SA Citrix Virtual Desktop Infrastructure (VDI)
Configuration Guide
This document covers steps to configure Citrix VDI on Pulse Secure’s SA Series SSL VPN platforms. It also covers brief overview of XenDesktop components which are essential for understanding the process work flow through SA and for SA configuration/troubleshooting.

Note: This document is not intended to be a Citrix Xen Desktop implementation guide. If you are planning to deploy XenDesktop in your environment then please refer to product documentations available on vendor’s website.

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Xendesktop Overview

Citrix XenDesktop is a desktop virtualization system that delivers client virtual desktops as a service to users.

Citrix XenDesktop Components

The components you need to have in place for a working XenDesktop farm are:

- Delivery controller component (DDC).
- Farm data store. This is where it stores configuration information and administrator account information.
- Citrix Licensing. By default, this is installed when you install Desktop Delivery Controller, but you can choose to use a separate server for licensing.
- Management consoles are used to create and manage desktop groups. It will get installed on DDC by default and can be installed manually on other machine for remote management.
- Active directory. DDC requires that all computers in a farm should belong to same domain or of mutually trusting domains in a forest.
- VMs or physical machine hosting the desktops.
- Endpoint devices running the Citrix client (Desktop Receiver) to access desktops.

Citrix XenDesktop architecture can be broken down into three major components:

1. **Desktop Receiver**
   The Citrix client installed on the end-point allows connections to the virtual desktop using the Citrix ICA protocol.

2. **Virtual Desktop Agent(VDA)**
   Virtual Desktop Agent is desktop-side components of XenDesktop. It consists of following components:
   - **XD Agent service** on VM is used to communicate with DDC on port 8080 (default).
   - VDA provides the PortICA, XTE services and PortICA drivers which are required for endpoint to communicate with the VM on ICA (1494) or CGP (2598).
- **Desktop Delivery Controller** (XenDesktop Server)
  DDC delivers and control access to desktops. Following are the core components of DDC:

- **MFCOM/IMAProxy** uses DCOM & Windows Communication Foundation (WCF) to communicate with the Access Management Console (AMC).

- **Pool Manager** makes DDC capable of selecting VM from the Desktop Group and assigning it to user. It has plugins due to which DDC works with XenServer, VMware etc.

- **XML Svc-DDC** uses this service to communicate with Web Interface.

- **Controller service** - It is use to query Active Directory for user authentication and then set up connection to the VM.

- **IMA service** - DDC uses this service to communicate with other servers in Farm e.g. License server, additional DDCs and Data Store.
SA VDI CONFIGURATION

SA version used/tested: 6.5R1
Below configuration is supported from SA release 6.5Rx onwards

Configuring Citrix DDC resource profile

- Click on Users>Resource Profiles>Virtual Desktops
- Click on New Profile and choose Citrix Xendesktop
- Type the name the Profile, Description
- Type in the IP address of the Xendesktop
- Under the credentials you can either type in the credential manually or use the variables
- Click on ‘Save Changes’

Under the ‘Roles’ choose the role you want to map to this resource profile and click on ‘Save Changes’
• Click on the Bookmark Tab to configure the XenDesktop

• Under Desktops section you can either choose All Desktops or the ‘Subsets of selected Desktops’

• You can either use the manual credentials or variable password for SSO

• Under Settings>Screen Size you can either choose Full Screen or a specific window size

• Choose Allow USB Redirection or Multimedia Redirection (MMR) if you want to have USB redirection or Multimedia redirection

• Finally select the roles you want to map to this profile and click on ‘Save Changes’
Citrix client configuration

- Click on Configuration>Virtual Desktops>Citrix to choose the View Client Delivery Method
- You can either choose to download the view client from the Citrix web page or manually upload the Citrix client agent to the IVE by clicking on browser

Citrix XenDesktop Server Connection Timeout

This value is the timeout used for the XML RPC connection between SA and the XenDesktop Server. All the XML RPC calls made by the SA including the call for retrieval of VM list, use this timeout before returning with the error "Unable to connect to any of the servers".
VIRTUAL DESKTOP CONNECTION PROCESS
(Through IVE)
<table>
<thead>
<tr>
<th>Step</th>
<th>Source</th>
<th>Destination</th>
<th>Port</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>End-point</td>
<td>SA Device</td>
<td>443</td>
<td>User Selects a bookmark representing a virtual desktop</td>
</tr>
<tr>
<td>2</td>
<td>SA Device</td>
<td>Web Interface</td>
<td>80</td>
<td>The bookmark selection information is sent to Web Interface for processing</td>
</tr>
<tr>
<td>3</td>
<td>Web Interface</td>
<td>XML &amp; IMA Service (DDC)</td>
<td>80</td>
<td>Web Interface sends the request to the XML Service then to IMA Service.</td>
</tr>
<tr>
<td>4</td>
<td>XML Service (DDC)</td>
<td>Data Collector</td>
<td>IMA:2512</td>
<td>The request is forwarded to the Data Collector for processing.</td>
</tr>
<tr>
<td>5</td>
<td>IMA Service (Data Collector)</td>
<td>Controller Service via IMA Service (DDC)</td>
<td>IMA:2512</td>
<td>The data collector will check if the user currently has a virtual desktop (In disconnected, connecting or active state). Once a virtual desktop is recognized, the data collector requests the controller to prepare the virtual desktop.</td>
</tr>
<tr>
<td>6</td>
<td>Controller Service (DDC)</td>
<td>Virtual Desktop Service (Virtual Desktop)</td>
<td>8080</td>
<td>The controller sends the request to VM to start (DDC) listening on ICA (1494) &amp; CGP (2598) ports for incoming session.</td>
</tr>
<tr>
<td>7</td>
<td>Controller Service (DDC)</td>
<td>IMA Service (Data Collector)</td>
<td>IMA:2512</td>
<td>Controller forwards the virtual desktop connection information to the data collector through IMA.</td>
</tr>
<tr>
<td>8</td>
<td>XML Service (Data Collector)</td>
<td>Web Interface</td>
<td>80</td>
<td>The data collector forwards the virtual desktop connection information onto Web Interface via the XML broker.</td>
</tr>
<tr>
<td>9</td>
<td>Web Interface</td>
<td>SA Device</td>
<td>443</td>
<td>Web Interface creates an ICA file for the virtual desktop and forwards it to SA device.</td>
</tr>
<tr>
<td>10</td>
<td>SA Device</td>
<td>End-Point</td>
<td>443</td>
<td>SA Device forwards the ICA file to the end-point.</td>
</tr>
<tr>
<td>11</td>
<td>End-Point</td>
<td>SA Device</td>
<td>File Type Association</td>
<td>The end-point receives the ICA and executes it and connection request is sent to IVE.</td>
</tr>
<tr>
<td>12</td>
<td>SA Device</td>
<td>Virtual Desktop</td>
<td>ICA or CGP</td>
<td>SA Device proxies the launch request between the end-point and virtual desktop.</td>
</tr>
<tr>
<td>13</td>
<td>Virtual Desktop</td>
<td>Controller Service (DDC)</td>
<td>8080</td>
<td>Virtual Desktop sends user’s logon information to the controller for validation.</td>
</tr>
<tr>
<td>14</td>
<td>Controller Service</td>
<td>License Server</td>
<td>27000</td>
<td>The Controller Validates the credentials and checks policies for the virtual desktop. Controller contact License server to check the license.</td>
</tr>
<tr>
<td>15</td>
<td>Controller Service (DDC)</td>
<td>Virtual Desktop</td>
<td>8080</td>
<td>Once credentials and license are validated, then License and policy are sent to the virtual desktop for processing.</td>
</tr>
<tr>
<td>16</td>
<td>Virtual Desktop</td>
<td>Active Directory</td>
<td>LDAP</td>
<td>Once controller approved the connection, the virtual desktop sends credentials to logon against Active Directory.</td>
</tr>
</tbody>
</table>
Connection Process (DebugLog)

IVE reading Citrix bookmark

IVE fetching user credentials, client type etc details

IVE sending request to DDC to get VM details

IVE received VM details
Sample DebugLog (Not Working)

User launching VM "XenSrv-XP"

Making connection to VM after name resolution

Connection Established successfully

Sample DebugLog (Not Working)

Sample DebugLog (Not Working)
TROUBLESHOOTING

Things to Check:

• Check if the desktop is accessible going directly via XenDesktop.
• Check the user access logs; it should give you information about whether or not a desktop was successfully assigned to the user from a pool.
• On DDC, check if the user has access to the particular desktop that he is trying to use.

LOGS

IVE LOGS

• Event & User Access Logs
• TCP DUMP
• Debug Log with events “VDI,CitrixApps” at log level 20
• DebugLog(client) after enabling “Virtual Desktops” on IVE under client logs
CITRIX XENDESKTOP INSTALLTION

***DISCLAIMER***: Below setup and screenshots is based on our lab test environment. Only purpose of below content is for understanding purpose. For more details on Xendesktop, please refer vendor documentation.
XenDesktop 4.0 System requirement

Operating systems:

- Microsoft Windows Server 2003 SP2 or R2 (x86 and x64)

Note: We cannot install DDC on a domain controller.

- Terminal Services running in application mode.
- Java Runtime Environment (JRE) Version 1.5.0_15.
- Microsoft Internet Information Services (IIS) Version 6.0 and ASP.NET.

Disk space requirements:

- 400 MB for Desktop Delivery Controller
- 30 MB for the licensing components

Configuring Active Directory

Before we start DDC installation, you need to create and configure the Active Directory Organizational Unit (OU) for the farm.
DDC INSTALLATION

1. Attach the Desktop Delivery Controller ISO or insert Installation CD.
2. On Welcome page, select Install Server Components.
3. Select **I accept the license agreement**, then click **Next**.
4. On the **Select Components** page, make sure all the check boxes are selected.

If Citrix Licensing server is running or if you are planning on different server, deselect the Citrix Licensing check box. Click Next.
5. On the **Create or Join a Farm page**, select **Create new farm** and give name for the farm, then click **Next**.
6. On **Specify Farm Edition** page, select the XenDesktop edition, and click **Next**.

On the **Optional Server Configuration** page, you can select “Using an existing database server” if you want to use a separate database server, if we don’t select this option DDC will create Access database for the farm locally.
On the **Start Installation** page, click **Next**.
Start Installation

Click Next to start the installation.

Note that a restart may be required near the end of the installation, but installation will continue automatically when you log on again.

Please wait while components are installed...

- Prerequisites
  - Citrix Web Interface
  - Citrix License Server
  - Citrix Desktop Delivery Controller
  - Citrix Management Consoles
  - Citrix Diagnostics Facility

Component: Microsoft .NET Framework 3.5
Action: Adding to system
**Note:** Before installation finishes, you will be prompted to restart your server. You must login with same user to complete the installation.

On the **Setup complete** page, make sure that “Configure an Active Directory OU now” check box is selected, and click Finish

1. On the first page of the Active Directory Configuration Wizard, click “Add Local Machine” and then click **Next**.
2. Browse and select the OU (created on DC for DDC), and then click **Next**.
3. Click **Finish**.
The License Management Console opens in different window and you can install licenses after configuring Active Directory.

**Starting the Access Management Console (AMC)**

The first time when you start AMC console, the **Configure and Run Discovery wizard** starts automatically.

**To configure and run discovery**

1. Click **Next** on **Welcome** page.
2. On the **Select Products or Components** page, make sure “Configuration tools” and “Desktop delivery controller” is selected and then click **Next**.
3. On the Select Controllers page, click on Add Local Computer and then click Next.
4. Once discovery completed, make sure that there is no error message, then click **Finish**.
4. Once discovery completed, make sure that there is no error message, then click **Finish**.
CITRIX VIRTUAL DESKTOP AGENT INSTALLATION

Installing the Virtual Desktop Agent

1. Log on to the computer with user which has administrative privileges.
2. Insert the Desktop Delivery Controller installation media.
3. On the Welcome page, click Install Virtual Desktop Components and then click Next.
5. Select **I accept the license agreement**, and click **Next**.
6. On the **Port Number** page, leave default value “8080” and click next. Delivery controller uses this port to communicate with desktops.

Note: If you want to use port other than default port, you can use any value of range 1 to 65535.
Select “Automatically configure Windows firewall” check box to create firewall exceptions, then click Next.
CITRIX DESKTOP DELIVERY CONTROLLER CONFIGURATION

XenDesktop Configuration

1. Login with an account which has full privileges on Desktop Delivery Controller.
2. In the Access Management Console, select Desktop Groups.
3. Right click on Desktop group and select Create desktop group.
4. Click Next.
5. On the **Assignment Type** page, select desktops type **Pooled** or **Assigned** and then click **Next**.
6. On the **Hosting Infrastructure** page, select the hosting infrastructure from the dropped down menu for your desktops. Click **Next**.

Hosting infrastructure can be:

1. **Citrix Xen VM Infrastructure**: Select this option if VMs are hosted on XenServer

2. **VMware Virtualization**: Select this option if VMs are hosted on VMware

3. **None**: Select this option to add virtual machine manually.
7. If you select 1 or 2 option in previous step then on the Logon Information page, specify the address and user name & password for the server on which you are hosting VMs. Click Next.
8. For pooled or assign-on-first-use desktop groups, the **Virtual Desktops** page appears, prompting you to select the VMs. For pre-assigned groups, the **Virtual Desktops and Users** page appears, prompting you to both select VMs and assign users to them.

You can add information by:

- Selecting VMs from the hosting infrastructure by clicking on Add from the list that appears. If this VM list is not available then add the AD computer account manually.
- Importing data from a file.
9. In **Users** page, add the user groups that for which you want give access, and then click **Next**

Note: If no user group is added, then desktop group will be disabled.
10. On the Desktop Group Name page, type the name and description (optional) for the group and click Next.
11. On the **Icon** page, will show current icon for this desktop group. If you want different icon then click **Change Icon** and select a new icon. Click **Next**.
11. On the **Icon** page, will show current icon for this desktop group. If you want different icon then click **Change Icon** and select a new icon. Click **Next**.

12. On the **Publishing Options** page, Click **Finish**

   - If you do not want the desktop group to be available to users immediately, select the Disable desktop group initially checkbox.

   - To configure advanced options, select the **Configure advanced desktop settings now** check box.
Desktop States

- Not Registered
- Idle
- In Use