Getting Started with Citrix® Provisioning Services 7.0

Chapter No. 1
"Introduction to Citrix® Provisioning Services 7.0"

Puthiyavan Udayakumar
In this package, you will find:

A Biography of the author of the book

A preview chapter from the book, Chapter NO.1 "Introduction to Citrix® Provisioning Services 7.0"

A synopsis of the book’s content

Information on where to buy this book

About the Author

Puthiyavan Udayakumar has more than six years of IT experience with expertise in Citrix, VMware, Microsoft products, and Apache CloudStack. He has extensive experience in designing and implementing virtualization solutions using various Citrix products, VMware Products, and Microsoft products. He is an IBM certified Solution Architect and Citrix certified Enterprise Engineer along with more than 15 certifications in infrastructure products. He is the author of the book, Getting Started with Citrix® CloudPortal™. He holds a master's degree in Science with a specialization in System Software from Birla Institute of Technology and Science, Pilani, a bachelor's degree in Engineering through SKR Engineering College from Anna University, and National award from the Indian Society for Technical Education. He presented various research papers in more than 15 national and international conferences including IADIS (held in Dublin, Ireland) followed by the IEEE pattern.

I would like to dedicate this book to my beloved mom, Dr.K. Mangayarkarasi, dad, Dr.P.Udayakumar, brother, Mr.Kathiravan, and to his family.

Big thanks to Packt Publishing to get this book published!

For More Information:

www.packtpub.com/getting-started-with-citrix-provisioning-services-7-0/book
Citrix® Provisioning Services fulfills the need of virtual disk streaming over networks. The product allows virtual disks to be provisioned and reprovisioned in real time from a single shared disk image or from a dedicated disk. The product also aids to avoid the necessity to manage and patch discrete systems. Instead, all image management is through the master image, and this results in a reduction of power usage, system failure rates, and security risks.

Citrix® Provisioning Services shrinks the total cost of ownership and improves both manageability and business agility, along with the cost over operational expenditure. The attractiveness of this particular product is that a single read-only image can be concurrently streamed to compound diskless targets, both physical and virtual.

Getting Started with Citrix® Provisioning Services 7.0 will accompany a Citrix® Provisioning Services administrator looking to understand Citrix® Provisioning features, architecture, terminology used, installation and configuration, operating and managing farm, store, sites, views, and Citrix® Provisioning Server.

With Getting Started with Citrix® Provisioning Services 7.0, you will learn about the concepts and administration of the Citrix® Provisioning Server.

What This Book Covers

Chapter 1, Introduction to Citrix® Provisioning Services 7.0, explains how to get started with Citrix® Provisioning Services, product overview, essentials of products, features fulfilling the real-world needs, the logical flow and technical architecture of the product, and the terminology and system requirement to install provisioning services.

Chapter 2, Installing and Configuring Citrix® Provisioning Services 7.0, covers installation and configuration of Citrix® Provisioning Services, Citrix® Provisioning Services Console using graphical user interface and using a command-line interface.

Chapter 3, Managing Citrix® Provisioning Disk, explains about organizing a (master) principal target device aimed at imaging, constructing a vDisk image, creating a vDisk, allocating vDisk to the target disk, followed by dealing with bootstrap files and booting devices.

For More Information:
www.packtpub.com/getting-started-with-citrix-provisioning-services-7-0/book
Chapter 4, *Operating Citrix® Provisioning Services 7.0*, covers managing and operating farms, sites, stores, target devices, target device collection, Provisioning Server, view, and creating a vDisk.

Chapter 5, *Upgrading Citrix® Provisioning Farm and vDisk*, explains about requirements, mandate action to upgrade Citrix® Provisioning Services, upgrading vDisk, and a list reference article that helps in basic troubleshooting for administrators/engineers.

For More Information:  
www.packtpub.com/getting-started-with-citrix-provisioning-services-7-0/book
Introduction to Citrix®
Provisioning Services 7.0

Thank you for picking up Getting Started with Citrix® Provisioning Services 7.0. As you are reading this book, you have most likely heard about the virtual disk streaming solution from the Citrix system. In this chapter, we will thoroughly get acquainted with the topic, right from getting started with Citrix’s provisioning service, features, and functionality, to terminology and system requirements for Citrix Provisioning Services 7.0.

In this chapter, we will cover:

• A background of Citrix Provisioning Services 7.0
• Architecture of Citrix Provisioning Services 7.0
• Terminology used in Citrix Provisioning Services
• System Requirements of Citrix Provisioning Services

The background of Citrix® Provisioning Services 7.0

Citrix Systems acquired the company Ardence based out of Virginia Beach, U.S. Ardence developed a product called Provisioning Services, which is now Citrix Provisioning Service (PVS). Its primary functionality is to provision the disk via the software-streaming technology. The product aims to fulfill the needs of the administrator in provisioning and re-provisioning systems from a single shared-disk image. It can potentially completely eliminate the need of managing and patching individual servers and desktops. Instead, all the image and patch management is done on the single master image and replicated across the system.

For More Information:
www.packtpub.com/getting-started-with-citrix-provisioning-services-7-0/book
The single master image will be called vDisk. The master image is configured, managed, and delivered from a centralized datacenter and consequently makes Citrix Provisioning Service increase security and flexibility and enables uncompromised user experiences.

Citrix Provisioning Services address the major problems of the IT business, such as operational expenditure (opex) and capital expenditure (Cpex), along with the time spent on managing distributed servers, desktops, laptops, or kiosk-based devices. Usually, even the operational cost (opex) is higher than the server and system procurement cost. In order to overcome this major problem, Citrix came up with an out-of-the-box solution, transforming the existing IT relationship between hardware and the software that runs on the hardware, which also enables the organization to reduce the need for managing multiple disks even with the rapid growth of servers and desktops as well as providing the high efficiency of centralized distributed management.

Citrix Provisioning Service brings in higher benefits to server pool administrators and desktop pool administrators. For server pool administrators in the current trending IT infrastructure management, a majority of the servers are in need of unique patch compliances, but doing so is highly challenging in terms of technical and triple-factor constraints (Cost, Time, and Quality). To overcome this constraint, Provisioning Services’ patch management for servers and desktops becomes highly reliable and secure. Patching is done on a single image, and it is streamed across systems on bootup. For desktop administrators, Citrix Provisioning Service helps in reducing the effort and cost involved in managing both the physical and virtual desktops. Provisioning helps to reduce storage cost (90 percent) to a huge extent for a desktop virtualization solution.

Citrix Provisioning Service comes in two different editions, which are Provisioning Services for datacenters and Provisioning Services for desktops.

In this book, we will be dealing with Citrix Provisioning Services 7.0. A lot of the known issues of the previous release have been fixed. To know the list of issues fixed, please refer to http://support.citrix.com/product/provsrv/pvsv7.0/topic/fixedissue.

**High-level logical flow of Citrix® Provisioning Services**

Citrix Provisioning Service can be used to convert the existing static deployment to dynamic deployment. vDisks are streamed to diskless desktops and servers on demand and not physically installed.

For More Information:
www.packtpub.com/getting-started-with-citrix-provisioning-services-7-0/book
A high-level logical streaming flow with a three-step process is illustrated in the following figure:

- **Virtualize it** means to create a master image with a desktop OS and applications
- **Store it** means to store the virtual image on a network storage device
- **Stream it** implies stream on demand from datacenters to diskless servers and desktops

Having understood this logical flow, let us move to the technical flow of Citrix Provisioning Services as illustrated in the following screenshot:

1. On-demand desktops and servers send a request for a vDisk to the provisioning server.
2. Citrix Provisioning Server sends a boot file back to the desktops and servers upon successful communication.

3. Based on the boot file configuration (desktops and servers boots) with respect to the configuration file, the vDisk is located and mounted on the Citrix Provisioning Server.

The application and the disk are streamed to the desktops and servers. It appears to the users like a real hard disk attached to the desktops and servers (target device). With an understanding of the technical flow of Citrix Provisioning Services, now let us look at the ports used in communication with the network in the following table:

<table>
<thead>
<tr>
<th>Component</th>
<th>Protocol</th>
<th>Port series</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provisioning server</td>
<td>UDP</td>
<td>6890 – 6909</td>
<td>Used for inter-server communication (Post 6.0 Version)</td>
</tr>
<tr>
<td></td>
<td>UDP</td>
<td>6905 – 6909</td>
<td>Used for inter-server communication (Pre 6.0 Version)</td>
</tr>
<tr>
<td></td>
<td>UDP</td>
<td>6910</td>
<td>Used for the desktop and server (target device) to logon to PVS</td>
</tr>
<tr>
<td></td>
<td>UDP</td>
<td>6910 – 6930</td>
<td>Used for vDisk streaming</td>
</tr>
<tr>
<td></td>
<td>UDP</td>
<td>6969</td>
<td>Used for boot from ISO/USB, in a short, two-stage boot (BDM)</td>
</tr>
<tr>
<td></td>
<td>TCP</td>
<td>54321</td>
<td>SOAP service</td>
</tr>
<tr>
<td></td>
<td>TCP</td>
<td>54321</td>
<td>SOAP service</td>
</tr>
<tr>
<td>Domain controller</td>
<td>TCP</td>
<td>389</td>
<td>Communication between target device and Active Directory</td>
</tr>
<tr>
<td>Microsoft SQL server</td>
<td>TCP</td>
<td>1433</td>
<td>Communication between PVS infrastructure and the SQL DB system</td>
</tr>
<tr>
<td>DHCP server [Broadcast]</td>
<td>UDP</td>
<td>67</td>
<td>Communication between PVS infrastructure and the DHCP system</td>
</tr>
<tr>
<td>PXE service [Broadcast]</td>
<td>UDP</td>
<td>67/4011</td>
<td>Used for bootstrap name in case of DHCP option 66</td>
</tr>
<tr>
<td>TFTP server</td>
<td>TCP</td>
<td>69</td>
<td>Used for bootstrap delivery</td>
</tr>
</tbody>
</table>

For More Information:
www.packtpub.com/getting-started-with-citrix-provisioning-services-7-0/book
Architecture of Citrix® Provisioning Services 7.0

Citrix Provisioning Services is designed to connect to administrative roles within a Citrix Provisioning Services farm. A Citrix Provisioning Services administrator role is to govern the components an administrator can manage or view in the Citrix Provisioning Console. There are several components that make up a Citrix Provisioning Services farm.

The following diagram provides a high-level view of the basic Provisioning Services infrastructure and clarifies how Provisioning Services components might appear within the datacenter post installation and implementation:

For More Information:
www.packtpub.com/getting-started-with-citrix-provisioning-services-7-0/book
Provisioning Service License server

The License Server either should be installed within the shared infrastructure or an existing Citrix license server can be selected. However, we have to ensure the Provisioning Service license is configured in your existing Citrix Enterprise License servers.

A License Server can be selected when the Provisioning Service Configuration Wizard is run on a planned server. All Provisioning Servers within the farm must be able to communicate with the License Server.

Provisioning Service Database server

The database stores all system configuration settings that exist within a farm. Only one database can exist within a provisioning service farm. We can choose an existing SQL Server database or install an SQL Server in cluster for High Availability from a redundancy business continuities perspective.

The Database server can be selected when the Provisioning Service Configuration Wizard runs on a planned server. All Provisioning Servers within the farm must be able to communicate with the Database server, and only one database can exist within a Provisioning Service farm.

Provisioning Service Admin Console

Citrix Provisioning Service Admin Console is a tool that is used to control your Provisioning Services implementation. After logging on to the console, we can select the farm that we want to connect to. Our role determines what we can look at in the console and operate in the Provisioning Service farm.

Shared storage service

Citrix Provisioning Service requires shared storage for vDisks that are accessible by all of the users in a network. They are intended for file storage and allowing simultaneous access by multiple users without the need to replicate files to their machines' vDisk.

The supported shared storages are SAN, NAS, iSCSI, and CIFS.

For More Information:
www.packtpub.com/getting-started-with-citrix-provisioning-services-7-0/book
Active Directory Server
Citrix Provisioning service requires Microsoft's Active Directory. It provides authentication and authorization mechanisms as well as a framework, within which other related services can be deployed. Microsoft Active Directory is an LDAP-compliant database that contains objects. The most commonly used objects are users, computers, and groups.

Network services
Dynamic Host Control Protocol (DHCP) is used for the purpose of getting IP addresses for servers and systems.

Trivial File Transfer Protocol (TFTP) is used for automated transfer of boot configuration files between servers and a system in a network.

Preboot Execution Environment (PXE) is a standard used for client/server interface that allows networked computers that boot remotely to boot locally instead.

Citrix® Provisioning Server
A Provisioning Server is a server that has stream services installed on it. The purpose is to stream software from vDisks on demand to the target devices. In a few implementations, vDisks exist directly on the Provisioning Server. In larger implementations, Citrix Provisioning Servers will get the vDisk from shared storage.

Citrix Provisioning Server also reclaims and provides configuration in sequence to and from the Provisioning Services Database. The Provisioning Server feature of configuration is available to ensure that there is High Availability and that load balancing is in place for target devices.

Terminology
Citrix uses a variety of terminology in this product. Now let us see the most important terms used in this product.

For More Information:
www.packtpub.com/getting-started-with-citrix-provisioning-services-7-0/book
Citrix® Provisioning Service farms
A Citrix PVS farm represents the peak level of the Provisioning Services infrastructure on a console. The farm is formed when the Provisioning Services Configuration Wizard runs on the first Citrix Provisioning Server in the farm. It will be added to the farm as well. Farms provide a vDisk administrator with a method for operating all components within the farm, such as Farm properties, Active Directory configurations, product licensing, administrative roles, provisioning servers, vDisk images, sites, stores, views, target devices, and target device collections.

Citrix® Provisioning Service stores
The Citrix Provisioning Service store is a logical name that is assigned to a physical or virtual vDisk storage place. The store name is the common name used by all Citrix Provisioning Servers within the farm. A Citrix Provisioning Service farm contains one or more stores.

The Citrix Provisioning Service disk storage administration is very important because a Provisioning Server should have vDisks stored, and each vDisk can be more than a few gigabytes in volume. In the case of issues, our streaming performance can be improved by using the best storage solution instead.

Citrix® Provisioning Service sites
The first site for Citrix Provisioning Service is created with the Citrix Provisioning Configuration Wizard run on the first Provisioning Server in the farm. A site provides both a site administrator and farm administrator with a scheme of representing and operating its components within a site, which includes servers, vDisk pools, vDisk Update Management components, device collections, views, and hosts. Citrix Provisioning Service can have one or more sites live within a farm.

Citrix® Provisioning Service vDisk
Citrix Provisioning vDisks live on a Provisioning Server as disk image files or on-a shared-storage device within reach. A vDisk is available with a base image file in the VHD format and associated files, such as properties files (.pvp) and VHD differencing disks (.avhd). Post that, vDisks are assigned to target devices.

For More Information:
w w w . p a c k t p u b . c o m / g e t t i n g - s t a r t e d - w i t h - c i t r i x - p r o v i s i o n i n g - s e r v i c e s - 7 - 0 / b o o k
Citrix® Provisioning Service vDisk modes
Citrix Provisioning vDisks live on a Provisioning Server and can be configured in two different modes. One is the Private Image mode and the other, the Standard Image mode. The Private Image mode fulfills the read-and-write purpose for a single device (physical servers, virtual servers, and virtual desktops), whereas the Standard Image mode fulfills the read-only purpose for multiple devices (physical servers, virtual servers, and virtual desktops).

Citrix® Provisioning Service vDisk pools
Citrix Provisioning Service vDisk pools are gatherings of all vDisks available to a site. Citrix Provisioning Service allows you to have only one vDisk pool per site.

Citrix® Provisioning Service vDisk Update Management
The Citrix Provisioning Service vDisk Update Management attribute is used to configure the automation of vDisk updates using virtual machines. Robotically vDisk updates can take place on a scheduled base or on demand when the administrator initiates the update directly from the Console. The Citrix Provisioning Service vDisk feature updates are delivered from the Electronic Software Delivery (ESD) servers.

When you expand the console tree, the vDisk Update Management utility appears. On further expansion the vDisks and Tasks components appear.

Citrix® Provisioning Service write cache destination
Citrix Provisioning Services provides a number of write cache destination options, such as on the device’s RAM, on the device's server disk, on the device's server persisted, on the device's hard drive, and on the device's hard drive persisted. These are described in the following table:

<table>
<thead>
<tr>
<th>Device</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>On the device RAM</td>
<td>The write cache can live as a temporary file in the target system device's RAM. It is fastest way of disk access, the reason being that memory access is always faster than disk access. But it only supports Windows 7 and Windows Server 2012.</td>
</tr>
</tbody>
</table>

For More Information:
www.packtpub.com/getting-started-with-citrix-provisioning-services-7-0/book
Device Description

On the device's disk The write cache can live as a temporary file in NTFS format and is located in the target system's hard drive; this option does not require any additional software components.

On the device's disk persisted The write cache can live as a temporary file in the target system's hard drive. It requires a different bootstrap, and hence it can be used for experimental purposes. It only supports NT6.1 or later versions.

On the device's PVS server disk The write cache can live as a temporary file in Citrix Provisioning Server. In this option, writes are handled by the Provisioning Server, in turn increasing disk I/O and network traffic.

On the device's PVS server disk persisted The write cache can live as a temporary file in the Citrix Provisioning Server. This cache option allows for the saving of changes between reboots even after the rebooting changes made can be read by the target devices. One of the two main benefits is that PVS saves the target device-specific changes that are made to the vDisk image, and the other one is the same as the standard vDisk image. Some disadvantages that are also observed are that the Cache files are not deleted and manual deletion of housekeeping is required periodically.

System requirements

Citrix Provisioning Service can be installed with following requirements:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operation system</td>
<td>Windows 2012: Standard, Essential, and Datacenter editions; Windows 2008 R2; Windows 2008 R2 SP1: Standard, Enterprise, and DataCenter editions; and all editions of Windows 2008 (32 or 64-bit)</td>
</tr>
<tr>
<td>Processor</td>
<td>Intel or AMD x86 or x64 compatible</td>
</tr>
<tr>
<td></td>
<td>2 GHz / 3 GHz (preferred) / 3.5 GHz Dual Core / HT or an equal one for growing capacity fulfiller</td>
</tr>
<tr>
<td>Memory</td>
<td>2 GB RAM; 4 GB (greater than 250 vDisks)</td>
</tr>
</tbody>
</table>

## Citrix Provisioning Server

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Description</th>
</tr>
</thead>
</table>
| Hard disk            | To determine IOPS needed along RAID Level, please plan your sizing based on the following formula:  

\[
\text{Total Raw IOPS} = \text{Disk Speed IOPS} \times \# \text{ of Disks} \\
\text{Functional IOPS} = ((\text{Total Raw IOPS} \times \text{Write %})/\text{RAID Penalty}) + (\text{Total Raw IOPS} \times \text{Read %})
\]

| Network adapter      | IP assignment to servers should be static. 1 GB is recommended for less than 250 target devices. If you are planning for more than 250 devices, Dual 1 GB is recommended. For High Availability, please have two NICs for redundancy purposes. |
| Pre-requisite software components | Microsoft .NET 4.0 and Microsoft Powershell 3.0 loaded on a fresh OS |

The Infrastructure components required are described as follows:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supported hypervisor</td>
<td>XenServer 6.0, Microsoft SCVMM 2012 SP1 with Hyper-V 3.0; SCVMM 2012 with Hyper-V 2.0, VMware ESX 4.1, ESX 5, or ESX 5 Update 1; vSphere 5.0, 5.1, 5.1 Update 1; along with Physical Devices for 3D Pro Graphics (Blade Servers, Windows Server OS machines, and Windows Desktop OS machines with XenDesktop VDA installed).</td>
</tr>
</tbody>
</table>

For More Information:  
Introduction to Citrix® Provisioning Services 7.0

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provisioning Console</td>
<td><strong>Hardware requirement:</strong> Processor 2 GHz, Memory 2 GB, Hard Disk 500 MB</td>
</tr>
<tr>
<td></td>
<td><strong>Supported Operating Systems:</strong> all editions of Windows Server 2008 (32-bit or 64-bit); Windows Server 2008 R2: Standard, DataCenter, and Enterprise editions; Windows Server 2012: Standard, Essential, and Datacenter editions; Windows 7 (32-bit or 64-bit); Windows XP Professional (32-bit or 64-bit); Windows Vista (32-bit or 64-bit): Business, Enterprise, and Ultimate (retail licensing); and all editions of Windows 8 (32-bit or 64-bit).</td>
</tr>
<tr>
<td></td>
<td><strong>Pre-Requisite Software:</strong> MMC 3.0, Microsoft .NET 4.0, and Windows PowerShell 2.0</td>
</tr>
<tr>
<td></td>
<td>In case we are using Provisioning Services, we would require XenDesktop and NET 3.5 SP1, and in the event that we are using Provisioning Services then we would require SCVMM 2012 SP1 and PowerShell 3.0.</td>
</tr>
<tr>
<td>Supported ESD</td>
<td>Apply only in case VDisk Update Management is used; ESD supports WSUS Server-3.0 SP2 and Microsoft System Center Configuration Management 2007 SP2, 2012, and 2012 SP1</td>
</tr>
<tr>
<td>Supported target device</td>
<td><strong>Supported Operating Systems:</strong> all editions of Windows 8 (32 or 64-bit); Windows 7 SP1 (32 bits or 64 bits): Enterprise, Professional, and Ultimate (Support alone in Private Mode); Windows XP Professional SP3 32-bit and Windows XP Professional SP2 64-bit; Windows Server 2008 R2 SP1: Standard, DataCenter, and Enterprise editions; Windows Server 2012: Standard, Essential, and Datacenter editions.</td>
</tr>
</tbody>
</table>

Summary

In this chapter, we learned about getting started with Citrix Provisioning Service, the product overview, essentials of products, the features fulfilling the real-world needs, the logical flow of the product, the technical architecture of the product, the terminology, and the system requirements for installing for Provisioning Service. In the upcoming chapter, we will learn about the installation of Provisioning Service.

For More Information:  
Where to buy this book

You can buy Getting Started with Citrix® Provisioning Services 7.0 from the Packt Publishing website: http://www.packtpub.com/getting-started-with-citrix-provisioning-services-7-0/book.

Free shipping to the US, UK, Europe and selected Asian countries. For more information, please read our shipping policy.

Alternatively, you can buy the book from Amazon, BN.com, Computer Manuals and most internet book retailers.