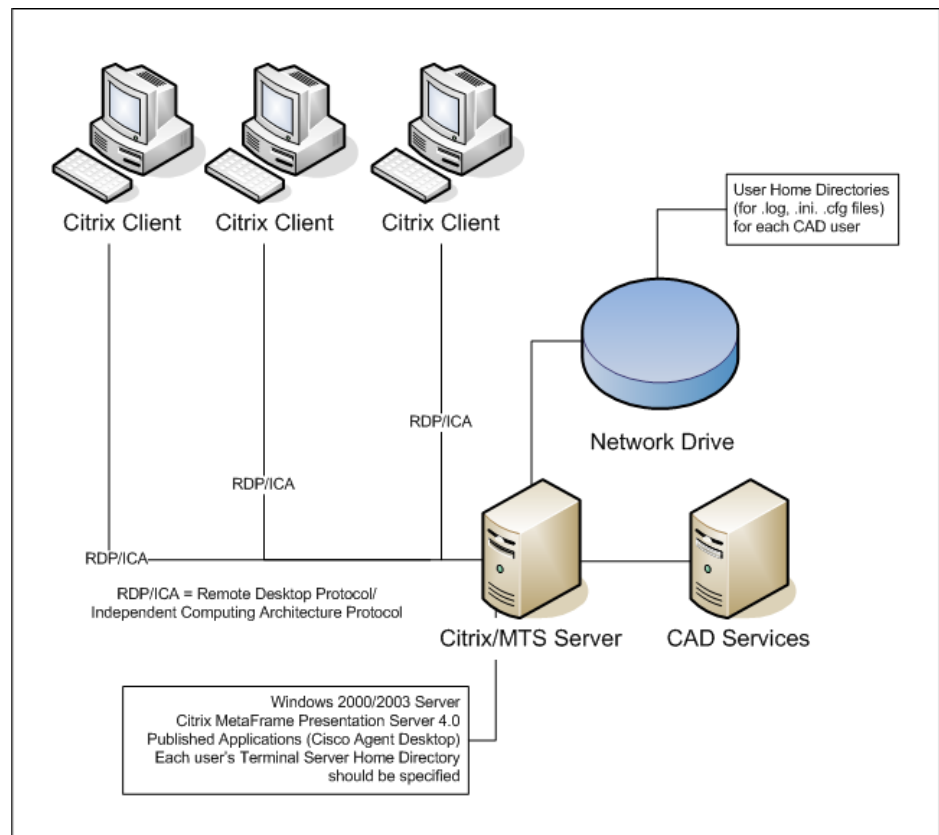
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**NOTE:** Designing your Microsoft Terminal Services implementation should be done in consultation with a Microsoft Certified Engineer. In particular, the guidance of such a professional is essential to determine how many agents can be accommodated on an MTS suite. Citrix users should obtain the services of a Citrix Certified Administrator to provide similar deployment assistance.

CAD can be run in mixed mode—that is, a configuration in which some agents use Cisco Agent Desktop on Citrix/MTS and some agents use Cisco Agent Desktop on a PC, with both agent setups pointing to the same CAD services.

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**FIGURE 1.** Configuration of CAD in a Citrix/MTS environment.



## 8.0 Installing and Configuring CAD in a Citrix 3.0 Environment

### 8.1 Installing CAD

Install CAD according to the procedures in the *Cisco CAD Installation Guide*.

- Install the CAD services, Cisco Desktop Administrator, and Cisco Supervisor Desktop on the appropriate servers and desktops.
- Install Cisco Agent Desktop on the Citrix server.

## 8.2 Modifying Citrix Server Registry Settings

Make the following registry modification on each Citrix server where Cisco Agent Desktop is installed.

1. Access the Windows registry editor on the Citrix server.
2. In the Registry Editor, create a new registry key:  
HKEY\_LOCAL\_MACHINE\SOFTWARE\Spanlink\Chat Server API\Setup
3. Under the Setup key, create a DWORD value named **OmniOrbUsePort** and set the value data to **0** (zero).

## 9.0 Installing and Configuring CAD in a Citrix 4.0 Environment

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The process of installing and configuring CAD for use with a Citrix environment involves the following procedures:

- Creating users
- Installing CAD
- Publishing Cisco Agent Desktop in the Citrix server
- Configuring a Citrix ICA connection between the Citrix server and client desktops

### 9.1 Creating Users

Configure your user properties and group memberships as defined in the Citrix and operating system vendor documentation.

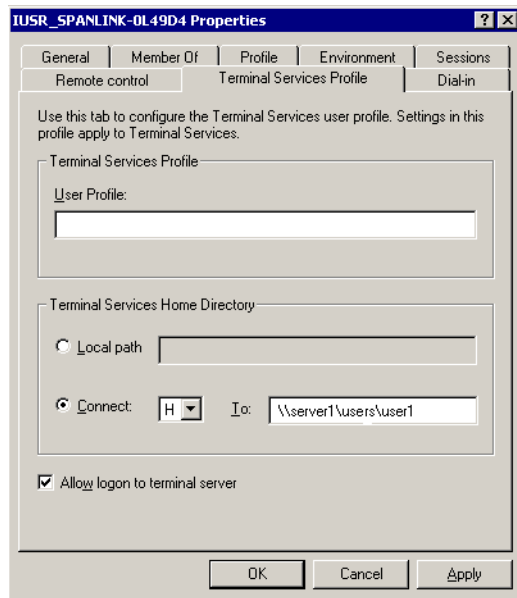
CAD requires user-specific home folder mappings so that logs and configuration files for each user can be created and modified as needed. Configure the home folder properties so that the user is connected to the home folder on a network server. This network server must not be the Citrix server.

For example, in a Microsoft computing environment, the Terminal Services Profile tab of the User Properties dialog box (see Figure 2) must contain this drive mapping:

```
\\servername\sharename\%username%
```

CAD automatically creates subfolders “log” and “config” in this location.

FIGURE 2. User Properties dialog box.



## 9.2 Installing CAD

Install CAD according to the procedures in the *Cisco CAD Installation Guide*.

- Install Cisco Agent Desktop on the Citrix server
- Install the CAD services, Cisco Desktop Administrator, and Cisco Supervisor Desktop on the appropriate servers and desktops

**NOTE:** In a Cisco Unified CC Express environment, the CAD services are installed with CRS and a separate installation is not necessary.

**NOTE:** CAD for Cisco Unified CC Express must be installed on the C drive of the Citrix server. If no C drive exists, you must map a drive to C. This mapping can be removed after the installation is completed.

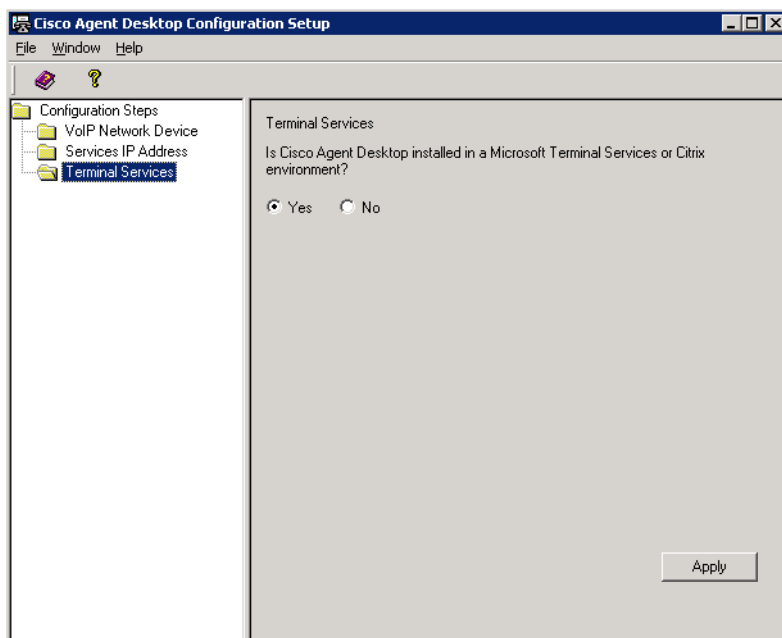
### 9.2.1 Enabling CAD to Run in a Citrix/Terminal Services Environment

CAD must be enabled to run in a Citrix or Terminal Service environment. This is done in the CAD Configuration Setup utility, which runs automatically as part of the CAD installation process. To run CAD Configuration Setup after installation, double-click **PostInstall.exe** located in the ... \Cisco\Desktop\bin folder on the Citrix/MTS server.

On the Terminal Services window in CAD Configuration Setup, click **Yes** to enable CAD to run in a Citrix or Terminal Services environment (see Figure 3).

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**FIGURE 3.** Terminal Services window in the CAD Configuration Setup utility



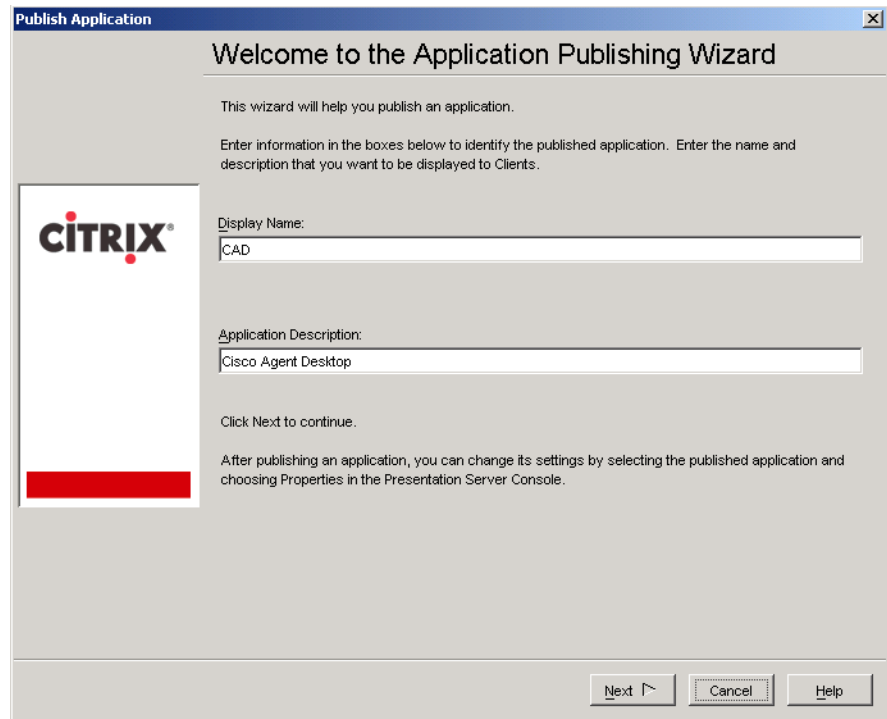
### 9.3 Publishing CAD Clients in the Citrix MetaFrame Presentation Server

To publish the applications in Citrix, perform the following steps.

1. Launch the Management Console for MetaFrame Presentation Server.
2. From the tree on the left, under the farm on which you want to publish the CAD clients, select **Applications**.
3. From the menu bar, choose **Actions > New > Published Application**. The application publishing wizard appears.

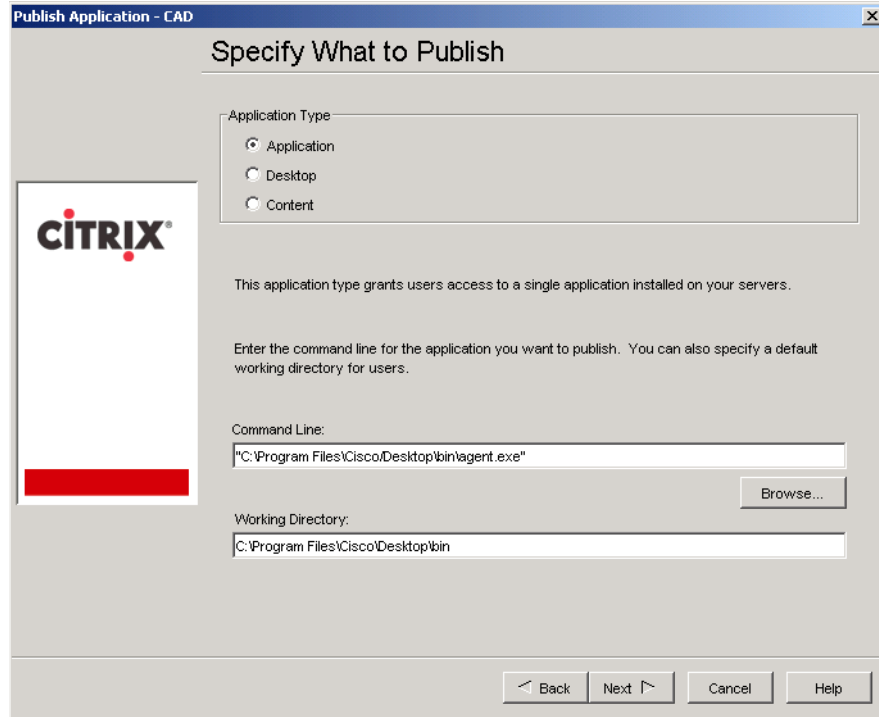
FIGURE 4.

Application Publishing wizard main window.



4. Enter a user-friendly display name and a clear description.
5. Click **Next**. The Specify What to Publish window appears.

**FIGURE 5.** Application Publishing wizard: Specify What to Publish window.

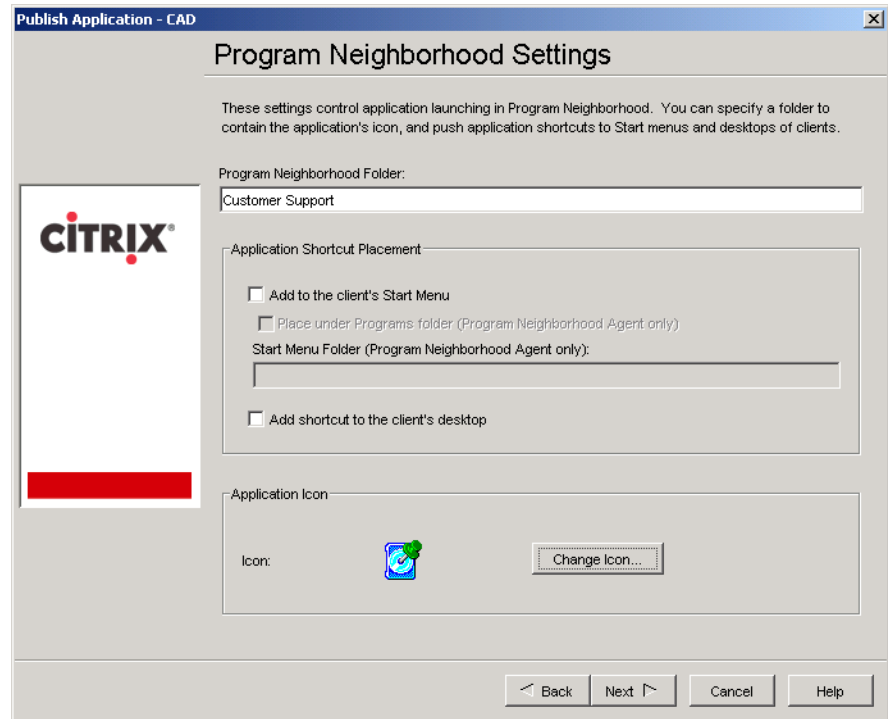


Specify the following information:

- For **Application Type**, select Application.
  - For **Command Line** and **Working Directory**, specify the full path and working directory of the CAD client you are publishing.
6. Click **Next**. The Program Neighborhood Settings window appears.

FIGURE 6.

Application Publishing wizard: Program Neighborhood Settings window.



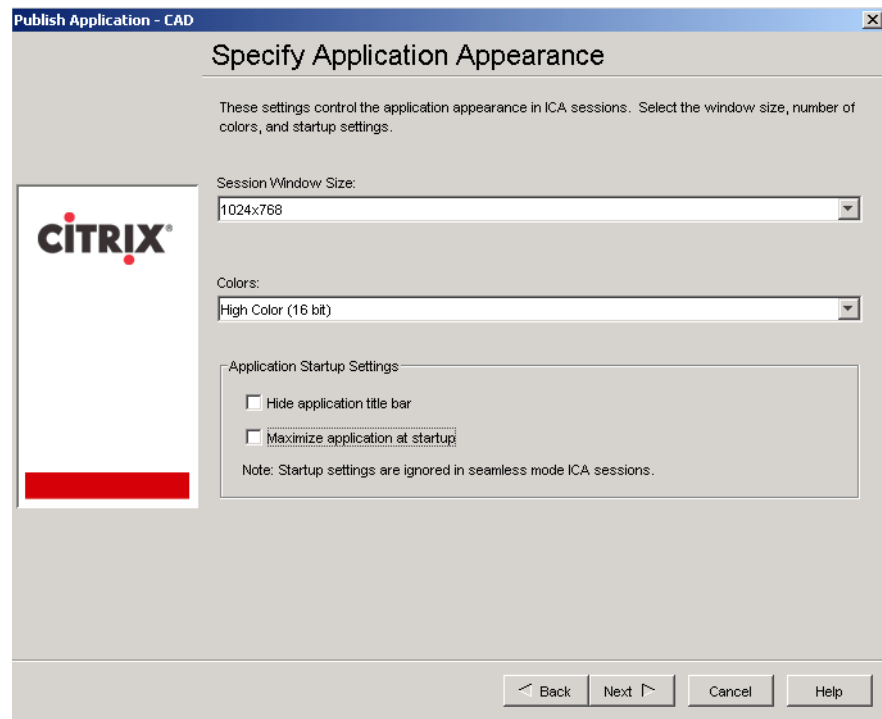
Specify the name of a Program Neighborhood folder that will contain the application icon.

Optionally, specify the following additional information:

- An application shortcut to the client Start menu
- A shortcut to the client desktop
- An application icon

7. Click **Next**. The Specify Application Appearance window appears.

**FIGURE 7.** Application Publishing wizard: Specify Application Appearance window.

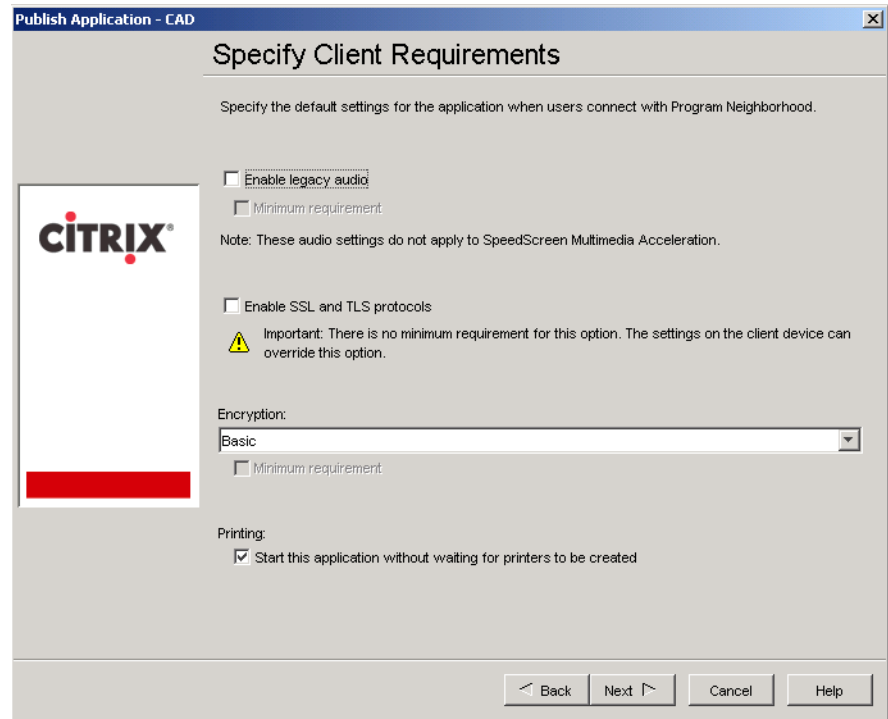


Specify a 1024 × 768 resolution session window size and high color (16 bit) depth. Uncheck all check boxes in the Application Startup Settings group.

**NOTE:** If a lower resolution is required for accessibility purposes, resolutions as low as 800 × 600 are supported.

8. Click **Next**. The Specify Client Requirements window appears.

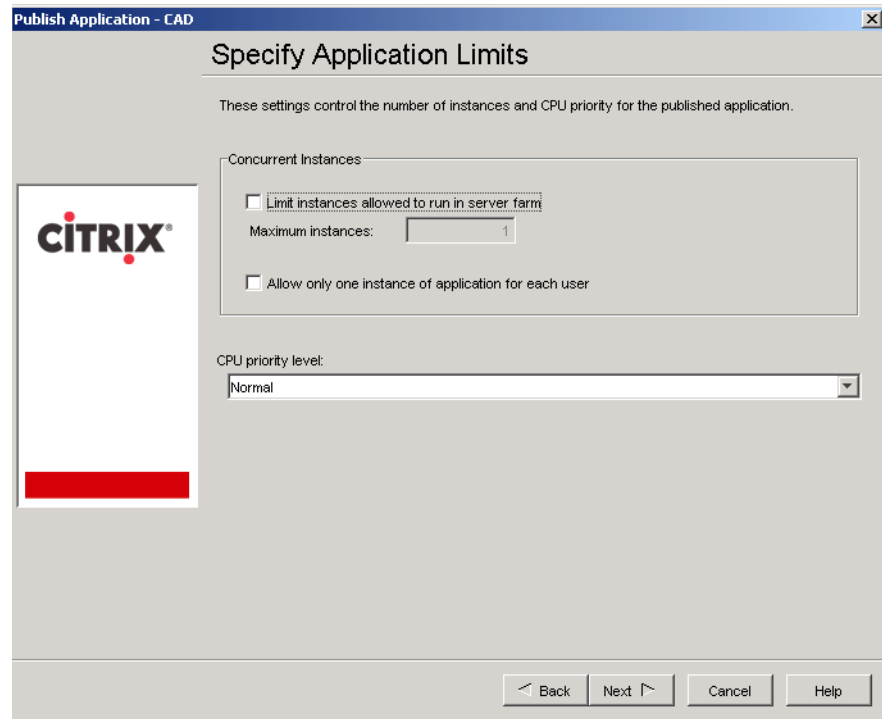
**FIGURE 8.** Application Publishing wizard: Specify Client Requirements window.



Remove the check from the **Enable Legacy Audio** box. If your site security policies require that your ICA client connection be secure, check the **SSL and TLS Protocols** check box (see the *Citrix MetaFrame Presentation Server Administrator's Guide* for more information). Ensure that the **Printing** check box is checked.

9. Click **Next**. The Specify Application Limits window appears.

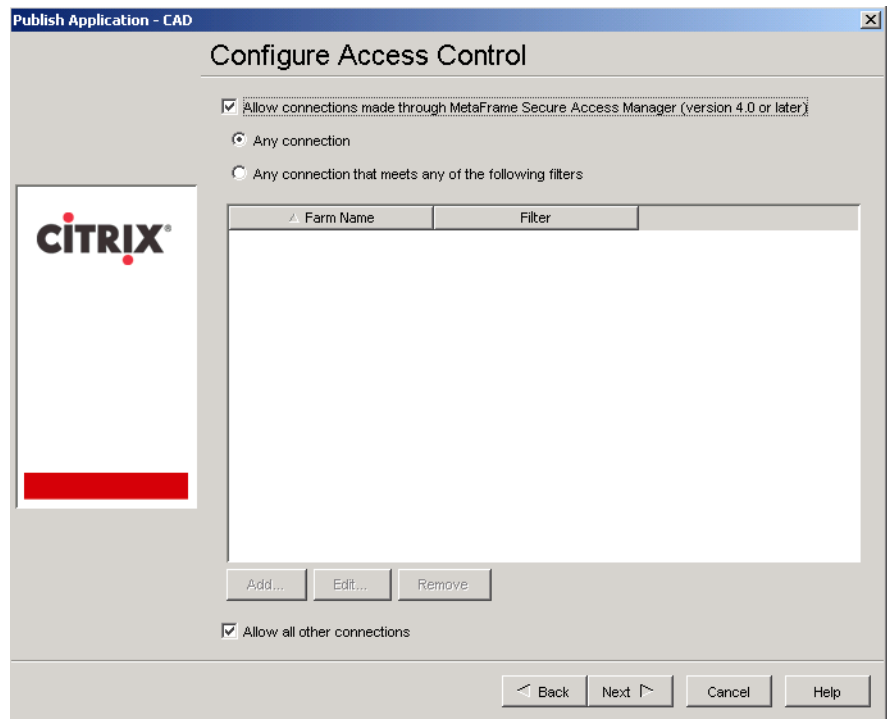
**FIGURE 9.** Application Publishing wizard: Specify Application Limits window.



Accept all defaults in this window.

10. Click **Next**. The Configure Access Control window appears.

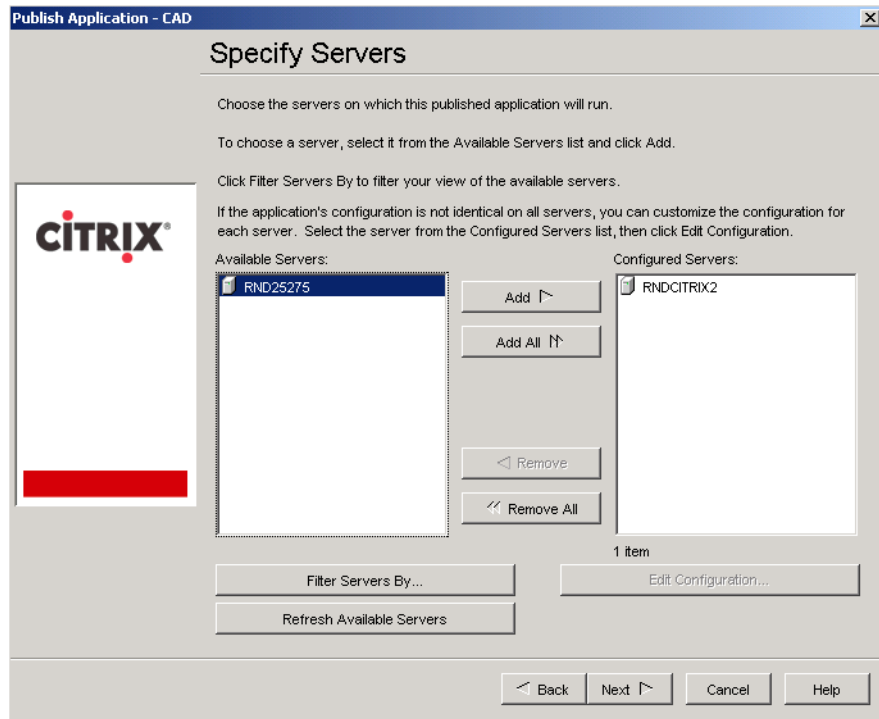
**FIGURE 10.** Application Publishing wizard: Configure Access Control window.



Accept the defaults unless your site security policies require different settings.

11. Click **Next**. The Specify Servers window appears.

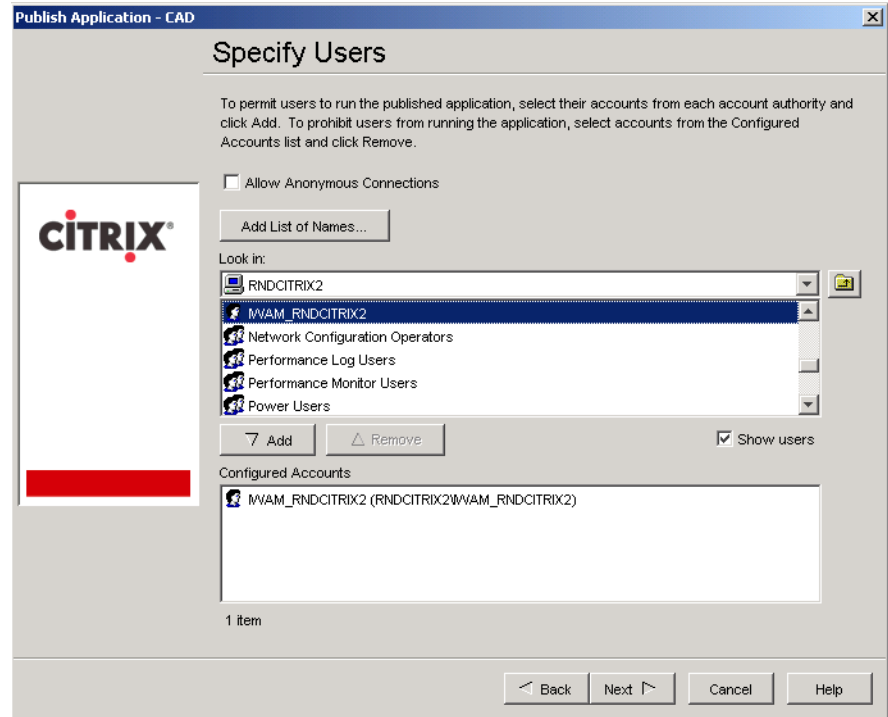
**FIGURE 11.** Application Publishing wizard: Specify Servers window.



Specify the Citrix server(s) on which the CAD applications will run.

12. Click **Next**. The Specify Users window appears.

FIGURE 12. Application Publishing wizard: Specify Users window.



Check the **Show Users** check box, select the users who will be allowed to run the CAD client, and then add them to **Configured Accounts**.

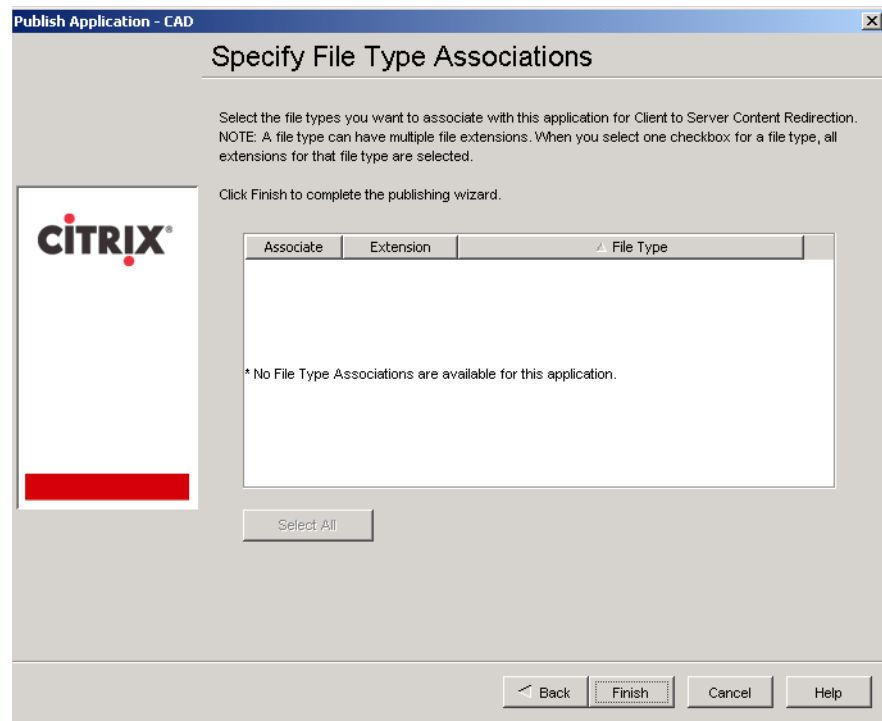
**NOTE:** You may wish to set up a Windows user group specifically for Citrix users, and add all agents who will be using CAD in a Citrix environment to that user group.

**NOTE:** Ensure that the **Allow Anonymous Connections** check box is *not* checked. If it is checked, incorrect environmental variables will be set and Cisco Agent Desktop will not be able to run.

13. Click **Next**. The Specify File Type Associations window appears.

FIGURE 13.

Application Publishing wizard: Specify File Type Associations window.



There are no file type associations available for the application, so no action is needed.

14. Click **Finish**.

## 9.4 Configuring a Citrix ICA Connection

Perform the following steps to create ICA connections for the user to run the applications.

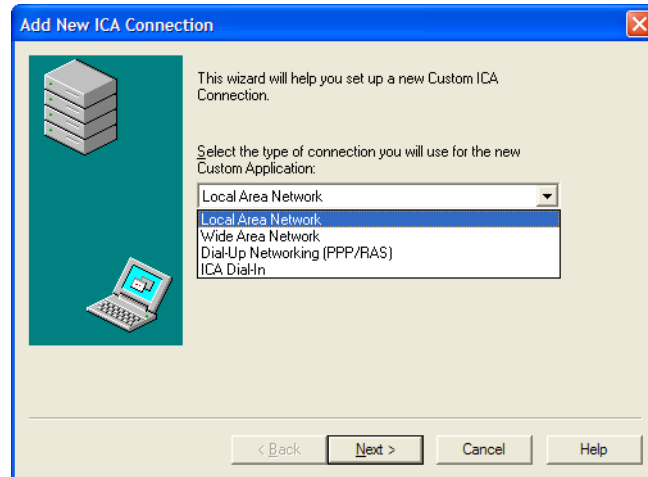
### 9.4.1 Using the Citrix Program Neighborhood Client

1. On the Citrix server, launch Citrix Program Neighborhood. Double-click the **Custom ICA Connections** icon. The Custom ICA Connections window appears.

**NOTE:** Citrix Program Neighborhood may open without the Custom ICA Connections icon visible. You may need to navigate up or down levels to find the icon.

2. Double-click the **Add ICA Connection** icon. The Add New ICA Connection wizard appears.

**FIGURE 14.** Add New ICA Connection wizard: main window.

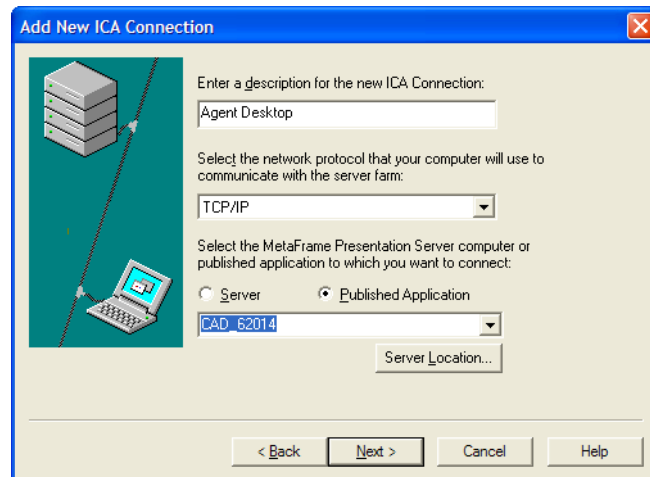


3. From the pull-down list, select either **Local Area Network** or **Wide Area Network**.

**NOTE:** Low-bandwidth connections such as dial-up or ICA dial-in are not capable of supporting the CAD client real-time telephony events, and therefore are not supported.

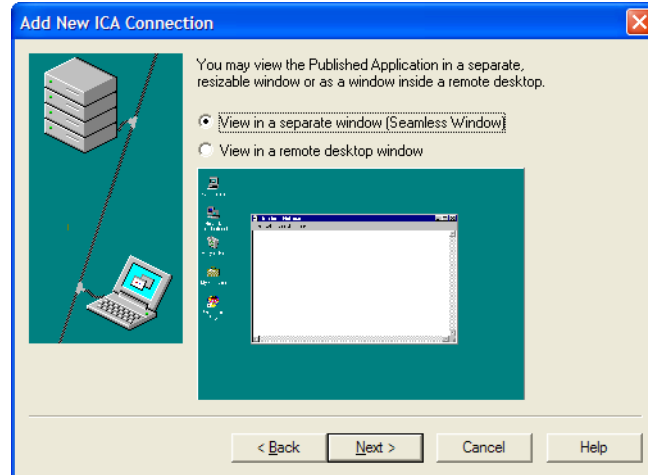
4. Click **Next** to advance to the next window.

FIGURE 15. Add New ICA Connection wizard: window 2.



5. Specify a user-friendly description for the new ICA connection.
6. If your site security policies require a secure connection between the Citrix server and your ICA client host computer, select **SSL/TLS + HTTPS** for the network protocol. Otherwise, select **TCP/IP**. (See the *Citrix MetaFrame Presentation Server Administrator's Guide* for more information on these choices.)
7. Select the **Published Application** radio button and choose the application from the pull-down list.
8. Click **Next** to advance to the next window.

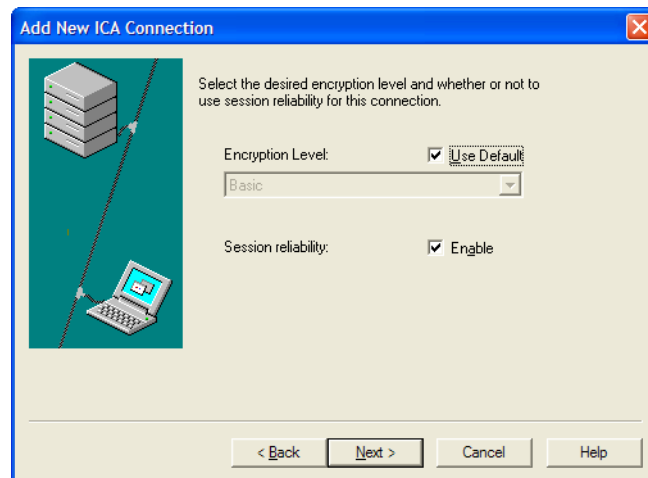
FIGURE 16. Add New ICA Connection wizard: window 3.



9. Select the type of window used to display the published CAD client. If you choose Seamless Window, the CAD client will run using its standard user interface as if the application were running on the agent's desktop. If you chose Remote Window Desktop, the CAD client user interface will be contained within the Citrix Desktop window.
10. Click **Next** to advance to the next window.

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FIGURE 17. Add New ICA Connection wizard: window 4.



11. If you do not require a secure connection, use the default encryption. Otherwise, select the level that applies to your environment.

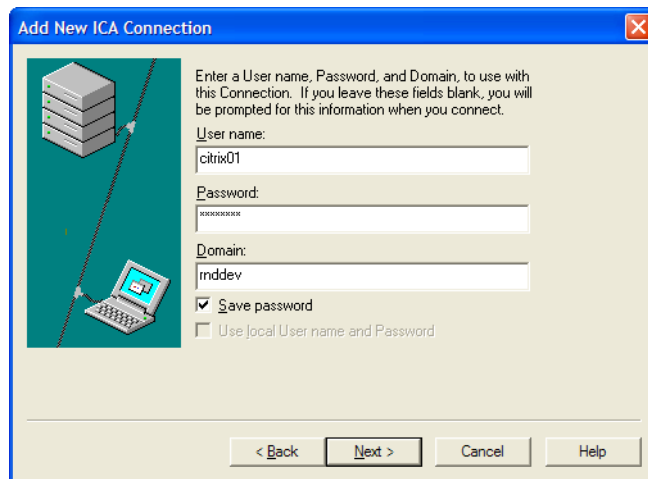
**NOTE:** Be careful in selecting the encryption level, as this can affect both the latency and response time of any published application. Work in conjunction with your Citrix configuration and network administrators to choose the appropriate level that will ensure both optimal performance and security for your application.

12. Ensure that the **Session Reliability Enable** check box is checked. Disabling this feature affects the failover capabilities of the Citrix ICA client and results in loss of connectivity with the Citrix server. In addition, manual reset and logout of the dangling ICA session in the Citrix server may be required.
13. Click **Next** to advance to the next window.

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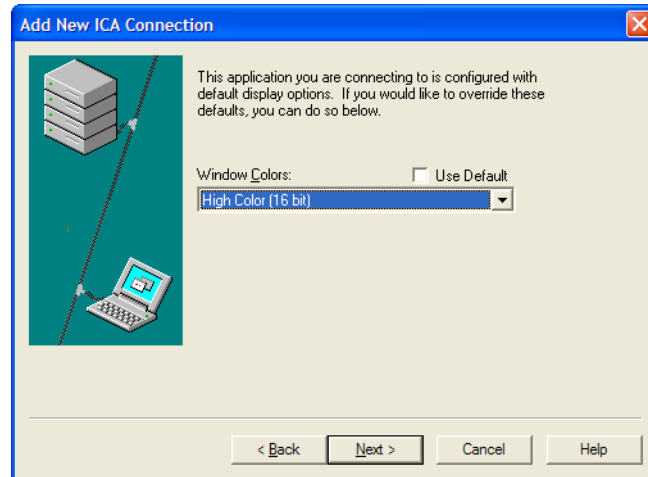
**FIGURE 18.**

Add New ICA Connection wizard: window 5.



14. Specify the login information that will be associated with the connection. This is the Windows login information associated with the contact center agent in the Windows domain on which the Citrix server resides.
15. Click **Next** to advance to the next window.

FIGURE 19. Add New ICA Connection wizard: window 6.



16. Choose any of the color depths in the pull-down list except 16 Colors.
17. Click **Next**, and then click **Finish**. An icon for the newly-created connection appears in the Citrix Program Neighborhood window.

#### 9.4.2 Using the Citrix Program Neighborhood Agent

1. Using the Program Neighborhood Agent Site in the Access Suite Console, configure the authentication methods according to your site security policies.
2. Configure the following session options:
  - In the Client Session Sizes window, uncheck the **640 × 480** check box. If you define a custom window size (resolution) it must not be lower than 800 × 600.
  - In the Client Resources window, uncheck the **16** color depth option, and uncheck all audio options.
  - In the Manage Server Settings window, uncheck the **Allow user to customize the server URL** check box.
3. Install the Citrix Program Neighborhood Agent software at each agent desktop and configure the URL to the server running the Program Neighborhood Agent Site, usually:

`http://<Citrix server web interface IP address>/Citrix/PNAgent/config.xml`

For more detailed information about how to configure Program Neighborhood Agent, see the *Client for 32-bit Windows Administrator's Guide* at:

<http://support.citrix.com/docs>

## 10.0 Installing and Configuring CAD in an MTS Environment

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The process of installing and configuring CAD for use with an MTS environment involves the following procedures:

- Enabling Microsoft Terminal Services on the Windows server
- Creating users
- Installing CAD
- Installing the Microsoft Terminal Services client on the client PC (if that platform is Windows 2000 Professional)

### 10.1 Enabling Microsoft Terminal Services

The following two services should be enabled on the Windows server:

- Terminal Services
- Terminal Services Licensing

Refer to your Microsoft documentation for Windows Server 2000 or 2003 Terminal Services for instructions.

### 10.2 Creating Users

Configure your user properties and group memberships as defined in the MTS and operating system vendor documentation.

CAD requires user-specific home folder mappings so that logs and configuration files for each user can be created and modified as needed. Configure the home folder properties so that the user is connected to the home folder on a network server. This network server must not be the MTS server.

For example, in a Microsoft computing environment, the Terminal Services Profile tab of the User Properties dialog box (see Figure 2) must contain this drive mapping:

```
\\servername\sharename\%username%
```

CAD automatically creates subfolders “log” and “config” in this location.

### 10.3 Installing CAD

Install the CAD services, Cisco Desktop Administrator, and Cisco Supervisor Desktop on the appropriate servers and desktops, and Cisco Agent Desktop on the MTS server, following the procedures in the *Cisco CAD Installation Guide*.

**NOTE:** When running the CAD Configuration Setup utility, be sure to click **Yes** when asked if CAD will be running in a Citrix or Terminal Services environment.

#### **10.4 Installing Microsoft Terminal Services on the Client PC**

Agents will use the Microsoft Terminal Services client (Remote Desktop Connection) to connect with the instance of Cisco Agent Desktop running on the MTS server.

If the agent's PC uses Windows XP Professional, the client is already installed.

If the agent's PC uses Windows 2000 Professional, the client must be installed. It is available on the Windows 2000 Professional installation CD, or from the Microsoft website.

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### **11.0 Troubleshooting**

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#### **11.1 Troubleshooting Check List**

Follow this check list when investigating a CAD/Citrix/MTS problem.

1. Document the steps that reproduce the problem.
2. Document the call flow that led to the problem.
3. Set the appropriate trace mask.
4. Test the problem. Does the problem repeat:
  - while using a hard phone?
  - while using CAD on a standalone workstation?
  - while using CAD to log in at the Citrix host console?
5. Ensure that the client configuration is set up in accordance with the documentation.
6. Ensure that the ICA Publishing settings are configured in accordance with the documentation.
7. Collect the ICA client logs (if you are using Neighborhood Programs).
8. Collect all relevant logs: Cisco Unified CC Express, Cisco Unified CC Enterprise, CAD or CTI OS, and CallManager.

## 11.2 Problems and Solutions

### 11.2.1 No Citrix Licenses Available at CAD Login

When a user attempts to log into Cisco Agent Desktop, the user receives the error message that there are no Citrix licenses available.

**Solution.** If a user makes two connections, one through ICA and one through Microsoft Remote Desktop Connection, two concurrent Citrix licenses are consumed. The user must log out of one of the connections to free up a license.

More information on this issue is available in the Citrix 4.0 release notes (see “Microsoft Remote Desktop Connections Consume Licenses”) and article CTX104605 in the Citrix Knowledge Base ([www.knowledgebase.citrix.com](http://www.knowledgebase.citrix.com)).

### 11.2.2 Unable to Locate CAD Logs for Individual Users

The CAD logs for an individual user cannot be located.

**Solution.** You must map a network share home drive for each agent in order to have logs for individual CAD users. See Section 9.1 on page 12 for more information.

### 11.2.3 Agents Disappear from CSD Tree Control

Agents are displayed one at a time in the Cisco Supervisor Desktop’s tree control. For instance, Agent A appears in the tree control when logging in, and then when Agent B logs in, Agent A disappears. Only one agent can be seen at a time.

**Solution.** The CAD Configuration Setup utility (`postinstall.exe`) has not been run on the Citrix server where Cisco Agent Desktop is installed.

Run CAD Configuration Setup by double-clicking **PostInstall.exe** (located at `...\\Cisco\\Desktop\\bin`) on the Citrix server.

In CAD Configuration Setup, select **Terminal Services** in the navigation tree and make sure that **Yes** is selected in the right pane.

See the *Cisco CAD Installation Guide* for more information on using CAD Configuration Setup.

### 11.2.4 Only One Agent at a Time Able to Log Into CAD

Only one agent can log into Cisco Agent Desktop at a time. The only way another agent can log in is to forcibly log the first agent out.

**Solution.** Terminal Services has not been enabled in the CAD Configuration Setup utility during CAD installation. This must be done in order to allow multiple logins to Cisco Agent Desktop in a Citrix/MTS environment.

Run CAD Configuration Setup by double-clicking **PostInstall.exe** (located at ...\\Cisco\Desktop\\bin) on the Citrix server.

In CAD Configuration Setup, select **Terminal Services** in the navigation tree and make sure that **Yes** is selected in the right pane.

See the *Cisco CAD Installation Guide* for more information on using CAD Configuration Setup.

#### 11.2.5 Agent's Login Persists in Terminal Services

An agent using CAD with Terminal Services logs out, closes Cisco Agent Desktop, and then later attempts to log back in. The agent receives the message, "Cisco Agent Desktop is already running for Terminal Services user '<agent's user name>'. Only one instance per user is allowed."

**Solution.** The OS variable SESSIONNAME was not updated when the agent logged out. If this variable is set to RDP-<session number> or ICA-<session number>, the system looks at the HOMESHARE variable for the agent's home directory, where that agent's logs and configuration files are stored. If the SESSIONNAME variable is not cleared, then Terminal Services sees the agent as logged in. This can happen if the agent does not log off of Terminal Services cleanly after logging out of CAD. To log out cleanly, the agent must select **Log Out** from the Terminal Services dialog box drop-down list and then click **OK**.

#### 11.2.6 Unable to Install CAD Express on a Citrix Server

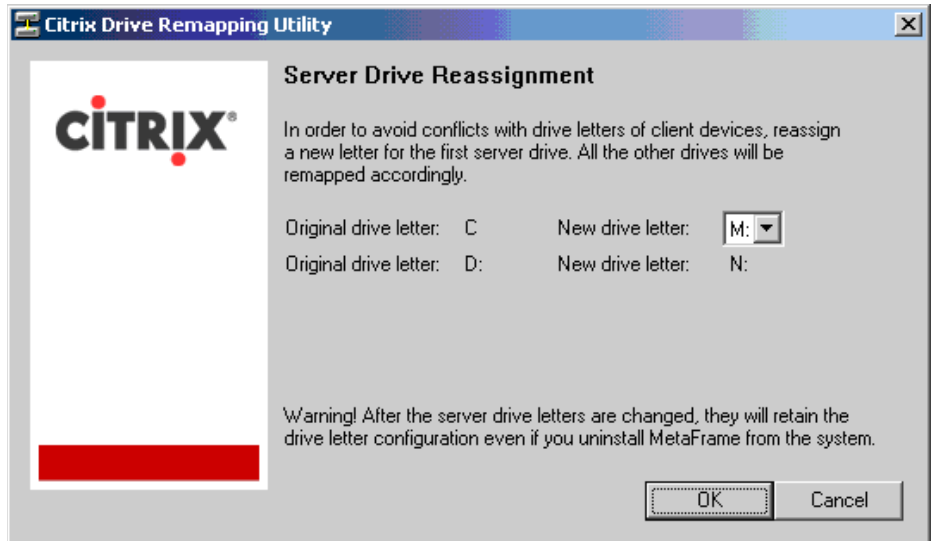
When attempting to install CAD for Cisco Unified CC Express on a Citrix server, errors are received.

**Solution.** By default, CAD for Cisco Unified CC Express is installed on the C drive. However, when Citrix was installed and configured, no C drive was designated. To correct the problem, map a C drive on the Citrix server and then install CAD.

#### 11.2.7 CAD Express Uninstall Not Complete

CAD for Cisco Unified CC Express could not be completely uninstalled from the Citrix/MTS server using the Windows Add or Remove Programs utility.

**Solution.** Citrix recommends that you reassign server drive letters to avoid conflicts with the drive letters on client devices. This reassignment is done using the Citrix Drive Remapping Utility.



The uninstall program for CAD versions for Cisco Unified CC Express looks for a C drive as the location where Cisco Agent Desktop was installed, despite it having been installed on another drive. As a result, the uninstall does not completely remove all files. This occurs only in CAD versions for Cisco Unified CC Express.

To prevent this from happening, make sure the Citrix server creates a C drive on installation. Otherwise, CAD can be manually uninstalled. See the *Cisco CAD Service Information* manual for the procedure.