
XenApp Essentials Service Deployment Guide

January 2018

XenApp Essentials Service delivers Windows applications from Microsoft Azure to any device securely.

The service combines the industry-leading XenApp service with the power and flexibility of Microsoft Azure.

This document guides you through configuring the Azure environment by using Azure Resource Manager and the XenApp Essentials Service.

Introduction

Microsoft Azure is a reliable and flexible cloud platform that allows quick deployment of applications in Microsoft-managed data centers. This paper provides guidelines for deploying the XenApp® Essentials Service on Azure and discusses decisions that impact deployment scenarios.

This deployment guide also describes Azure concepts and components, and basic Azure implementation using Azure Resource Manager. Azure Resource Manager deployment differs from the "classic" Service Management (ASM) model available previously in how Azure components are managed and monitored. Azure Resource Manager also provides security, auditing, and tagging features to allocate and control Azure resources. All new Azure deployments use the Azure Resource Manager model.

This paper describes underlying Azure and Citrix components that are required for the deployment.

The first part of this guide describes the overall solution deployment. The second part is a "runbook" that gives specific procedures to install and configure a sample XenApp Essentials deployment on Azure.

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Overview

XenApp Essentials Service combines the power of the Citrix Cloud with Microsoft Azure to deliver Windows applications. XenApp Essentials Service replaces Microsoft RemoteApp and provides the same application access experience for users. XenApp Essentials Service provides performance and flexibility by moving application delivery to the cloud, without sacrificing management or user experience.

Microsoft Azure Infrastructure as a Service makes it possible to create new virtual machines in minutes and adjust usage quickly when infrastructure requirements change. By provisioning XenApp Essentials workloads on Azure, businesses can avoid the acquisition and maintenance costs associated with expanding on-premises infrastructure. Instead, they can use Azure to supply the compute, storage, and networking resources to provision application sessions to meet demand.

Deployment and Considerations

To deliver a successful XenApp Essentials Service deployment, there are four key steps to address:

1. Preparing and linking your Azure subscription.
2. Creating and uploading a master image.
3. Creating catalogs and assigning applications to users.
4. Accessing applications.

This paper provides detailed information, example configurations of your Azure environment, and integration with XenApp Essentials.

This guide is for customers who have the technical skills to deploy XenApp Essentials Service in Azure.

Figure 1 at a high level describes the Citrix Cloud service offerings.

Figure 2 describes a conceptual XenApp Essentials Service deployment in Azure.



Figure 2: Citrix Cloud Services.

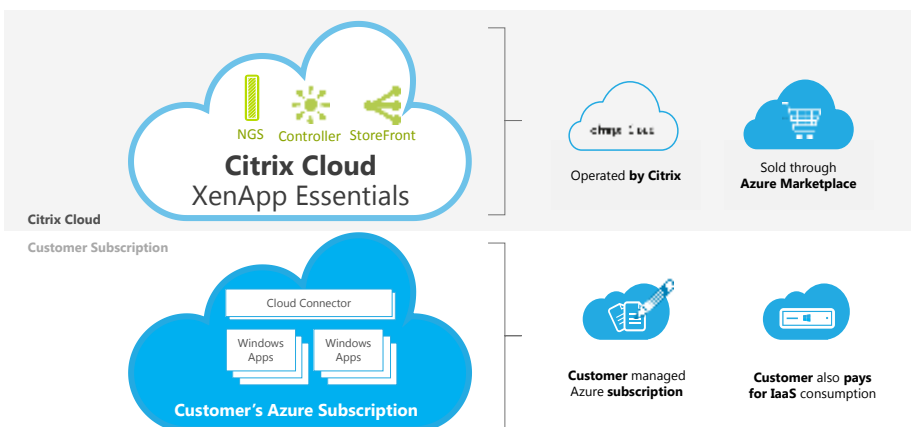


Figure 1: XenApp Essentials Service Conceptual Architecture.

Concepts and Terminology

Azure hosts infrastructure components in different Microsoft-managed data centers. Azure services can vary according to geographic regions, different Infrastructure as a Service capabilities, and different usage-based pricing. At the time of writing this document, Azure is generally available in 30 regions around the world.

Azure Resource Manager deployment model concepts

The [Azure Resource Management deployment](#) model is based around the concept of flexible, virtualized Infrastructure as a Service resource.

Azure Resource Manager enables you to support the resources in your solution as a group. You can deploy, update, or remove all the resources for your solution in a single, coordinated operation. You can use a template for deployment and that template can work for different environments such as testing, staging, and production.

In Azure Resource Manager, you can create resources by using the Azure portal interface as described in this guide. You can also use PowerShell commands to create resources.

There are three critical types of Azure Resource Manager resources — compute, storage, and networking — that are required to deploy XenApp Essentials workloads on Azure. The Azure Resource Manager model organizes these resources into management containers called Resource Groups. In the Azure Resource Manager model, Resource Groups offer these advantages:

- Resources can be deployed, managed, and monitored as a group, simplifying deployment steps.

- Resources can be easily removed by deleting the group only that contains all objects.

- Resources can be defined with dependencies in a Resource Group, allowing them to be deployed in the correct order.

- Resources can be defined with Role-Based Access Controls (RBAC), which enables decentralized management.

- Resources can be tagged to organize them within a subscription.

This guide introduces fundamental Azure concepts that describe general compute, storage, and networking requirements.

Azure compute

To deploy XenApp Essentials on Azure, these compute resources are relevant:

Virtual machines.

Virtual machines supply basic functionality and assigned compute, memory, and I/O resources based on an Azure compute instance type.

Availability Sets.

Assigning virtual machines to an

Azure storage

Azure provides different storage categories and redundancy options. Storage pricing is tiered with lower rates for higher levels of use. Charges vary depending on the following:

- Storage capacity
- Type of data replication
- Number of I/O operations per second
- Data transfer

Figure 3 shows a storage account that

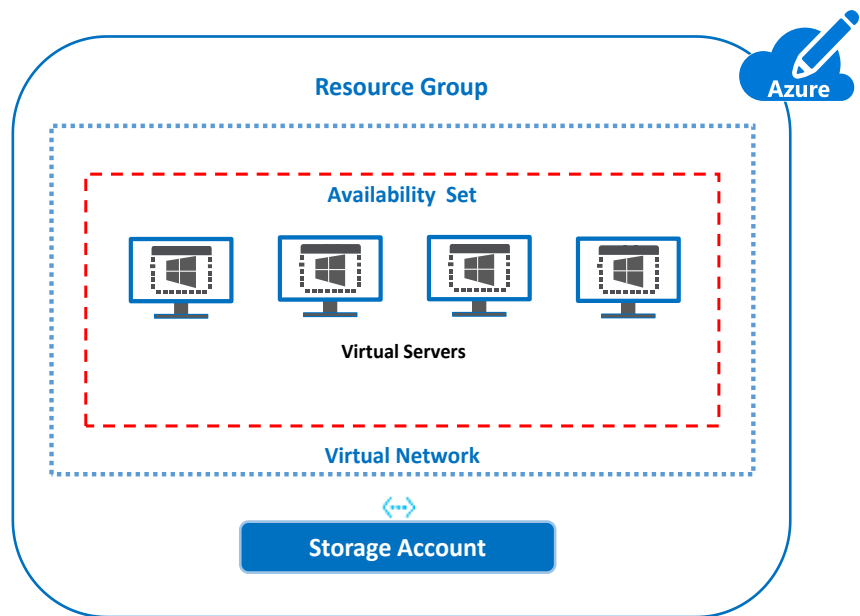


Figure 3: Microsoft Azure concepts and terminology.

Availability Set causes them to be hosted on different fault domains and upgrade domains in the Microsoft data center, enhancing availability.

Note: You can assign a virtual machine to an availability set only when creating the machine.

Resource groups.

Resource groups are a logical construct that helps in grouping objects together. For example, a resource group can be created specifically for items such as infrastructure virtual machines or XenApp Essentials virtual machine workloads.

Figure 3 depicts virtual machines defined within a single group on the same virtual network. The resource group contains both virtual machines and virtual machines defined in the Availability Set (outlined by the red dashed line).

provides shared storage for virtual machines. Persistent storage for Azure virtual machines uses page blobs. The blobs are block storage optimized for random read and write operations. Citrix recommends using blobs for XenApp Essentials Service deployments.

Azure offers three options for replicating page blob storage:

- Locally Redundant Storage (LRS), which creates three synchronous data copies within a single data center.
- Geographically Redundant Storage (GRS). Replicates data three times in a primary region and in a remote secondary region. The data replication protects against a data center outage or a disaster.
- Read-Access Geographically Redundant Storage (RA-GRS), which

is the same as GRS but supplies read access to the secondary data center.

For infrastructure components in Azure, Citrix recommends using Geographically Redundant Storage (GRS)—the mid-tier availability option—to enable high availability infrastructure. Configure XenApp Essentials to use Locally Redundant Storage (LRS) because a deployment typically uses multiple identical workload servers providing redundancy.

Infrastructure and application storage in Azure

The XenApp Essentials workload server and application storage needs about 30 GB of storage. This amount can vary depending on the size of the application workload. To conserve costs, it's best to install a clean XenApp Essentials workload Master image server to minimize required capacity.

User profile storage in Azure

User data storage is a critical architectural element and a reasonable size estimate for a user profile is 25 GB per user.

XenApp Essentials Service uses the XenApp Profile Management solution to enable profiles and Microsoft folder redirection.

Storage transactions in Azure

Microsoft also imposes a charge for the total number of storage transactions, including read and write operations. Microsoft limits the standard storage account to a maximum of 20,000 I/O operations per second. This constraint factors into the deployment, as noted in the topology discussion.

Azure networking

Azure enables flexible networking and network options to support various deployment scenarios. Azure permits the creation of standalone, cloud-only virtual networks, and virtual private networks (VPNs) that support cross-premises connectivity. Virtual machines constructed within an Azure virtual network can communicate directly and securely with one another. There is no cost associated with virtual machine communication or data transfers within a single region. To provide cross-premises connectivity across Azure regions or to an on-premises data center, it's also possible to configure VPN gateways (see [VPN Gateway](#)

[documentation](#)). Site-to-site VPNs are protected using industry-standard IPsec protocol for secure communications. There is no cost to set up a virtual network. Microsoft charges for VPN gateways in Azure that connect to other Azure virtual networks or to an on-premises network. Data transfers to an Azure data center are free but Microsoft charges for outgoing data (for pricing specifics, see [Virtual Network Pricing](#)).

Azure virtual machines acquire network settings during creation. Citrix recommends designing the virtual networking setup during the early deployment stages. The process of creating virtual machines includes steps to define and configure the virtual network and its address space.

Other infrastructure components

In support of a XenApp Essentials deployment on Azure, Azure configures or provides the following extra components:

Active Directory

For user authentication and access management, the deployment requires Active Directory Domain Services. In XenApp Essentials, the approach provides three options to choose from:

- Use a replica of the on-premises Active Directory in Azure
- Build a standalone domain with its own Azure Active Directory Domain Services (described in this paper).
- Use Azure Active Directory Domain Services. For more information, see "[Install a replica Active Directory domain controller in an Azure virtual network](#)."
- **Note:** Azure Active Directory is not currently supported.

DNS

Azure can provide name resolution, or can use an external DNS server. This deployment requires a customer-defined DNS server.

DHCP and IP address configuration

Azure provides DHCP services that assign private IP addresses to virtual machines using a specified IP address range. Using the Azure portal, an administrator can configure the IP address range and specify static IP address assignments with a persistent long-term lease.

More considerations for XenApp Essentials deployments on Azure

Deployments in Azure are subject to certain subscription and service limits, quotas, and constraints (see <http://azure.microsoft.com/en-us/documentation/articles/azure-subscription-service-limits/>).

When deploying XenApp Essentials Service on Azure, consider the following:

The following deployment considerations are important in larger scale deployments: I/O operations per second constraints.

A single storage account is limited to a maximum of 20,000 I/O operations per second. For A-Series Standard, D-Series Standard, and Dv2-Series Standard Azure instances, Microsoft recommends a maximum of 40 high availability VHDs per storage account. This amount allows a maximum of 500 I/O operations per second per disk (see Sizes for virtual machines). The deployment presented here adheres to these guidelines.

Citrix deployment concepts

XenApp Essentials Service gives IT departments the flexibility of delivering Windows applications at an economical price.

When implementing XenApp Essentials on Azure, the deployment architecture follows a simplistic approach for provisioning the workloads.

Figure 4 shows that only two virtual servers are required for infrastructure. These virtual machines are the Citrix Cloud Connectors.

Cloud Connectors serve as a channel for communication between Citrix Cloud and your resource locations in Azure. You can enable cloud management without requiring any complex networking or infrastructure configuration, such as VPNs or IPsec tunnels.

In a XenApp Essentials deployment, the "NetScaler Gateway Service" for secure access requires no configuration. XenApp Essentials Service automates creating the StoreFront site.

The workload instances (server VDA) are the workload virtual machines hosting the applications delivered to your users. Actual deployments can include other services not shown in **Figure 4**: These include Active Directory, DNS, DHCP, and file services.

Basic topology and networking considerations

This section describes a simple topology for deploying XenApp Essentials on Azure, as shown in Figure 4.

IP address assignment

Virtual machines receive a private IP address from a range that is based on the subnet to which they are assigned.

The default IP address is set to dynamic. The virtual machine retains the IP address until you remove the virtual machine from the resource group.

Some machines, such as domain controllers, require a static IP address. You can change machines to use a static IP address by using the Azure portal, PowerShell, or the Azure CLI.

Scalability testing on different Azure instance types

Microsoft Azure instance types vary according to infrastructure resources and relative cost per hour. Pricing for Azure virtual machines varies by region and includes Windows licensing. For more information, see [Windows Virtual Machines Pricing](#).

Citrix engineers conducted single-server scalability testing to determine optimal user densities and cost-per-user under different XenApp session workloads and various Azure instance types. The testing,

described in the paper "[Deploying Citrix XenApp on Microsoft Azure cloud: the scalability and economics of delivering Citrix XenApp services](#)," simulated user

- Microsoft Azure A-Series Standard
- D-Series Standard
- Dv2-Series Standard

Login VSI 4.1.6 was used in testing to generate user connections to XenApp VDA workers, simulating typical user workloads running on Azure instances (Note: Login VSI uses the concept of [Task Workers or Knowledge Workers](#) for user simulation purposes).

Testing results indicate that the D2v2 virtual machines use faster processors and local SSD storage devices for caching. The D2v2 virtual machines can provide higher performance for workloads servers than the respective A-Series and D-Series virtual machines. In addition, D2v2 instances offer the lowest cost per user for typical XenApp workloads.

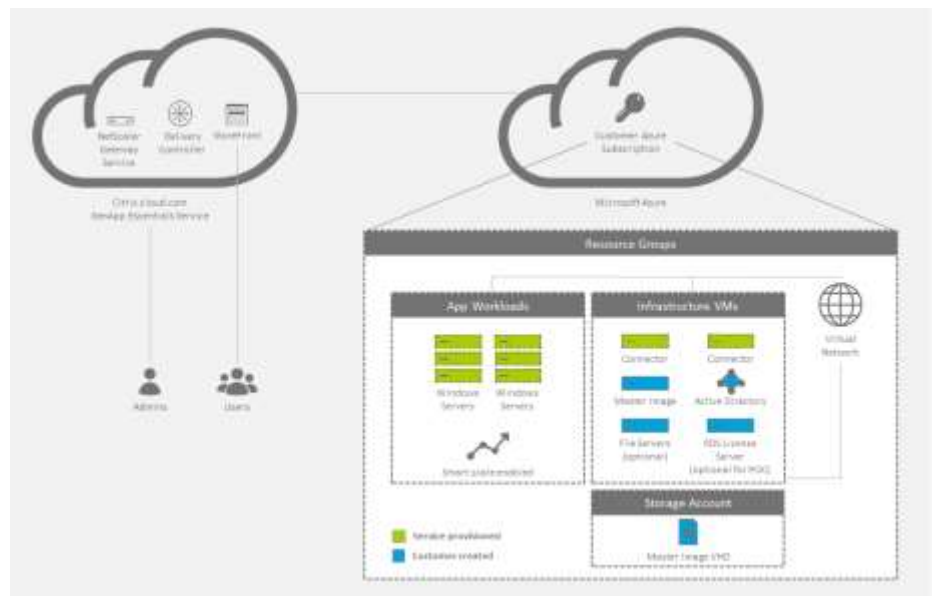


Figure 4: Basic Azure deployment of XenApp Essentials.

Runbook: Preparation Tasks and Prerequisites.

The focus for the remainder of this document is on the detailed process of setting up and deploying the system. There are four major steps in the overall process:

1. Set up an Azure account and configure the Azure Infrastructure as a Service topology (virtual networks, storage accounts, Resource Groups, Availability Sets, and infrastructure virtual machines). This step also includes the configuration of Azure Active Directory.
 - a. In this example deployment, the Citrix Cloud Connectors are configured automatically as part of the XenApp Essentials first catalog setup.
2. Prepare and deploy the XenApp Essentials workload master image.
 - a. Optionally, Citrix-prepared images are available for use. Citrix recommends that you deploy a prepared image in a test environment only.
3. Create a XenApp Essentials catalog.
 - a. Publish applications to users.
4. Access applications.

Plan Your Deployment

The first step in an Azure implementation is to create a sizing plan based on specific requirements. The appropriate number of resource groups, storage accounts, and virtual machines depends on estimates for the number and type of users in the environment.

There are different server functions that must be considered in the sizing of Azure resources: Infrastructure servers and workload servers. In planning, it is necessary to consider the appropriate sizing of each.

[Appendix A](#) provides tables that you can prepopulate with customer-specific details before starting the configurations in the runbook section. Citrix recommends that you update these tables to reflect detailed requirements and nomenclature before proceeding.

Step 1: Preparing and Linking your Azure Subscription

In this step, you create the Azure topology, which includes virtual networks, storage accounts, resource groups, availability sets, and virtual machines.

It's assumed that the administrator created a Microsoft Azure account, and has some general experience with creating virtual machines in Azure. To configure the topology in Azure for a XenApp Essentials Service deployment, you must first establish these prerequisites:

1. Create a resource group
2. Create an Azure virtual network
3. Create Azure storage accounts
4. Create the Azure subscription account used in XenApp Essentials
5. Create virtual machines for infrastructure servers (Optional)

Create an Azure Resource Group

The administrator creates resource groups. In this test deployment, type **ctx-resource-group1** as the resource group name. (ctx-resource-group1 is used as the resource group for the XenApp Essentials components).

Instructions	Visual
<p>Connect to the Azure portal at portal.azure.com. In the navigation pane, click Resource groups, click +Add and type the relevant details.</p> <p>Resource Group Name:</p> <ul style="list-style-type: none">• ctx-resource-group1 <p>Subscription:</p> <ul style="list-style-type: none">• Select your subscription <p>Resource group location:</p> <ul style="list-style-type: none">• Select the appropriate location, such as Australia East	

Create an Azure Virtual Network


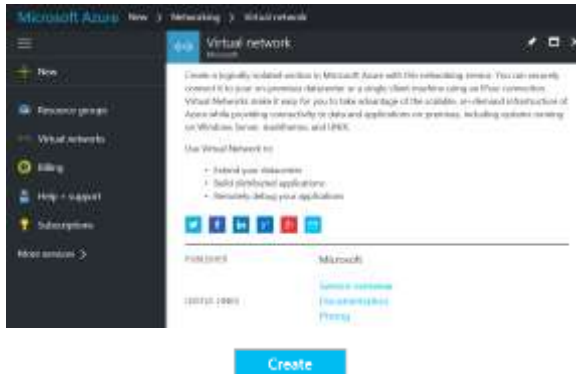
XenApp Essentials requires an Azure virtual network. Specify the settings for the virtual network, which include:


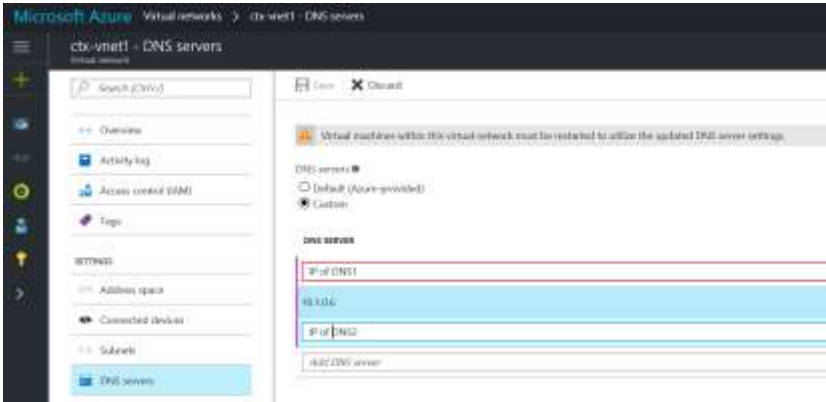
- Virtual network name
- Address space
- Subnet name
- Subnet address range

For the virtual network name, use **ctx-vnet1**. For the resource group name, use **ctx-resource-group1**. Use the defaults for the other settings.

Note1: For this deployment, place all virtual machines in the **same** virtual network. Existing infrastructure virtual machines such as Active Directory or File Services must reside in this same virtual network. You can also use virtual network peering between virtual networks. For more information, see [Create a virtual network peering using the Azure portal](#) on the Microsoft website.

Note2: For production environments, it is important to configure the network according to recommended Azure deployment practices. For more information, see [Virtual Network Documentation](#) on the Microsoft website.

Instructions	Visual
<p>Connect to the Azure portal at portal.azure.com.</p> <p>Click + New, click networking, and then click Virtual network.</p>	
<p>On the Virtual network page, in Select a deployment model, select Resource Manager.</p> <p>Click Create.</p>	



Instructions	Visual
<p>Example Configuration.</p> <p>Specify the settings for the virtual network you are creating. Type the virtual network name (ctx-vnet1) and type the address space, subnet name, and subnet address range.</p> <p>Select Use existing and select ctx-resource-group1 as the resource group.</p> <p>Confirm that the location is correct.</p> <p>Click Create. Azure creates the virtual network.</p>	
<p>Next, specify the DNS servers, for example, by using the IP address of your domain controller (DNS server). Using this IP address ensures connections to your internal domain. Click the virtual network (ctx-vnet1) on the Azure dashboard.</p> <p>Select DNS servers from the navigation pane. In the details pane, click Custom, click Add, and specify the primary and secondary DNS servers. The servers are DNS server IP 1 and DNS server IP 2 respectively. Click Save at the top to save the customized settings. Click the X in the upper right corner to dismiss each of the network panes and return to the top menu.</p>	

Create an Azure Storage Account

This section describes creating a storage account. A storage account is required when importing a master image from your Azure subscription. You can use either an existing storage account or a newly created account. For more information, see [Preparing a Master Image](#) and [Uploading a Master Image](#) for this storage account.

The example here assumes that you are creating a single storage account. You configure the storage account by using **Standard-RAGRS (Read-Access Geo-Redundant)** as the storage replication type.

Instructions	Visual
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Instructions	Visual
From the top menu, click + New , click Storage , and then and click Storage account .	
<p>Type the name for the storage account:</p> <ul style="list-style-type: none">ctxxae99 <p>In Replication, select</p> <ul style="list-style-type: none">Read-access geo redundant storage (RA-GRS). <p>In Resource group, type the name of the resource group:</p> <ul style="list-style-type: none">ctx-resource-group-1 <p>When all settings for this storage account are correct, click Create.</p>	

Creating the Subscription Account to be used in XenApp Essentials



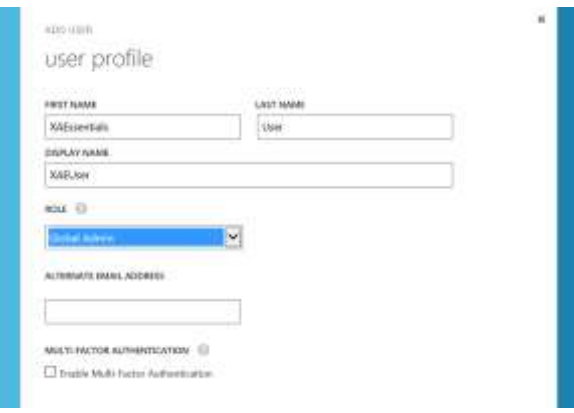


Azure Resource Manager uses Azure Active Directory for authentication. Before you provision a virtual machine, it must successfully authenticate against the Azure Active Directory tenant to which the subscription is linked. For this reason, it's necessary to set up an Azure Active Directory account (traditional Microsoft accounts are not sufficient). The account used must be able to administer the Azure Active Directory tenant linked to the subscription. The user account requires:

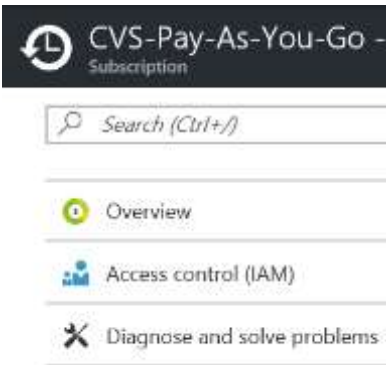

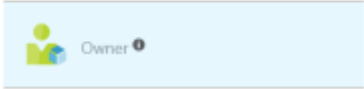
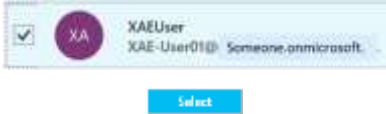
- Global administrator role for Azure Active Directory
- Owner permissions for the subscription

For more information, see "[XenApp on Azure: Demystifying Azure AD Authentication](#)". Also, see "[How to Add or Change Azure Administrator Roles](#)" and "[How to get an Azure Active Directory tenant](#)."

The following procedure shows the process of creating an account in Azure Active Directory. You configure the account in the Azure classic portal. You connect to the classic portal by choosing **Active Directory** in the Azure portal. Then, click **Classic portal** at the top of the Active Directory page.

Instructions	Visual
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Instructions	Visual
<p>The Azure Active Directory administrator must create an Azure Active Directory account that you link to the subscription for the XenApp Essentials deployment.</p> <p>Connect to the classic version of the portal, click the icon for Azure Active Directory, and then click the Default Directory.</p>	
<p>Click Add User at the bottom of the page to add a user to the default directory. Authorize this user to administer the Azure Active Directory domain for the XenApp Essentials deployment.</p> <p>Type the Azure Active Directory user name and Active Directory domain name, and make a note of them (they are used in other procedures). The account name appears as user123 @ xyz.onmicrosoft.com.</p>	
<p>Complete the profile for the user. In ROLE, select Global Admin.</p>	
<p>Click Create to create the account and get a temporary password (this password is changed at first log on).</p> <p>Record this password for future use. When configuring a XenApp Essentials catalog, you use these details to link your Azure subscription and authenticate to the Azure Active Directory account.</p>	
<p>When the Azure Active Directory account is created, you must provide access to the subscription for this account:</p> <p>Click Subscriptions.</p>	

Instructions	Visual
Click the subscription that you use for XenApp Essentials and select Access Control .	
Click Add to add a role.	
Click Owner .	
Choose the user you previously created to make them an owner of the subscription and then click Select .	

Creating Azure Virtual Machines

When you create virtual machines, XenApp Essentials creates Cloud Connectors automatically. During installation, the Cloud connector setup creates two A2v2 instances. The two A2v2 instances can potentially support up to 1,000 concurrent typical knowledge worker sessions.

Extra components that might be required, such as domain controllers and file services are not included in this paper.

Note: To optimize the availability of services, Citrix recommends creating pairs of virtual machines for most infrastructure functions. You can then place the virtual machines into availability sets.

There are two ways to build infrastructure (Active Directory, and file services) and the XenApp Essentials master image:

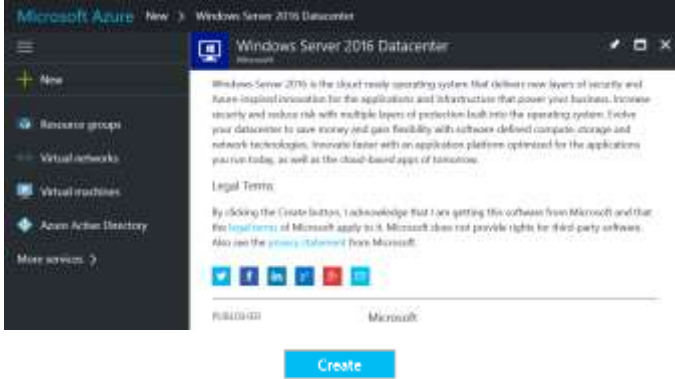
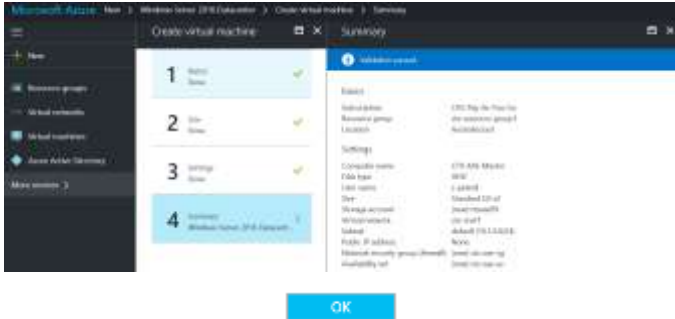

1. Manually by using the Azure portal (<https://portal.azure.com>)
2. Automatically by using a PowerShell script.



Load testing determines the instance type used in a deployment. In this example deployment, D2v2 or DS2v2 instances are used to deploy virtual machines. (The D2v2 instance type uses HDDs and the DS2v2 instance type uses SSDs for persistent storage, with similar CPU and memory configurations). If load testing indicates that persistent SSD storage is needed for virtual machines, Citrix recommends DS-series instances (such as DS2v2 instances).

Step 2. Prepare a Master Image

Follow these procedures to prepare an Azure virtual machine, which you use as the master image for the machine catalog. The instructions in the section [Creating Azure Virtual Machines](#) are similar to creating the master image virtual machine. The steps to prepare the master image include:


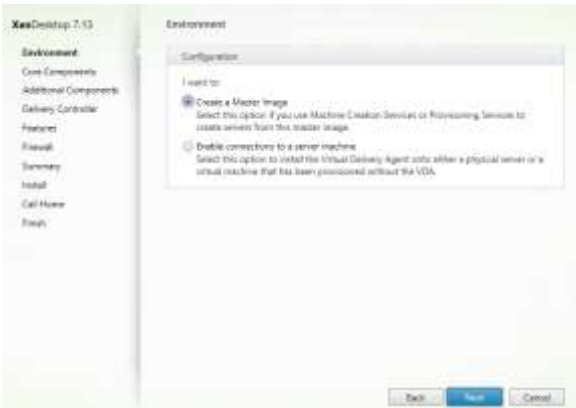
- Installing Line of Business (LOB) applications
- Installation of the Citrix XenApp server VDA

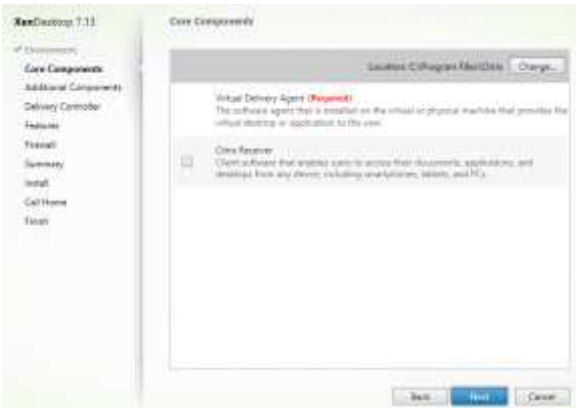
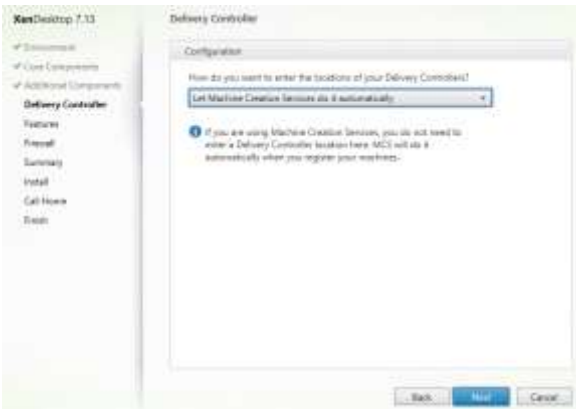
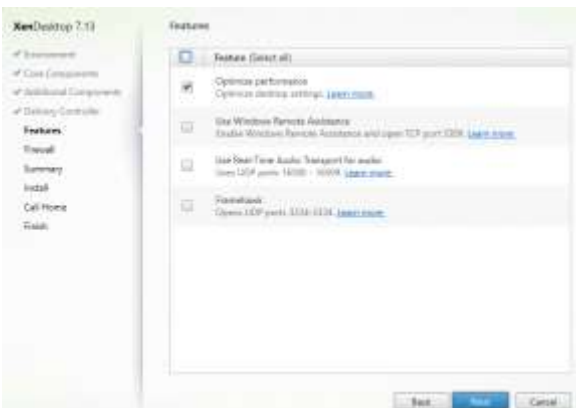
Instructions	Visual
<p>Example Resource Manager Deployment:</p> <p>Click + New and then click Virtual machines. Select Windows Server 2016 Datacenter as the virtual machine type.</p> <p>Click Create</p>	
<p>Use the following procedures for creating a virtual machine with the appropriate settings:</p> <p>1: Basics, Configure basic Settings</p> <p>Name</p> <ul style="list-style-type: none"> • Virtual machine name: CTX-XAE-Master <p>Virtual machine disk</p> <ul style="list-style-type: none"> • Create a standard disk. Premium or managed disks are not supported in XenApp Essentials. <p>User name</p> <ul style="list-style-type: none"> • Local user name <p>Password</p> <ul style="list-style-type: none"> • ***** <p>Confirm Password</p> <ul style="list-style-type: none"> • ***** <p>Resource group</p> <ul style="list-style-type: none"> • ctx-resource-group1 <p>Location</p> <ul style="list-style-type: none"> • Australia East <p>Click OK.</p>	
<p>2: Size, Choose the virtual machine size</p> <p>3: Configure Optional Features</p> <p>Virtual machine size</p> <ul style="list-style-type: none"> • Example D2v2/ DS2v2 <p>Storage account</p> <ul style="list-style-type: none"> • ctxxae99 <p>Network</p> <ul style="list-style-type: none"> • ctx-vnet1, <p>Network security group</p> <ul style="list-style-type: none"> • ctx-xae-sg <p>Availability set</p>	

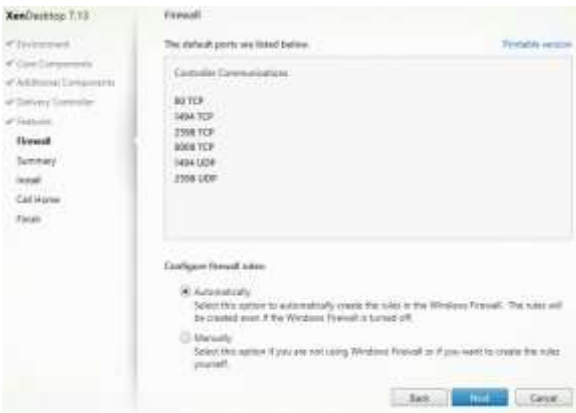
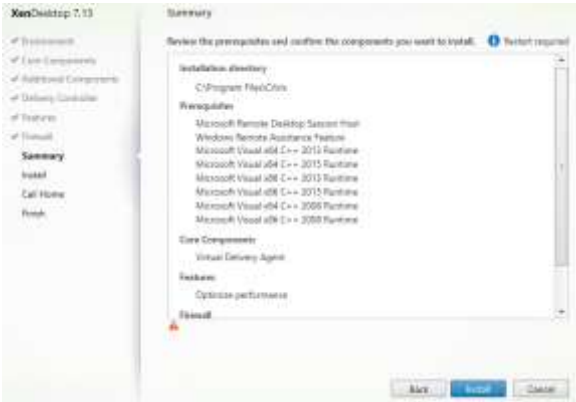

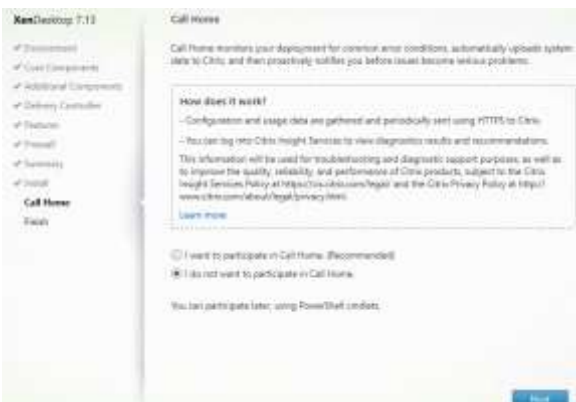
Instructions	Visual
<ul style="list-style-type: none"> ctx-xae-as <p>Click OK to proceed to the summary page and validation.</p>	
<p>4: Summary</p> <p>Click OK to create the machine.</p>	

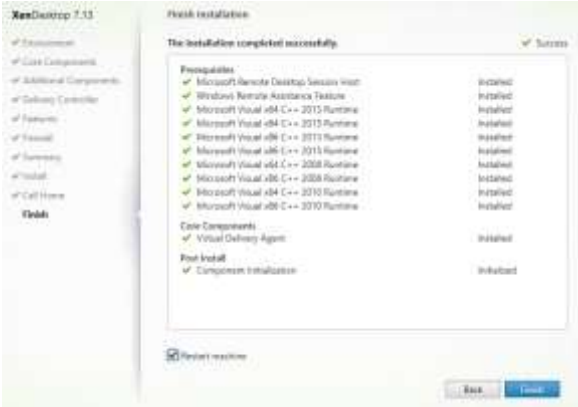
Install The Citrix Server VDA in the Master Image

The Virtual Delivery Agent (VDA) must be present in the golden image. The VDA allows XenApp Essentials to register with Delivery Controllers managed by Citrix in Citrix Cloud. The VDA also manages connections between machines and user devices. This procedure installs the Citrix VDA in the golden image virtual machine.

Instructions	Visual
<p>Connect to the XenApp Essentials master image virtual machine.</p> <p>Download the Citrix Server OS Virtual Deliver Agent.</p> <p>Navigate to the Server OS VDA source file.</p> <p>For example: VDAServerSetup_7.13.exe</p> <p>Click run to begin the Server OS Virtual Delivery Agent installation.</p>	
<p>Select Create a Master Image. Click Next.</p>	

Instructions	Visual
<p>Select Core Components. The VDA is selected by default because it is required.</p> <p>Click Next.</p>	
<p>When prompted, How do you want to enter the locations of your Delivery Controllers?</p> <p>Select:</p> <p>Let Machine Creation Services do it automatically.</p> <p>Click Next.</p>	
<p>Click Next to configure the default VDA features.</p> <p>For this deployment example, no options other than Optimize Performance are selected</p>	

Instructions	Visual
<p>Select Automatically and click Next to configure firewall rules automatically</p>	
<p>Review the configuration summary and click Install to begin the VDA installation.</p>	
<p>The page shows the installation progress. Prerequisites are installed first. The installation requires a machine restart.</p>	
<p>Log on again and resume the installation. The installation of prerequisites completes and then the VDA core components are installed.</p> <p>The Call Home screen appears. For this deployment example, Call Home is not selected. Click Next.</p>	

Instructions	Visual
<p>Click Finish. The machine restarts because the option Restart machine is selected.</p> <p>When all the steps are complete, shut down the virtual machine.</p>	


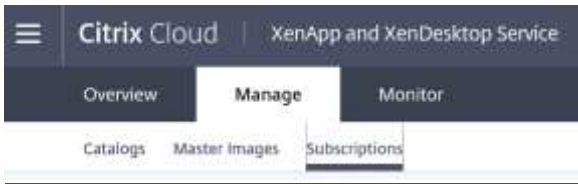

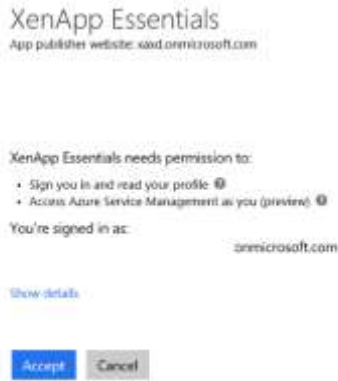
Step 3: Create a Catalog and Publish Applications to Users


In this section, configure the settings in Citrix Cloud and XenApp Essentials Service.

Overview: The XenApp Essentials interface guides you in creating the settings for a catalog. Some of the steps in this guide are preconfigured before we create our first catalog.

Link Your Subscription



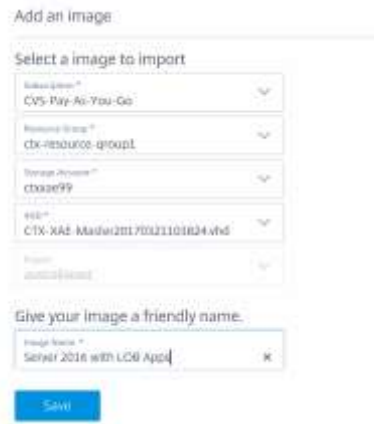
In this section, define the Azure Subscription details and link them to XenApp Essentials.

Instructions	Visual
Log on to Citrix Cloud at: https://citrix.cloud.com/ Navigate to the XenApp and XenDesktop Service and click Manage .	
Select the Manage tab and then click Subscriptions . Click + Add Subscription to add a subscription.	
The Azure logon page appears. Log on with the account you created in Creating a Subscription Account for Use with XenApp Essentials .	
Click Accept to link XenApp Essentials with your Azure account.	

Instructions	Visual
<p>When you accept the permissions dialog, you return to the Manage ->Subscription page. Select the subscription and then click Link.</p> <p>The linked subscription appears on the Subscriptions tab. You use the subscription information when you create the catalog.</p> <p>The process creates an Application and Service Principal object in Azure Active Directory.</p>	

Upload a Master Image


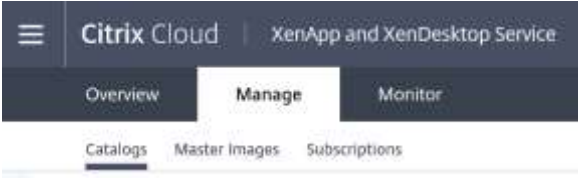

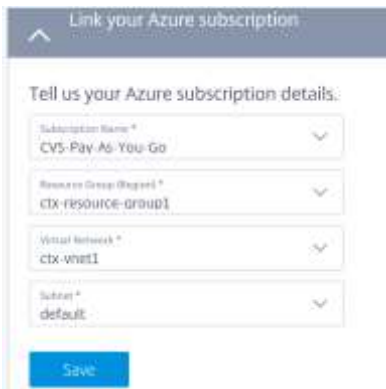
In this section, we import a master image to use with the catalog configuration.




Instructions	Visual
<p>Log on to the Citrix Cloud at: https://citrix.cloud.com/</p> <p>Navigate to the XenApp and XenDesktop Service and then click Manage.</p>	
<p>Select the Manage tab and then click Master Images. Click + Add Image.</p>	
<p>Select an image to import:</p> <p>Subscription:</p> <ul style="list-style-type: none"> Use the drop-down list to select your subscription <p>Resource Group</p> <ul style="list-style-type: none"> Ctx-resource-group1 <p>Storage Account</p> <ul style="list-style-type: none"> Ctxxae99 <p>Select the VHD</p> <ul style="list-style-type: none"> Select the VHD used for the master image <p>Image friendly name</p> <ul style="list-style-type: none"> Server 2016 with LOB Apps 	


Create the Catalog


In this section, we create the catalog and associated components.

Instructions	Visual
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Instructions	Visual
<p>Log on to Citrix Cloud at: https://citrix.cloud.com/</p> <p>Navigate to the XenApp and XenDesktop Service and click Manage.</p>	
<p>Click the Manage tab and then click Catalogs. Click + Catalog.</p> <p>Follow the instructions on your screen to configure the catalog.</p>	
<p>Option – Pick a name Select a name for the catalog:</p> <ul style="list-style-type: none"> For example, XAEssentials-01 <p>How would you like to deploy your catalog?</p> <ul style="list-style-type: none"> Domain Joined <p>Click Save.</p>	
<p>Option - Link your Azure subscription Tell us your subscription details. Example only.</p> <p>Subscription Name:</p> <ul style="list-style-type: none"> Select your subscription <p>Resource Group:</p> <ul style="list-style-type: none"> ctx-resource-group1 (the resource group Azure creates for the virtual network) <p>Virtual Network:</p> <ul style="list-style-type: none"> Ctx-vnet1 <p>Subnet:</p> <ul style="list-style-type: none"> default <p>Click Save.</p>	

Instructions	Visual
<p>Option – Join local domain Tell us your domain details. Example only. Fully Qualified Domain Name:</p> <ul style="list-style-type: none"> • xae.test <p>Organisational Unit:</p> <ul style="list-style-type: none"> • OU=XAEssentials,DC=xae,DC=test <p>Service Account Name</p> <ul style="list-style-type: none"> • service-xae@xae.test <p>Password</p> <ul style="list-style-type: none"> • ***** <p>Confirm Password</p> <ul style="list-style-type: none"> • ***** <p>Click Save.</p>	
<p>Option – Connect to a resource location To create a resource location:</p> <ol style="list-style-type: none"> 1. Provide a name for your resource location. 2. If you want to create connectors in a specific Azure Resource Group, click Edit next to Azure Resource Group to change the resource location. If you do not change the resource location, XenApp Essentials uses the Azure Resource Group that you specify when you link your Azure subscription. 3. If you want to put the connectors into a separate OU, click Edit next to Organizational Unit to change the resource location. If you do not change the resource location, XenApp Essentials uses the OU that you specify when you link your Azure subscription. <p>If your resource location is available, just click Save and continue. The catalog uses the resource location specified in XenApp Essentials.</p>	
<p>Option – Choose the master image How would you like to link your master image? Example only. Link an existing image. Select an image:</p> <ul style="list-style-type: none"> • Use the drop-down list to select your image (defined earlier) 	

Instructions	Visual
<p>Option – Select capacity and manage costs.</p> <p>For more information, see XenApp Essentials Service in the Citrix Product Documentation.</p> <p>Example configuration:</p> <p>Pick Compute:</p> <ul style="list-style-type: none">• Task worker:• Up to 16 users per Dv2 instance. For more information, see The scalability and economics of delivering Citrix XenApp services from Microsoft Azure. <p>HUB:</p> <ul style="list-style-type: none">• Select whether or not to use existing on-premises Windows Server licenses. Enabling this feature and using existing on-premises Windows Server images utilizes Azure Hybrid Use Benefits (HUB). More details are available at https://azure.microsoft.com/pricing/hybrid-use-benefit/.• HUB reduces the cost of running VMs in Azure to the base compute rate, since it waives the price of additional Windows Server licenses from the Azure gallery. You need to bring your on-premises Windows Servers images to Azure to use HUB. Azure gallery images are not supported. On-premises Windows Client licenses are currently not supported. See https://blogs.msdn.microsoft.com/azureedu/2016/04/13/how-can-i-use-the-hybrid-use-benefit-in-azure/%23comment-145. <p>Select scale settings:</p> <ul style="list-style-type: none">• Maximum number of instances: 2• Minimum number of running instances: 1• The capacity buffer enables extra sessions to be ready for demand spikes, as a percentage of current session demand. For example, if there are 100 active sessions and the capacity buffer is 10%, Citrix provides capacity for 110 sessions. As the total session capacity changes, the number of running instances for this catalog scales. The number of running instances always stays within the configured minimum and maximum values. A lower capacity buffer percentage can result in a decreased cost, but could also result in some sessions having an extended logon time if several sessions start concurrently. <p>I want to set a schedule for peak time:</p> <p>Optional check box:</p>	

Instructions	Visual
<ul style="list-style-type: none"> Select days of the week Select Mon-Fri Start Time: 8:00 AM End Time: 5:00 PM Time zone "as appropriate" Minimum instances Running at Peak time: 2 <p>Set idle or disconnected time-out</p> <ul style="list-style-type: none"> 1 hour <p>Example configuration summary: Deploy two Dv2 instances that support a maximum of 16 users per instance for a total of 32 concurrent users. One instance is always running. At peak times, two instances run to support user demand. If the session is idle or the user disconnects, XenApp Essentials logs users off after one hour. Unused instances shut down during non-peak times and support management of capacity and costs.</p>	
<p>To deploy the catalog and configuration, click Start Deployment.</p>	

It can take 1–2 hours to deploy the catalog. The length of time depends on the number of virtual machines you selected for workloads.

When using a proxy

If your deployment uses a proxy for external Internet access, catalog creation will fail because the virtual network that you specify (when you link your Azure subscription) doesn't have that access. To resolve this, after the failure:

1. In Azure, create two Windows Server 2012 R2 or Windows Server 2016 VMs on the virtual network, and join them to your domain.
2. From the Citrix Cloud console, [install a Citrix Cloud Connector](#) on each server. Be sure to select the resource location that was created for the catalog.
3. From the XenApp Essentials management console, redeploy the catalog.

Publish Applications to Users

In this section, provide the details to publish an application for users.

Instructions	Visual
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Instructions	Visual
<p>When catalog creation is complete, you then publish apps and assign users (Item 2).</p>	
<p>You can add apps to the catalog manually on the Catalogs tab. Click the ellipsis in the catalog that you want to update. In the context menu, click Manage Apps.</p>	
<p>Select Apps and then click + Publish Apps.</p> <p>When prompted, how would you like to publish apps select an option: Publish from Start menu Publish using path</p> <p>In Select App, choose the apps that you want to publish. When you select the application, it publishes automatically.</p>	
<p>On the catalog tab, click Users and then click + Add Users.</p>	
<p>A dialog box appears asking for you to add either a user or group details. In the example, we use domain users. Note: the actual domain name is obscured.</p>	

Configure Profile Management in More Settings


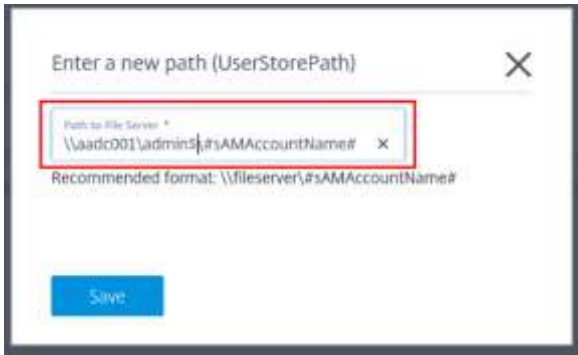
In this section, we provide details for configuring Profile Management for your users.

Profile Management ensures that personal settings apply to users virtual applications, regardless of the location of the user device.

You can enable Profile Management by using the profile optimization service. This service provides a reliable way for managing these settings in Windows. Managing the profiles ensures a consistent experience by maintaining a single profile that follows the user. It consolidates automatically and optimizes user profiles to minimize management and storage requirements. The profile optimization service requires minimal administration, support, and infrastructure. Also, profile optimization provides users with an improved log on and log off experience.

The profile optimization service requires a file share where all the personal settings persist. You must specify the share as a UNC path. The path can contain system environment variables, Active Directory user attributes, or Profile Management variables. To learn more about the format of the UNC text string, see [To specify the path to the user store](#).

Note the deployment of a File Server for this purpose is not covered in this document.

Instructions	Visual
The More Settings tab is on the Catalog tab.	
Type the path to the profile share: \\fileservr\share\#sAMAccountName# Click Save .	

Note: When enabling Profile Management, consider further optimization of the users profile by configuring folder redirection to minimize the effects of the user profile size. Applying folder redirection complements the Profile Management Solution. For more information, see [Microsoft Folder Redirection](#).

Configure the Microsoft Remote Desktop Services (RDS) License Server

The XenApp Essentials Service offering accesses Windows Server remote session capabilities that would typically require a Remote Desktop Services client access license (RDS CAL). The Virtual Delivery Agent (VDA) must be able to contact a Remote Desktop license server to request RDS CALs. You are required to install and activate the license server. For more information, see [Activate the Remote Desktop Services License Server](#). For POC environments, you can use the grace period provided by Microsoft.

Using this UI, you can have the XenApp Essentials Service apply the license server settings. You can also configure the license server and per user mode by using the Remote Desktop Services console on the master image. You can also configure the license server by using Microsoft Group Policy settings. For more information, see [License your RDS deployment with client access licenses \(CALs\)](#).

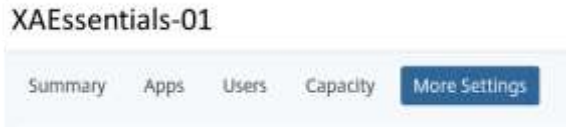

Configuring the RDS license server requires the following steps:

1. Install Remote Desktop Services License Server on one of the virtual machines that is always available. The XenApp Essentials workloads must be able to reach this license server.
2. Activate the Remote Desktop Services License Server by using these steps.

- Specify the license server address and per user license mode by following the steps as shown next.

You can also configure this setting by using Microsoft Group Policy.

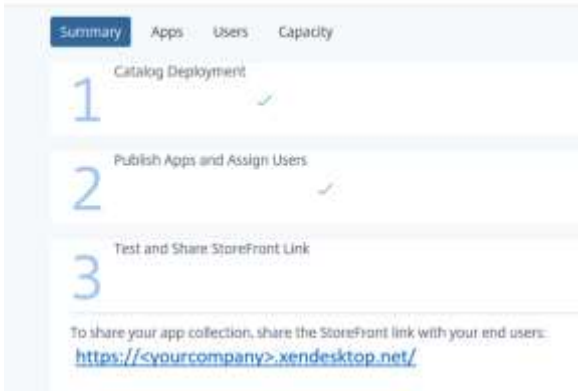
Note: If you purchased CAL licenses from Microsoft Remote Access, you do not have to install the licenses. You can purchase licenses from Microsoft Remote Access in the Azure Marketplace along with XenApp Essentials.

Instructions	Visual
The More Settings Tab is located as a sub tab under the Catalog tab	 <p>XAEssentials-01</p> <p>Summary Apps Users Capacity More Settings</p>
Type the FQDN of the License Server licenseserver.domain.com Click Save .	 <p>Specify the Microsoft Remote Desktop Services (RDS) License Server</p> <p>Enter the FQDN of the license server:</p> <p>License Server * licenseserver.domain.com</p> <p>Example: licenseserver.domain.com</p> <p>Save</p>

Step 4: Accessing Applications

You can use Citrix Receiver to test application access by using the virtual infrastructure and workloads created. Validate the deployment internally and externally. To validate internally, connect to the Azure virtual machine by using an RDP session. To validate externally, connect with a public URL to the XenApp Essentials StoreFront site.

Validating the XenApp Essentials on Azure Deployment

Instructions	Visual
In the final step (3) A prompt appears to share the StoreFront link with your users: The shared link is unique to your organization.	 <p>Summary Apps Users Capacity</p> <p>1 Catalog Deployment</p> <p>2 Publish Apps and Assign Users</p> <p>3 Test and Share StoreFront Link</p> <p>To share your app collection, share the StoreFront link with your end users: <a href="https://<yourcompany>.xendesktop.net/">https://<yourcompany>.xendesktop.net/</p>
Instructions	Visual

In a web browser, type the URL from the previous step. Type your credentials to log on and test application access.



When users log on, a list of authorized applications appears.



Learn more

For more information about deploying XenApp Essentials on Microsoft Azure, see the following resources:

Resource	URL
Citrix XenApp	https://www.citrix.com/products/xenapp/overview.html
Microsoft Azure	https://azure.microsoft.com/
Virtual Network Pricing	https://azure.microsoft.com/en-us/pricing/details/virtual-network/
Replica Active Directory Domain Controller Installation	https://azure.microsoft.com/en-us/documentation/articles/virtual-networks-install-replica-active-directory-domain-controller/
Azure Subscription and Service Limits, Quotas, and Constraints	https://azure.microsoft.com/en-us/documentation/articles/azure-subscription-service-limits/
Virtual Machine Sizes for Azure	https://azure.microsoft.com/documentation/articles/virtual-machines-size-specs
Azure Virtual Networking Documentation	https://azure.microsoft.com/en-us/documentation/services/virtual-network/

Appendix A Deployment Parameters

Appendix A provides you with a set of tables that you can complete before starting your deployment. The table provides customer-specific configurations and nomenclature. You can also use these tables for the configuring the settings in the runbook sections of this document.

The parameters used in the tables are examples only.

Item	Name	Address space (CIDR)	Subnet name	Subnet address range	Resource Group	Location	DNS servers
Virtual Network	ctx-vnet1	10.0.0.0/16	Default	10.0.0.0/24	ctx-resrouce-group1	Australia East	10.0.0.5 10.0.0.6

Table 1: Virtual Network parameters

Item	Name	Location
Resource Group	ctx-resource-group1	Australia East

Table 2: Resource Group parameters

Item	Name	Deployment model	Account kind	Storage service encryption	Resource Group	Replication	Location
Storage Account	ctx-xae99	Resource Manager	Standard	Disabled	ctx-resrouce-group1	Read-access geo-redundant storage	Australia East

Table 3: Storage account parameters

Item	User name	First and last names	Role	Alternate email address	Subscription
Azure Active Directory Account	XAE-User01	XAE User01	Global administrator	XAE-user01@xae.test	Owner

Table 4: Azure Active Directory Account parameters

Appendix B Catalog Creation Summary

After creating the catalog, some items are configured within both the Citrix Cloud and Azure environments, called a resource location. The resource location includes:

- Cloud Connectors:
 - Two virtual machines deployed within Azure and configured as Citrix Cloud Connectors:
 - The default virtual machine type is the A2v2 instance.
 - The naming of these virtual machines is similar to Xenppxx-Conny. Where xx is derived from an environmental factor and y is an ordinal number.
 - The virtual machine account goes in an Active Directory container based on selections you made during catalog creation.
 - The virtual machines go into the resource group based on selections you made during catalog creation.
 - A new storage account is created in the resource group for each Cloud Connector.
 - A new availability set is created that hosts the two Cloud Connectors.
- XenApp Essentials Service workloads
 - The number of virtual machines deployed within Azure is based on the number selected during catalog creation.
 - Creates a resource group for the XenApp Essentials workload virtual machines.
 - Naming of these virtual machines is similar to Xenppxx-xx-yyy. Where xx is derived from an environmental factor and y is an ordinal number.
 - Places each virtual machine account into an Active Directory container based on selections you made during catalog creation.
 - Creates a storage account in the new resource group for all XenApp Essentials virtual machines (up to the limit of the storage account).

Within Citrix Cloud, a new resource location is defined with the two Cloud Connectors that were created automatically.



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