

Amazon AppStream 2.0: AutoCAD Deployment Guide

Build an Amazon AppStream 2.0 environment to stream AutoCAD or AutoCAD LTE to your users

April 2019

<https://aws.amazon.com/appstream2/>

Welcome

This guide describes how to deploy and stream AutoCAD for your company (in this example, DemoCo) by using [Amazon AppStream 2.0](#), a fully managed, secure application streaming service that runs in the AWS Cloud.

What you'll accomplish:

- Provision an Amazon virtual private cloud ([Amazon VPC](#)) to provide an isolated virtual network infrastructure within the AWS Cloud. Your AppStream 2.0 resources will use this environment.
- Use the [AWS Management Console](#) to perform the basic administrative tasks required to build an AppStream 2.0 environment. Specifically, you'll:
 1. Install and configure AutoCAD for streaming using an image builder.
 2. Provision a fleet of instances to stream your applications. The fleet will use either a Graphics Design or Graphics Pro instance type and adhere to scaling policies to match the number of users that you want to be able to stream concurrently.
 3. Provision a stack to create a web portal from which users can stream your applications.
 4. Configure persistent storage that users can access across application streaming sessions.
 5. Create a user pool to manage users who access your streaming applications.

What you need before starting:

- **An AWS account:** You need an AWS account to use AppStream 2.0 and other AWS services. For information about how to sign up for and activate an AWS account, see *Appendix A*.
- **A current email address:** During the user configuration process for your AppStream 2.0 environment, AWS sends you two emails. You must use these emails to complete the process.

- **Skill level:** You do not need prior experience with AWS to complete these exercises. A basic understanding of desktop computing is helpful but not required.
- **An active AutoCAD license.** AutoCAD Subscribers with Single User Subscription (SUS) license or Enterprise Business Agreement (EBA) licenses are eligible to use AutoCAD in a virtual environment
- **AutoCAD Requirements:** The hardware and software requirements for AutoCAD are available on the Autodesk [website](#). While each user may have different computing needs, the below table can serve as a reference for choosing an instance:

Use Case	Instance type
AutoCAD basic design and annotation (minimum required)	stream.graphics-design.xlarge
AutoCAD workflows involving 3D, medium-sized data sets, XREFS, and Blocks	stream.graphics-design.2xl
AutoCAD workflows involving 3D, large datasets, complex models, multiple XREFS and images (high performance)	stream.graphics-design.4xl <i>Note: For high-performance 2D-only workflows, stream.graphics-pro.4xl may provide slightly improved performance over the graphics-design instance type</i>

To learn more about the number of vCPU cores, RAM memory specifications of these instance families, see [Amazon AppStream 2.0 pricing](#)

- **End user client recommendations:** To use AutoCAD delivered through AppStream, your user would need a modern HTML browser such as Google Chrome, Mozilla Firefox, Microsoft Edge or Internet Explorer 11+. Your local computer should support a minimum display resolution of 1024x768. To use the application with multiple monitors or USB peripherals, you can use the AppStream client for Windows. The Windows client can be downloaded [here](#).

- **End user network recommendations:** AppStream2.0 uses an adaptive streaming protocol (NICE DCV) to deliver an interactive streaming session to users. The protocol encodes pixels on a remote host, securely transmits them over the network, and renders them on a client device. It also accepts user keyboard and mouse input, enables file transfer between client and remote host, and provides clipboard support to provide an interactive experience for a user when using streamed applications. While the streaming protocol adapts to changes on the screen and only transmits pixels when required, it will use the available bandwidth on the network. Also, since the streaming session is interactive, and the application on the remote host needs to respond to user inputs on a client device, the round-trip latency will influence the responsiveness that a user will experience.

The amount of bandwidth used when transmitting pixels is proportional to the changes on the screen and the resolution of the display monitor(s) used by the client device. The changes on the screen and the resolution are determined by the type of application (3D versus business application) and usage pattern (switching between windows and menus quickly). A 3D application may require a high-resolution monitor and trigger large changes to the screen when a user is interacting with complex hi-fidelity models. To transmit these changes on the screen quickly and provide a responsive experience to the user, the protocol will use a large amount of bandwidth momentarily. On the other hand, a business application may only involve text input. While changes to text on screen can be transmitted with very small amount of bandwidth, switching quickly between windows or menus within even a text-based application will result in large changes to the screen and hence drive momentary increases in bandwidth used. The round-trip network latency influences the responsiveness that a user perceives when entering input and viewing changes on the screen. While other factors such as quality of network, client device performance, and remote host instance selection can also influence the responsiveness, latency should be considered as one of the primary factors. In general, lower latency connections will deliver more responsive and performant streaming experience. Below are the recommendations for sample AutoCAD use-cases.

Use case	Recommended bandwidth available per user	Recommended maximum roundtrip latency
AutoCAD basic design and annotation	1-2 mbps	< 150 ms
AutoCAD workflows involving 3D, medium-sized data sets, XREFS, and Blocks	5-6 mbps	< 100 ms
AutoCAD workflows involving 3D, large datasets, complex models, multiple XREFS and images	10-12 mbps	< 50 ms

Note on Product Support:

Autodesk is not obligated to provide support services for support requests where the reported incident cannot be reproduced by Autodesk on a physical machine, outside of any virtualization environment. If you experience difficulties with AutoCAD in a virtual environment, please attempt to re-produce the issue on a physical device before creating a support request with Autodesk. Please refer the [Appendix D](#) for some troubleshooting tips if you run into any AutoCAD usability issues while you work through this guide.

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Step 1. Sign in to the AWS Management Console and select an AWS Region

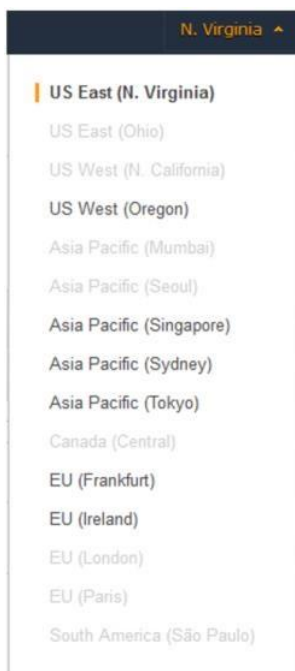
If you do not have an AWS account, you must first complete the steps in *Appendix A*.

1. Sign in to the AppStream 2.0 console at <http://console.aws.amazon.com/appstream2>.
2. Type your email address or your AWS account ID, and choose **Next**.
3. Type your AWS account password, and choose **Sign In**.
4. In the menu in the upper right corner of the console, select the AWS Region for your environment. AWS currently hosts services in 18 different geographical areas.



N. Virginia ▼ Support ▼

5. Select one of the following seven Regions in which AppStream 2.0 is available: Choose the AWS region that is closest to your end users who will be streaming AutoCAD for best performance and user experience.



Step 2: Create network resources

In this section, you will create an Amazon virtual private cloud (VPC) and other network resources required for your AppStream 2.0 environment. The following steps use a template in AWS CloudFormation to automatically create and configure the necessary network resources. To manually create and configure network resources, see *Appendix B*.

1. Make sure that you are signed in to the [AWS Management Console](#).
2. In the following list of regional choices, open the link associated with the AWS Region in which you want to build your AppStream 2.0 environment.

- [US East \(N. Virginia\)](#)
- [US West \(Oregon\)](#)
- [EU \(Frankfurt\)](#)
- [EU \(Ireland\)](#)
- [Asia Pacific \(Singapore\)](#)
- [Asia Pacific \(Sydney\)](#)
- [Asia Pacific \(Tokyo\)](#)

The AWS CloudFormation console displays the URL of a template that is used to create your network resources and the name of the resulting AWS CloudFormation stack.

3. Choose the Stack Name in the text box shown below. Then, in the bottom right corner of the window, choose **Create**. AWS CloudFormation starts creating the resources and displays a status message to indicate progress.

CloudFormation > Stacks > Create Stack

Create stack

Template

Template URL <https://s3.amazonaws.com/appstream-demo-vpc-cfn-template/AppStreamDemoVPCTemplate.template>

Description

Details

Stack name

[Cancel](#) [Create](#)

- When the creation process completes, usually within five minutes, the AWS CloudFormation console displays the status **CREATE_COMPLETE**.
- Navigate to the Amazon VPC console at <https://console.aws.amazon.com/vpc/>.
- In the navigation pane, under **Virtual Private Cloud**, choose **Your VPCs**.
- In the list of VPCs, you should see the following VPC that was automatically created (you may need to select the region where you created your AppStream 2.0 environment).

[Create VPC](#) [Actions](#)

Search VPCs and their properties

	Name	VPC ID	State	IPv4 CIDR
<input type="checkbox"/>	AppStream2 VPC	vpc-d6ff74ad	available	10.0.0.0/20

Note: The VPC ID value will differ for your VPC.

- In the navigation pane, under **Virtual Private Cloud**, choose **Subnets**. In the list of subnets, you should see the following subnets that were automatically created:

Create Subnet

Subnet Actions

Q

Search Subnets and their proj

X

<input type="checkbox"/>	Name	Subnet ID	State	VPC	IPv4 CIDR
<input type="checkbox"/>	AppStream2 Public Subnet	subnet-1a7dbb50	available	vpc-d6ff74ad AppStream2 VPC	10.0.0.0/24
<input type="checkbox"/>	AppStream2 Private Subnet2	subnet-fd405299	available	vpc-d6ff74ad AppStream2 VPC	10.0.2.0/24
<input type="checkbox"/>	AppStream2 Private Subnet1	subnet-c175b38b	available	vpc-d6ff74ad AppStream2 VPC	10.0.1.0/24

Note: The Subnet ID and VPC values will differ for your subnets.

9. You have now successfully created your network resources by using AWS CloudFormation. You can proceed to Step 3.

Step 3: Set up the license server

This step is only required for customers who will deploy AutoCAD with an Enterprise Business Agreement (EBA) Multi-User-License. If using Single-User-Subscription, proceed to Step 4.

We will now deploy the Autodesk Network License Manager (NLM) using an EC2 instance on AWS. AutoCAD applications running on your AppStream 2.0 streaming instances will contact this license server for license activation. In this section, you will:

- Configure an EC2 instance that will function as the license server.
- Configure VPC Security Group rules for the license server instance.
- Configure another EC2 instance that will be used to remotely administer the license server.
- Install and configure the NLM.
- Configure Windows Firewall on the license server instance to open up the license communication ports.

Configure an EC2 instance that will function as the license server

1. Open the Amazon EC2 console at <https://console.aws.amazon.com/ec2/>.
2. Click Launch Instance.

3. In **Step 1: Choose an Amazon Machine Image (AMI)**, select the Microsoft Windows Server 2016 Base Image.
4. In **Step 2: Choose an Instance Type**, select t2.large as the instance type, and then click Next: Configure Instance Details.
5. In **Step 3: Configure Instance Details**, choose the following a. Network – AppStream2 VPC b. Subnet – AppStream2 Private Subnet1
6. Leave the remaining options set to their default values, and then click Next: Add Storage.
7. In **Step 4: Add Storage**, in Size (GiB), enter 60, and then click Review and Launch.
8. In **Step 7: Review Instance Launch**, confirm that the instance configuration details are correct, and then click Launch.
9. In **Select an existing key pair or create a new key pair**, choose Create a new key pair. Provide a name for the instance key pair. Click Download Key Pair, download the key pair file and store it securely for future reference.

Select an existing key pair or create a new key pair

A key pair consists of a **public key** that AWS stores, and a **private key file** that you store. Together, they allow you to connect to your instance securely. For Windows AMIs, the private key file is required to obtain the password used to log into your instance. For Linux AMIs, the private key file allows you to securely SSH into your instance.

Note: The selected key pair will be added to the set of keys authorized for this instance. Learn more about [removing existing key pairs from a public AMI](#).

Create a new key pair

Key pair name
Demo Key Pair

Download Key Pair

You have to download the **private key file** (.pem file) before you can continue. Store it in a secure and accessible location. You will not be able to download the file again after it's created.

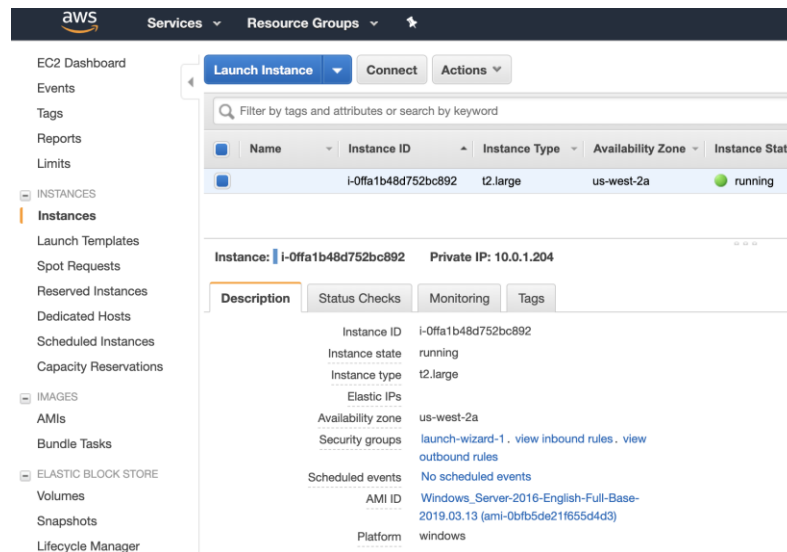
Cancel Launch Instances

10. Click Launch Instances.
11. Click View Instances to view the newly launched EC2 instance. This instance will be used as the license server and is provisioned in the private subnet.

Configure security group rules for the license server instance

1. On the EC2 Dashboard, in the navigation pane, select Instances, and then select the instance that you just launched.

- On the **Description** tab for the instance, click the name of the security group that is associated with the instance. The name of the security group is formatted as a link. Clicking this link opens the details page for the security group.



- On the details page for the security group, click the **Inbound** tab, and then click **Edit**. Enter the rules shown in the following screenshot, and then click **Save**.

The screenshot shows the 'Edit inbound rules' dialog box. It contains a table with two rules. Both rules are for 'Custom TCP' traffic from '0.0.0.0/0' to the instance. The first rule covers port range '27000 - 27009' and the second covers '2080'. Both are described as 'e.g. SSH for Admin Desktop'. There is an 'Add Rule' button and a note at the bottom stating that editing a rule will delete it and create a new one.

Type	Protocol	Port Range	Source	Description
Custom TCP	TCP	27000 - 27009	0.0.0.0/0	e.g. SSH for Admin Desktop
Custom TCP	TCP	2080	0.0.0.0/0	e.g. SSH for Admin Desktop

This allows AutoCAD applications to communicate with the AutoCAD license server. For more information, read about [ports used by the Autodesk Network License Manager](#).

- Click the Outbound tab and confirm that the outbound rule is configured as shown in the following screenshot.

Type	Protocol	Port Range	Destination	Description
All traffic	All	All	0.0.0.0/0	

Configure an EC2 instance that will act as the jump host to enable remote license server administration

1. Repeat the steps in the “Configure an EC2 instance that will function as the Autodesk license server” procedure to launch a second instance, but with the following changes for step 5 of the procedure (which describes how to select the instance subnet on the Configure Instance Details page):
 - a. In **Subnet**, select the public subnet (AppStream2 Public Subnet).
 - b. In **Enable for Auto-assign Public IP**, select Enable.

You will use this instance to connect to the license server that is deployed in the private subnet.

2. On the EC2 Dashboard, in the navigation pane, select **Instances**, and then select the new instance that you just launched.
3. On the **Description** tab for the instance, click the name of the security group that is associated with the instance.
4. On the details page for the security group, note the ID that is displayed in the Group ID column, or simply copy this ID to your clipboard. You will need to enter this ID later in the procedure.
5. On the navigation pane, click Instances to return to the list of EC2 instances.
6. Select the license server instance.
7. On the Description tab for the instance, click the name of the security group that is associated with the instance.
8. On the details page for the security group, click the Inbound tab, click Edit, and then click Add Rule.
9. Enter the third rule shown in the following screenshot.
 - a. In the Source box, enter the security group ID that you noted in step 4 (the ID shown in the screenshot is an example ID).
 - b. In the Source list, select Custom.

Type	Protocol	Port Range	Source	Description
Custom TCP	TCP	27000 - 27009	Custom 0.0.0.0/0	e.g. SSH for Admin Desktop
Custom TCP	TCP	2080	Custom 0.0.0.0/0	e.g. SSH for Admin Desktop
RDP	TCP	3389	Custom sg-0296ac83503e35491	e.g. SSH for Admin Desktop

NOTE: Any edits made on existing rules will result in the edited rule being deleted and a new rule created with the new details. This will cause traffic that depends on that rule to be dropped for a very brief period of time until the new rule can be created.

Cancel Save

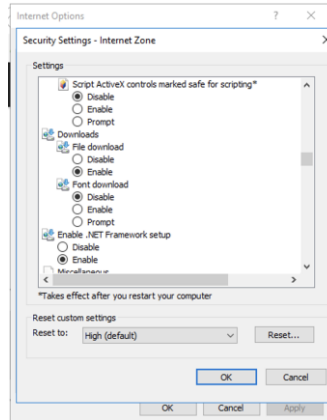
This rule adds one more security group rule to the security group associated with the license server instance. The rule enables you to use the jump host to establish a remote connection to the license server so that you can remotely administer the server.

10. Use the key pair file that you downloaded to your local computer earlier to obtain the password for the license server and the jump host. To do this, complete the following steps for each instance.
 - a. In the navigation pane, select Instances, select the instance, choose Connect, and in Connect To Your Instance, choose Get Password.
 - b. In Key Pair Path, click Browse, and then locate the file that contains the key pair associated with the instance.
 - c. Click Decrypt Password. Save the decrypted password to your local computer for later use.
 - d. Download the RDP connection file to your local computer so that you can use it to start a remote connection
11. On your local computer, open an RDP client to establish a remote connection to the jump host.
12. On the jump host, open an RDP client to establish a remote connection to the license server.

Install and configure the Autodesk Network License Manager

1. After you connect to the license server, navigate to [Autodesk Network License Administration](#) and download the Network License Manager for Windows 64-bit. You may need to alter your security preferences to enable downloads. If so, from internet explorer, click the **Tools** icon, and choose **Internet Options**. From Internet

Options, choose the **Security** tab, and choose **Custom Level**. Scroll to the options box and enable file downloads.



2. After downloading the Network License Manager Installer, open the file and complete the steps in the setup wizard. Use the default installation path.

Following installation, you should see the LMTOOLS Utility icon appear on your desktop



3. Install a license file:
 - a. Create a subfolder named Licenses under the folder in which you installed NLM. If you chose the default installation path (recommended) this will be:
C:\Autodesk\Network License Manager\Licenses.
 - b. Save your license file in this folder. You can choose any license filename but use the extension .lic. To learn more about obtaining a license file, [see here](#).
4. Create a debug log file:
 - a. Create a subfolder named Logs under the folder in which you installed NLM. If you chose the default installation path (recommended) this will be:
C:\Autodesk\Network License Manager\Logs.
 - b. Use a text editor to create a text file within the Logs subfolder.
 - c. Give the text file any name you like, but be sure to change the extension from .txt to .log.

5. Configure the NLM:
 - a. Open the LMTools Utility
 - b. From the **Service/License File** tab, verify that the **Configuration Using Services** option is selected.
 - c. Select the checkbox **LMTOOLS Ignores License File Path Environment Variables**.
 - d. From the **Config Services** tab, use the **Service Name** drop-down menu to specify a name.
 - e. Specify paths for the following three files:
 - i. **Path to the lmgrd.exe file**: Browse to select the file in your NLM folder.
 - ii. **Path to the license file**: Browse to select the license file you obtained from Autodesk.
 - iii. **Path to the debug log file**: Browse to select the debug log file you created earlier.

Note: Be sure that users and services have write access to the debug log file or folder.

 - f. Select **Use Services**. Then select **Start Server at Power Up**. This setting ensures that the license server starts automatically if the server rebooted after maintenance or a power outage.
 - g. Click **Save Service** and confirm.
 - h. To be sure the server is running, select the Start/Stop/Reread tab and

For more information on configuring a network license, [see here](#).

Configure Windows Firewall to open up the license server ports

Autodesk Network License Server uses the first available TCP port in 27000 to 27009 range for lmgrd (the master daemon) and TCP port 2080, which is reserved port for adskflex (Autodesk vendor daemon). Thus, after installing the Autodesk Network License Manager, network communication through these ports must be open in order to have a functional network license manager.

1. Select **Start -> Control Panel -> System and Security -> Windows Firewall**.
2. In the left pane, select **Advanced settings**.
3. Select **Inbound Rules**, and then **New Rule**.

4. Select **Port**, and then click **Next**.
5. Make sure that **TCP** is selected, enter 2080, 27000-27009 in **Specific local port**, and then click **Next**.
6. Select **Allow the connection**, and then click **Next**.
7. Select **Domain**, **Private**, and **Public**, and then click **Next**.
8. Enter a name for the rule, and then click **Finish**.

Step 4: Create an AppStream 2.0 image builder

AppStream 2.0 uses EC2 instances to stream applications. You launch instances, called *image builders*, from base images that AppStream 2.0 provides. To create your own custom image, you connect to an image builder instance, install and configure your applications for streaming, and then create your image by creating a snapshot of the image builder instance.

To install and configure applications to stream to your users, you must create an image builder instance as described in the following procedure.

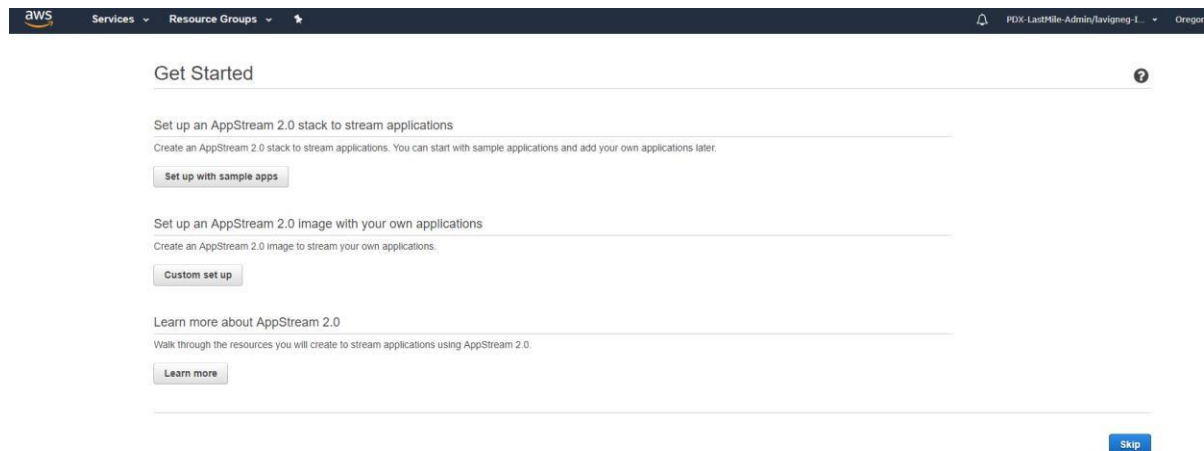
Deploy an image builder instance to install applications

1. Open the AppStream 2.0 console at <https://console.aws.amazon.com/appstream2>.
2. If you have not previously configured any AppStream 2.0 settings, the following page appears:



Note: If the AppStream 2.0 navigation page appears instead, skip to step 5.

3. Choose **Get started**.
4. In the lower right corner of the page, choose **Skip** (this guide walks you through a different process for getting started with AppStream 2.0).



5. In the navigation pane, choose **Images, Image Builder, Launch Image Builder**.
6. In the **Step 1: Choose Image** window, in the list of images, select the image builder with the name *Graphics-Design-Image-Builder-mm-dd-yyyy*, or *Graphics-Pro-Image-Builder-mm-dd-yyyy*, where *mm-ddyyyy* represents the most recent date. For best results, the image builder you choose should match the instance type of the virtual machines you intend to deploy (see page 3 of this guide for performance recommendations) Base images include the latest updates to Microsoft Windows and the AppStream 2.0 agent software. You use this base image to create a custom image that includes your own applications.
7. At the bottom of the page, choose **Next**.

8. In **Step 2: Configure Image Builder**, enter the below information:

Option	Value
Name	Provide a unique name identifier for the image builder, such as DemCo_Image_v1_mmddyyyy, using any of the following characters: a-Z, 0-9, -, _.
Display Name	Provide an optional name, such as “DemCo Image v1 April 2019”, to be displayed in the console for easier reference and readability.
Instance Family	Choose Graphics Design or Graphics Pro, depending on your choice in bullet 6.
Instance Type	Refer to page 3 of this guide for guidance on picking the right instance type.

9. Choose **Next** to continue to Step 3: Configure Network, then enter the below information:

Option	Value
Default Internet Access	Make sure that this option is not selected.
VPC	Select the option corresponding to AppStream 2 VPC .
Subnet	Select the subnet with the IP address range 10.0.1.0/24 (AppStream2 Private Subnet1).
Security group(s)	Accept the default security group listed.
Active Directory Domain (Optional)	Do not configure any options

10. Choose **Review** and confirm the details for the image builder. To change the configuration for any section, choose **Edit** and make your changes.

11. After you finish reviewing the configuration details, choose **Launch**. If an error message notifies you that you don't have sufficient limits to create the image builder, submit a limit increase request through the AWS Support Center. For more information, see [AWS Service Limits](#).
12. The image builder creation process takes about 15 minutes to complete. During this process, the status of the image builder displays as **Pending** while AppStream 2.0 provisions the necessary resources.
13. Click the **Refresh** icon periodically to update the image builder status. After the status changes to **Running**, the image builder is ready to use and you can create a custom image.

Note: Charges accrue for an image builder instance while it is running, even if no user is actively connected. You can stop or delete the image builder at any time. No user fees are incurred when users connect to an image builder. For more information, see [AppStream 2.0 Pricing](#).

Step 5: Connect to the image builder and install AutoCAD

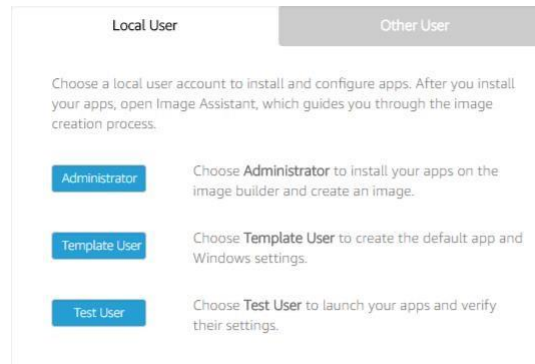
Now that you have provisioned an image builder, you can use it to install and configure the applications to stream to users. First, you must establish a remote connection to the instance to install and configure your applications.

Connect to the image builder instance

1. Open the AppStream 2.0 console at <https://console.aws.amazon.com/appstream2>.
2. In the navigation pane, choose **Images, Image Builder**.
3. Select the image builder instance that you created earlier (*DemoCo_Image1_mmdyyyy*). Verify that its status is **Running** and choose **Connect**.

Note: If the status is **Stopped**, select the instance, and choose **Actions, Start**. Click the **Refresh** icon periodically to update the instance list until the status is **Running**.

4. The new browser tab opens, displaying options for logging into the image builder instance. Choose **Local User, Administrator**.



Note: If a new browser tab does not open, configure your browser to allow popups from <https://console.aws.amazon.com/>.

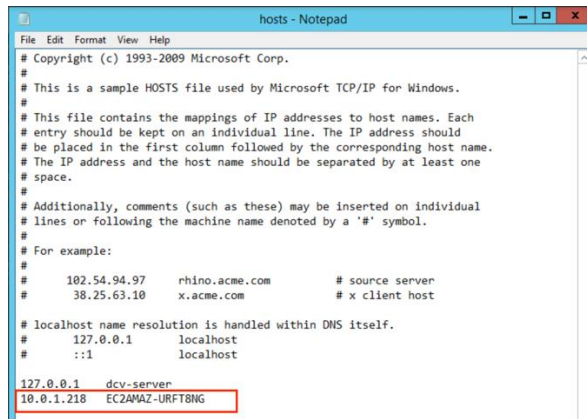
5. After a few moments, you are connected to the image builder instance with administrator rights.

Add the license server hostname to the host list

This is only required for deployments with a multi-user license. For single-user subscriptions, proceed to “Install AutoCAD”.

Customers with Enterprise Business Agreement Multi-User Licenses are entitled to run AutoCAD in a virtual environment. This step will map the IP address and the computer name of the license server to the hostname list of the image builder. This enables the image builder to communicate with the license server.

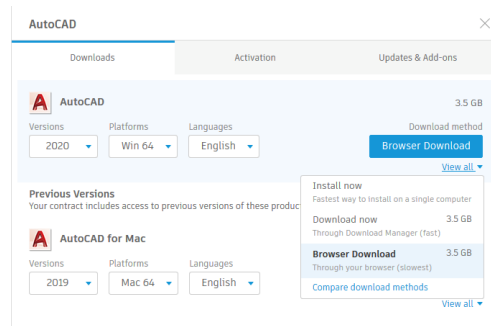
1. Log in into the license server EC2 instance by using the jump host.
2. After you are connected to the license server, open **Command Prompt**, type **ipconfig** and then press ENTER. Note the IP address of the license server.
3. At the command prompt, type **hostname** and then press ENTER. Note the computer name of the license server.
4. Switch to the AppStream 2.0 image builder. On the image builder, launch **Powershell** using the **Run as Administrator** option.
5. Browse to C:\Windows\system32\drivers\etc and open the hosts file by using the command notepad hosts.
6. Add the IP address and computer name to the hosts file as shown in the following screenshot, and then save the file.



```
# Copyright (c) 1993-2009 Microsoft Corp.
#
# This is a sample HOSTS file used by Microsoft TCP/IP for Windows.
#
# This file contains the mappings of IP addresses to host names. Each
# entry should be kept on an individual line. The IP address should
# be placed in the first column followed by the corresponding host name.
# The IP address and the host name should be separated by at least one
# space.
#
# Additionally, comments (such as these) may be inserted on individual
# lines or following the machine name denoted by a '#' symbol.
#
# For example:
#
# 102.54.94.97 rhino.acme.com      # source server
# 38.25.63.10  x.acme.com         # x client host
#
# localhost name resolution is handled within DNS itself.
# 127.0.0.1 localhost
# ::1 localhost
127.0.0.1 dcv-server
10.0.1.218 EC2AMAZ-URFT8NG
```

Install AutoCAD

1. From a browser within the image builder, navigate to the Autodesk Accounts portal, sign in, and go to **Products and Services**
2. Choose your preferred version of AutoCAD and select **Browser Download** (you may need to enable pop-ups for manage.autodesk.com to allow this)



3. When the download is complete, open the downloaded executable and follow instructions to install AutoCAD to a known file location in your image builder.
4. Choose to accept the licensing terms and conditions and click **Next**.
5. When the install is complete, you do not need to start AutoCAD.

Step 6: Use Image Assistant to create an AppStream 2.0 image

At this point, you have launched an image builder instance and installed AutoCAD on the image builder. Now you'll prepare the applications for streaming, optimize them for streaming performance, and create your image.

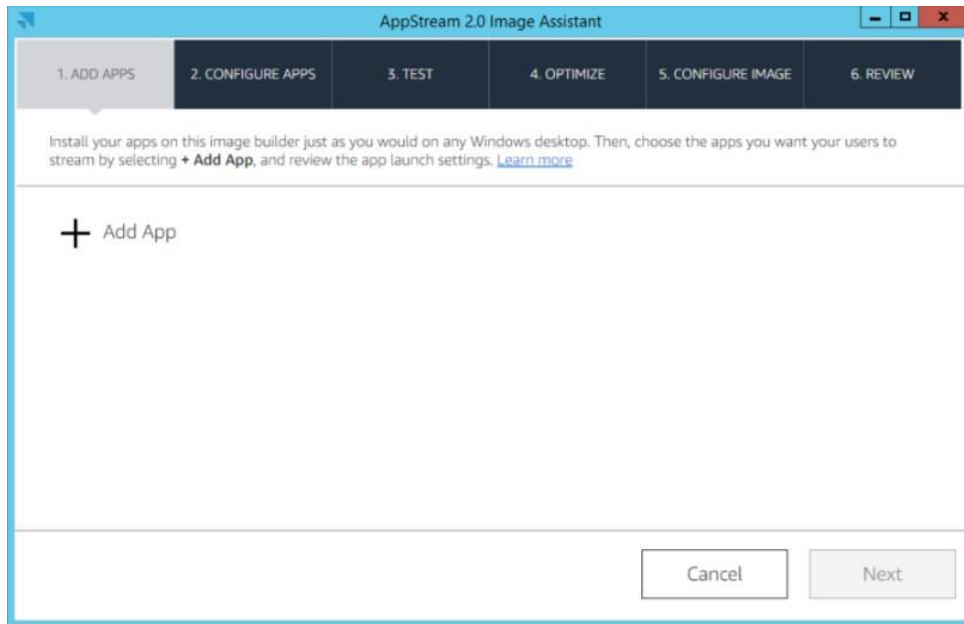
In this section, you'll do the following:

- Create an application catalog by using Image Assistant.
- Disable Internet Explorer Enhanced Security Configuration
- Test the application by using a local user account that has the same permissions that end users will have in their streaming sessions.
- Optimize the application's launch performance.
- Configure the image.
- Finish creating the image.

Create your AppStream 2.0 application catalog

The process of creating an AppStream 2.0 application catalog includes specifying the name, display name, executable file to launch, and icon to display for each application that you plan to stream.

1. From the image builder desktop, open Image Assistant.
2. In the **Add Applications to Image** dialog box, on the **Add Apps** tab, choose **Add App**.



3. Navigate to the location of the AutoCAD application executable (usually C:\Program Files\Autodesk\AutoCAD 20XX), select the application executable (acad.exe), and then choose **Open**.
4. In **Edit Application Setting**, type the following information and choose **Save**.

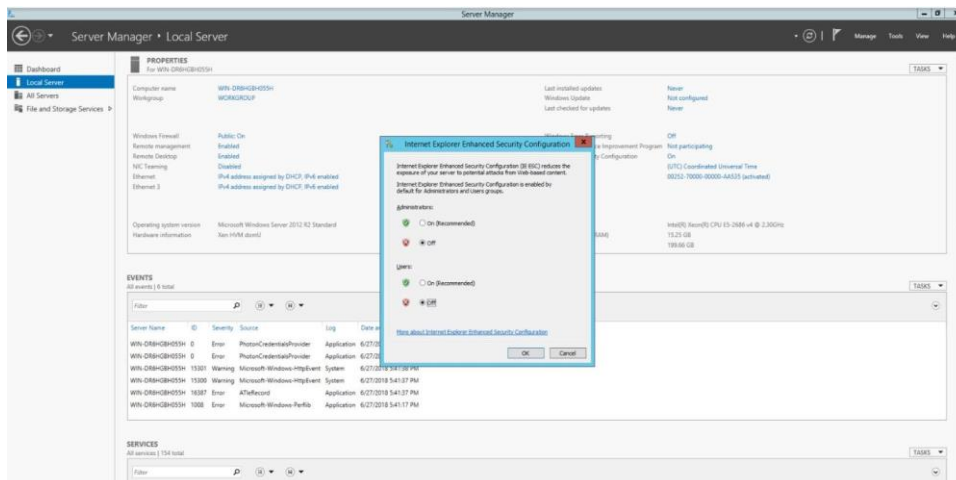
Option	Value
Name	Name of the application executable. This field is automatically populated and not editable.
Display Name	The name of the application that is displayed to end users. Type <i>AutoCAD</i> .
Launch Path	The location of your application executable file. Accept the default value.
Icon Path	Accept the default value of C:\ProgramData\Amazon\Photon\AppCatalogHelper...
Launch Parameters	Leave this blank.
Working Directory	Leave this blank.

5. Now that you have added AutoCAD to your catalog, choose **Next**.

Disable Internet Explorer enhanced security configuration

Applications use Internet Explorer to open http links embedded in the applications. When you launch one of these links, Internet Explorer displays a warning message for every webpage that it opens. This behavior is due to the Internet Explorer Enhanced Security Configuration, a security setting of IE that blocks access to web content and application scripts for security reasons. If this feature is turned on, the AutoCAD login prompt is not rendered correctly. We can safely disable this feature to proceed further. To disable this feature for AppStream 2.0 users, do the following.

1. Connect to your image builder as **Administrator**.
2. Open **Server Manager** from the Windows Task bar.
3. Choose **Local Server -> IE Enhanced Security Configuration**.
4. Choose Off option for both Administrators and Users.



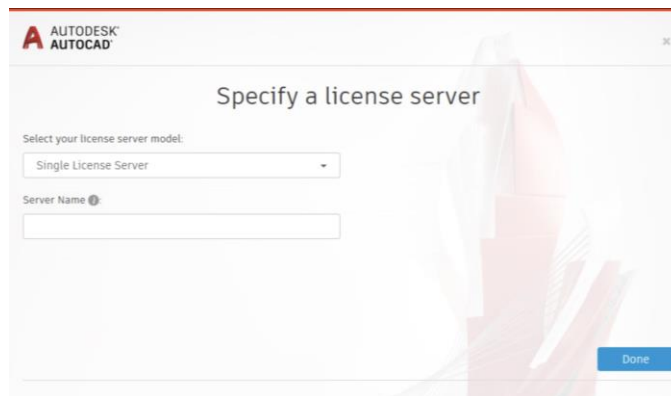
5. Choose **Admin Commands -> Switch User -> Template User** to switch to Template User account.
6. Once you are logged into the Template User account, go to the **Start** menu and search for **Internet Options**. Choosing Internet Options will open the Internet Properties dialog.
7. In the **Internet Properties** dialog, choose **Advanced**.

8. Click the **Reset** button. Click **Reset** again in the prompted dialog. Close **Internet Explorer** if it is open.
9. Switch to the **Administrator** account. Launch **Image Assistant**. Choose **Next** to proceed to the Configure step. From this tab, click **Save settings**. This will save the template user settings as default user settings.

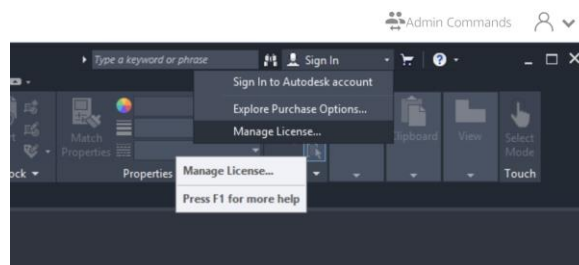
Configure multi-user licensing (if applicable)

Customers with Enterprise Business Agreement Multi-User Licenses are entitled to run AutoCAD in a virtual environment. Disabling the Internet Explorer Enhanced Security will allow you to properly configure AutoCAD with a Multi-User License.

1. Switch back to the **Template** User Account
2. Launch AutoCAD. When the “Let’s Get Started” icon appears, choose “Multi-User” and enter the name of the license server you previously created.



Note: if you do not successfully register a multi-user license on the first attempt, you can enter the name of the license server by going to “manage licenses” from the drop-down near the sign-in option.



3. Once you've successfully activated AutoCAD with a Multi-user license, close AutoCAD
4. Return to the **Administrator** account, and once again, proceed to the **Configure** step of the **Image Assistant**, and **Save Settings**.

Test your application by using a local user account

An image builder includes a test user account that enables you to test your applications by using the same policies and permissions as your users. Follow these steps to confirm that your applications open correctly.

1. In the **Test** tab, choose **Switch User, Test User**.

You are now logged into the same Windows Server 2012 R2 instance as a local user who has regular (non-administrative) user rights.

2. Open Image Assistant. In **Test Applications**, AutoCAD is displayed.
3. Choose the application to open it.
4. After successful authentication, wait for the application to launch fully. After validating the launch, close the application window.
5. Choose **Switch User**.
6. On the **Local User** tab, choose **Administrator**.
7. On the Image Assistant **Test** tab, choose **Next**.

Optimize the launch performance of your applications

During this step, Image Assistant opens your applications one after another, identifies their launch dependencies, and performs optimizations to ensure that applications launch quickly.

1. On the **Optimize** tab, choose **AutoCAD, Launch**.

2. Wait for AutoCAD to completely start, as prompted by the Image Assistant dialog.
3. After you complete the first run experience for the application and verify that it functions as expected, choose **Continue**.

Configure the image

1. On the **Configure Image** tab, type the following information.

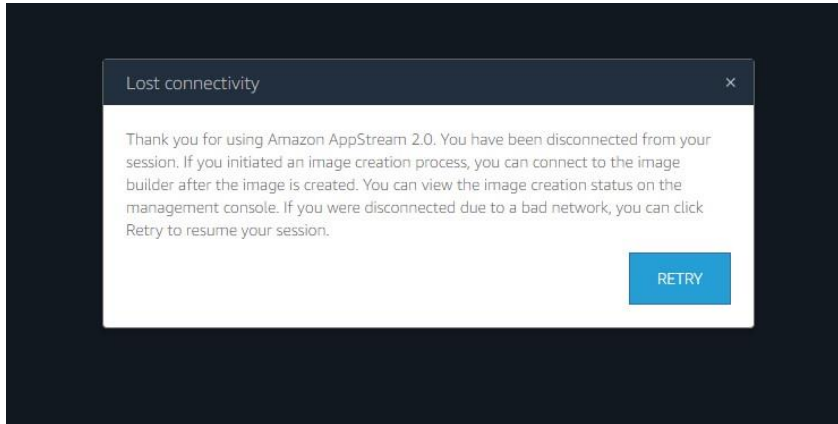
Option	Value
Name	The unique name identifier for the image, such as <i>DemoCo_Image_AutoCAD_v1_mmddyyyy</i> , using any of the following characters: a-Z,0-9,-,_,. Note: The name cannot begin with "Amazon," "AWS," or "AppStream."
Display Name	A user-friendly name to display in the console
Description	An optional description for the image: for example, <i>Image v1 created by (your initials or name) on mm/dd/20yy</i> .
Option	Value
Always use latest agent version	Leave this check box selected so that streaming instances that are launched from your image always include the latest AppStream 2.0 features, performance improvements, and security updates. For more information, see Amazon AppStream 2.0 Agent Version History .

Finish creating the image

Complete the following steps to disconnect from the remote session and start the image creation process.

1. Review the image details, and choose **Disconnect and Create Image**.

2. The remote session disconnects within a few moments. When the **Lost Connectivity** message appears, close the browser tab.



3. Return to the [Amazon AppStream 2.0 console](#) and choose **Images, Image Registry**. While your image is being created, the image status in the image registry of the console appears as **Pending**. While your image is being created, you cannot connect to it.
4. Click the **Refresh** icon periodically to update the status. Image creation takes about 20 minutes. After your image is created, the image status changes to **Available** and the image builder is automatically stopped.

Note: To make changes to your image, such as adding other applications or updating existing applications, you must create a new image. To do so, restart and reconnect to the image builder, make your changes, and then repeat the Image Assistant process to create a new image that includes the changes.

Step 7: Provision a fleet

An AppStream 2.0 fleet defines the hardware, network, Active Directory (if applicable), and scaling configuration for your application streaming infrastructure. For more information, see [Amazon AppStream 2.0 Stacks and Fleets](#).

In this section, you'll do the following:

- Provide details for your fleet.

- Choose an image.
- Configure the fleet.
- Configure the network.

Provide fleet details

1. Open the AppStream 2.0 console at <https://console.aws.amazon.com/appstream2>.
2. In the navigation pane, choose **Fleets**, **Create Fleet**.
3. For **Step 1: Provide Fleet Details**, type the following text and choose **Next**.

Option	Value
Name	The unique name identifier for the fleet, such as <i>DemoCo_Fleet_v1_mmdyyy</i> , using any of the following characters: a-Z,0–9,-,_,. Note: The name cannot begin with "Amazon," "AWS," or "AppStream."
Display Name	The name displayed in the console, such as <i>DemoCo Fleet v1 April 2019</i> .
Description	An optional description for the fleet. For example, <i>Fleet v1 created by (your initials or name) on mm/dd/20yy</i> .

Choose an image

For Step 2: Choose an image, choose the image that you created, scroll to the bottom of the page, and then choose **Next**.

Configure the fleet

1. **For Step 3: Configure fleet**, in **Choose instance type**, you define the hardware configuration for each of the instances that make up your fleet. Because you created the image by using the Graphics Design or Graphics Pro family, the instance type is already populated. However, you can select any of the four instance type options that are presented.

2. For this exercise, select the **Graphics Design** instance family, and then choose **stream.graphics-design.xlarge**. For more information, see [Amazon AppStream 2.0 Instance Families](#).
3. Under **Fleet Type details**, choose a fleet type that suits your needs. The fleet type determines the availability of streaming instances and affects your costs. You can choose either of the following:
 - **Always-on**: Instances run all the time, even when no users are streaming applications. When this option is selected, instances are immediately available for the next user to connect to immediately.
 - **On-Demand**: Instances run only when users are streaming applications. Idle instances that are available for streaming are in a stopped state. When this option is selected, a user must wait for one to two minutes for an instance to start up.

For this exercise, select the **On-Demand** option.

4. Under **User session details**, define the maximum amount of time that users can be connected to streaming sessions and how long streaming sessions should remain active after users disconnect.
 - **Maximum session duration** defines how long user streaming sessions can remain active. If users are still connected to a streaming session five minutes before this limit is reached, they are prompted to save any open documents before being disconnected. Choose a time most appropriate for your users (ex. 12 hours)
 - **Disconnect timeout** defines how long user streaming sessions can remain active after users are disconnected. If users try to reconnect to the streaming session after a disconnection or network interruption within this time interval, they are connected to the previous session. After the disconnect timeout expires, the session is terminated, and the user must start a new session to reconnect. Choose a time most appropriate for your users (ex. 15 minutes)
5. Configure your **Fleet capacity**.

- Capacity is defined in terms of the number of instances within a fleet and, consequently, every unique user streaming session that is served by a separate instance.
- The minimum capacity for your fleet is the minimum number of users who are expected to be streaming at the same time (ex. 2).
- The maximum capacity for your fleet is the maximum number of users who are expected to be streaming at the same time (ex 6).

6. Choose **Next**.

Configure the network

1. For **Step 4: Configure Network**, make sure that the **Default Internet Access** check box is not selected. This option does not need to be selected because you already configured a VPC with a NAT gateway to provide internet access.
2. For **VPC**, select **vpc-xxxxxxx (AppStream2 VPC)**.
3. For **Subnet 1**, choose **subnet-xxxxxxx | (10.0.1.0/24)**. This is the AppStream2 Private Subnet1.
4. For **Subnet 2**, choose **subnet-xxxxxxx | (10.0.2.0/24)**. This is the AppStream2 Private Subnet2.
5. For **Security group(s)**, choose the default option.
6. Choose **Next**.
7. Confirm the fleet configuration details. To change settings for any section, choose **Edit**, and make the needed changes. After you finish reviewing the configuration details, choose **Create**.
8. In the pricing acknowledgement dialog box, select the acknowledgement check box, and choose **Create** to begin provisioning your fleet with the initial set of running instances.

Create AppStream 2.0 Fleet [On-Demand] ✕

You will be charged the streaming instance fees when users are connected, and a small hourly fee for each instance in the fleet that is not streaming apps. You will also be charged for monthly user fees for any users who connect and stream their applications in a month. Charges for streaming instances and user fees are not eligible for the AWS Free Tier. [Learn more](#)

☒ I acknowledge that I have read the pricing details and want to continue.

Cancel Create

Note: If an error message notifies you that you don't have sufficient limits to create the fleet, submit a limit increase request to the AWS Support Center. For more information, see [Amazon AppStream 2.0 Service Limits](#).

Fleet provisioning usually takes 10 minutes to finish. While your fleet is being created and fleet instances are provisioned, the status of your fleet displays as **Starting** in the **Fleets** list. Choose the **Refresh** icon periodically to update the fleet status until the status is **Running**.

9. After the status changes to **Running**, the fleet is available and you can use it to create a stack.

Step 8: Create an AppStream 2.0 stack and a streaming URL

An AppStream 2.0 stack consists of a fleet, user access policies, and storage configurations. You create a stack to start streaming applications to users.

In this section, you'll do the following:

- Provide details for your stack and associate your stack with a fleet.
- Enable persistent storage for the stack.
- Create a streaming URL.

Provide stack details and associate the stack with a fleet

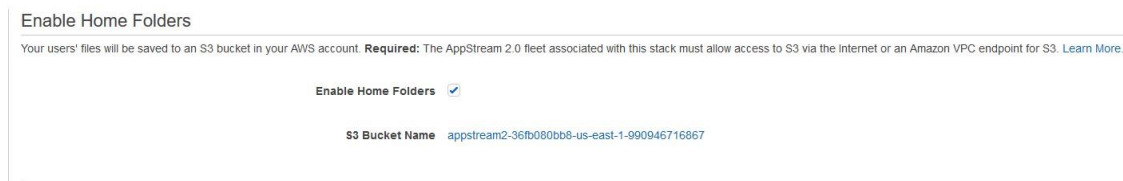
1. Open the AppStream 2.0 console at <https://console.aws.amazon.com/appstream2>.
2. In the navigation pane, choose **Stacks**, **Create Stack**.
3. For **Step1: Stack Details**, type the following information and choose **Next**.

Option	Value
Name	The unique name identifier for the stack, such as <i>DemoCo_Stack_mmddyyyy</i> , using any of the following characters: a-Z,0–9,-,_. Note: The name cannot begin with "Amazon," "AWS," or "AppStream."
Display Name	The name displayed in the console, such as <i>DemoCo Stack April 2018</i> .
Description	An optional text box where you can enter details of the stack:
Redirect URL (Optional)	An optional URL to which users are redirected at the end of their streaming session. Type: <i>https://aws.amazon.com</i>
Feedback URL (Optional)	An optional URL for your users to submit feedback Type: <i>https://aws.amazon.com</i>
Fleet	Select the fleet that you created.

Enable persistent storage for the stack

1. For **Step 2: Enable Storage**, make sure that the **Enable Home Folders** option is selected. When this option is selected for an AppStream 2.0 stack, users of the

stack are presented with a persistent storage folder in their AppStream 2.0 sessions. Data stored by users in their Home Folders is backed up to an Amazon S3 bucket that is automatically created in your AWS account. You can also enable *Google Drive for G Suite* or *OneDrive for Business* as user storage options if you use of these storage providers. For more information, see [Persistent Storage with AppStream 2.0](#).



2. For **Step 3: User Settings**, choose the **Clipboard**, **File transfer**, and **Print to local device** options for your users. The default settings grant your users maximum flexibility.
3. Check the **Enable applications settings persistence** box if you would like AutoCAD settings to be persistent for this stack.

note: this will create persistent settings for all users on this stack

4. Choose **Review**.
5. Confirm the stack configuration details. To change the settings for any section, choose **Edit** and make the needed changes. After you finish reviewing the configuration details, choose **Create**.

After a few moments, the **Stacks** list reappears. Your stack is listed with a status of **Active**.

Step 9: Manage user access with an AppStream 2.0 user pool

An AppStream 2.0 user pool is a built-in identity management feature that you can use to enable users to access their streamed applications. Alternatively, you can use SAML

2.0 to federate through Microsoft Active Directory or any other custom identity solution provider that supports SAML 2.0.

Note: This guide describes how to manage user access to AppStream 2.0 with the user pool. For information about configuring third-party SAML 2.0 identity provider solutions to work with AppStream 2.0, see [AppStream 2.0 Integration with SAML 2.0](#).

To enable users in the user pool to open applications after they sign in to the AppStream 2.0 user portal, you must assign each user to at least one stack that contains applications. After you assign the user to a stack, AppStream 2.0 sends an optional notification email to the user with instructions about how to access the stack and a URL. The user can access the stack by using the URL until you delete the stack or unassign the user from the stack.

In this section, you'll configure an AppStream 2.0 user pool and grant a user access to AppStream 2.0 by doing the following:

- Create a user in the user pool. AppStream 2.0 then sends a welcome email with instructions and a temporary password.
- Assign the stack that you created to the user.

Create a user

1. Open the AppStream 2.0 console at <https://console.aws.amazon.com/appstream2>.
2. In the navigation pane, choose **User Pool, Create User**.
3. In the **Create User** dialog box, type the following information and choose **Create User**.

Option	Value
Email	An active email address that you can access.
First Name	The first name of the user.
Last Name	The last name of the user.

4. After a few moments, the **User Pool** list refreshes, and the user is listed and enabled.

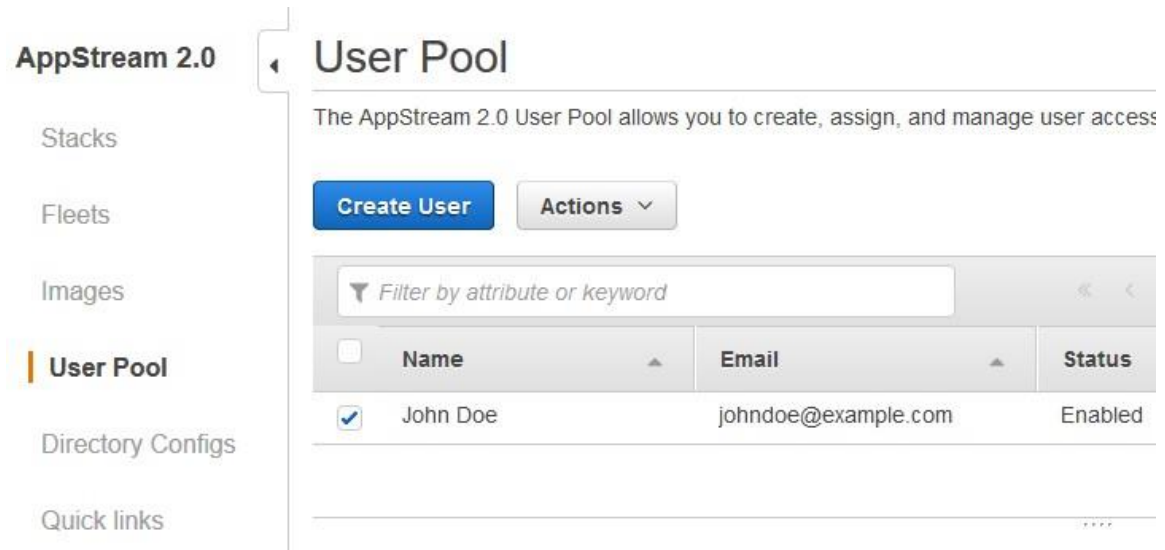


Figure 10: The User Pool dashboard showing the newly created user.

Assign a stack to the user

1. In the navigation pane, choose **User Pool**, and select the user that you created.
2. Choose **Actions**, **Assign Stack**.
3. In the **Assign Stack** dialog box, for **Stack**, select the stack that you created earlier.
4. Leave the **Send email notification to user** option selected.
5. Choose **Assign Stack**.
6. After a few moments, the **User Pool** list refreshes. The user that you created appears under **User Details** with as an assigned stack.

The screenshot shows the 'AppStream 2.0' management console. On the left is a sidebar with navigation links: 'Stacks', 'Fleets', 'Images', 'User Pool' (which is highlighted with an orange bar), 'Directory Configs', and 'Quick links'. The main content area is titled 'User Pool' and includes a sub-header: 'The AppStream 2.0 User Pool allows you to create, assign, and manage user access to your stacks.' Below this are two buttons: 'Create User' (in blue) and 'Actions' (in grey with a dropdown arrow). A search bar with the placeholder text 'Filter by attribute or keyword' is positioned above a table. The table has three columns: 'Name', 'Email', and 'Status'. It contains one entry for 'John Doe' with email 'johndoe@example.com' and status 'Enabled'. Below the table is a 'User Details' section. It displays the user's information: Name (John Doe), Email (johndoe@example.com), Status (Enabled), and Stacks (DemoCo_Stack_04182018). A 'Resend welcome email' button is located next to the status field.

AppStream 2.0

User Pool

The AppStream 2.0 User Pool allows you to create, assign, and manage user access to your stacks.

[Create User](#) [Actions](#)

Filter by attribute or keyword

Name	Email	Status
<input checked="" type="checkbox"/> John Doe	johndoe@example.com	Enabled

User Details

Name John Doe

Email johndoe@example.com

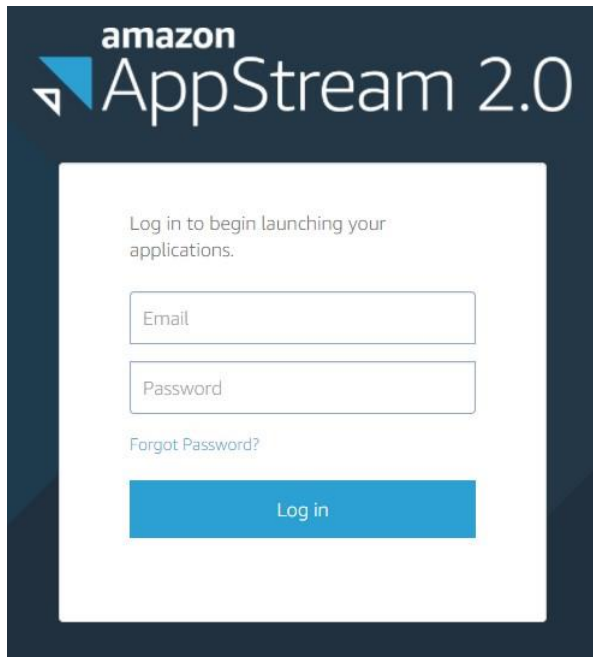
Status Enabled [Resend welcome email](#)

Stacks [DemoCo_Stack_04182018](#)

Step 10: Test the end user authentication and application streaming experience

In the previous section, you added a user to the user pool by providing a name and an email address and then assigned a stack to the user. AppStream 2.0 sent an email to the email address after each action. To test the end user experience, sign in to AppStream 2.0 as the user that you created and start a streaming session.

1. Open the first notification email that you received, and open the **Login page** link. The AppStream 2.0 portal sign-in page opens in your browser.



2. Type the email address used for the user that you created and the temporary password that was provided in the email, and then choose **Log in**.
3. When prompted, type a new password, confirm it, and then choose **Set Password**. The AppStream 2.0 application catalog page opens, displaying the applications that are available for streaming.
4. Choose an application to begin streaming.

Step 11: Take the next step with AppStream 2.0

Congratulations, you have now successfully created an AppStream 2.0 environment to stream applications. Below is an architectural diagram illustrating the AppStream 2.0 environment you created:

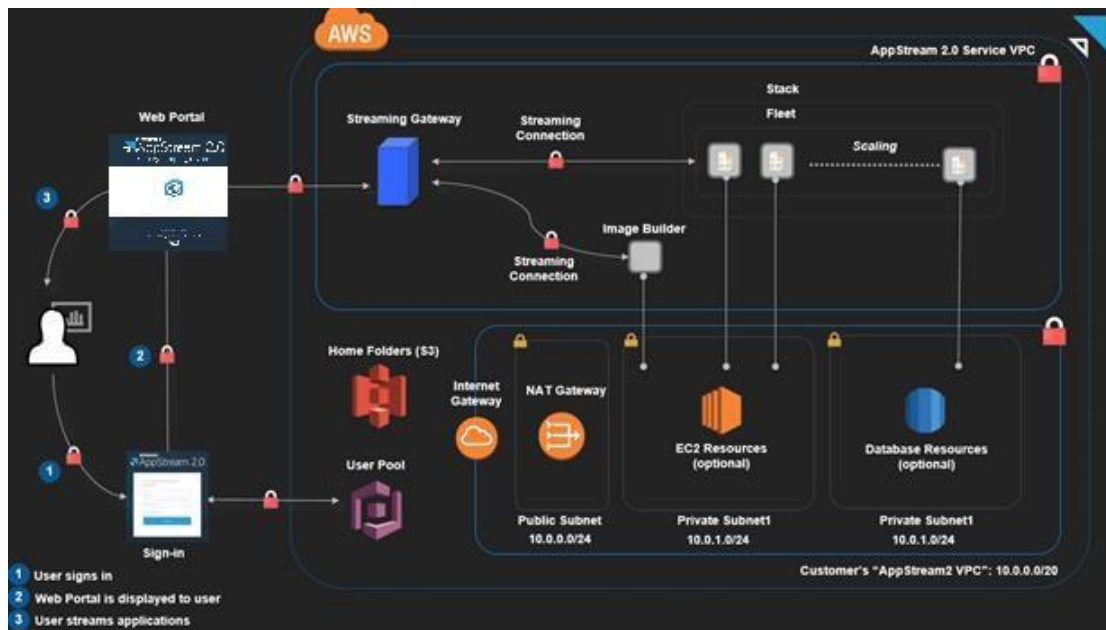


Figure 13: Your AppStream 2.0 environment.

This guide provided an introduction to AppStream 2.0 by walking you through basic configuration and deployment exercises for AutoCAD. To increase your understanding of AppStream 2.0 and take advantage of more features, consider doing the following:

1. Try using different instance types and sizes to match your application's requirements. For information about the different instance types and sizes available for AppStream 2.0, and their pricing, see [Amazon AppStream 2.0 Pricing](#).
2. Enable single sign-on (SSO) access to your streamed applications through SAML 2.0. When you do this, your users can use their existing credentials to sign into AppStream 2.0 streaming sessions through your own web portal. For more information, see [Single Sign-on Access to AppStream 2.0 Using SAML 2.0](#).
3. Join your AppStream 2.0 fleets and image builders to domains in Microsoft Active Directory. Your users can then benefit from access to Active Directory network resources such as printers and file shares from within their streaming sessions. You can also apply Group Policy settings to your streaming instances and users to meet the needs of your organization. For more information, see [Using Active Directory with AppStream 2.0](#).
4. Configure your fleet scaling policies to increase or decrease the number of instances available to users in response to changes in user demand or according

to time of day. For more information, see [Fleet Auto Scaling for Amazon AppStream 2.0](#).

Important: Remember to delete the resources that you created in these exercises to avoid further charges to your account. For information about how to delete AppStream 2.0 resources, see *Appendix E*. For more information about AppStream 2.0 pricing, see [Amazon AppStream 2.0 Pricing](#).

Appendix A: Create and activate an AWS account

If you do not already have an AWS account, complete the following steps to create and activate one. During this process, you do the following:

- Create your AWS account.
- Add a payment method.
- Verify your phone number.
- Select an AWS Support plan.
- Watch for three account confirmation emails.

Create your AWS account

1. In a browser window, open the [Amazon Web Services](https://aws.amazon.com/) webpage.
2. Choose **Create an AWS Account**. If you've signed in to AWS recently, you might see **Sign In to the Console** instead. If **Create a new AWS account** isn't visible, choose **Sign in to a different account, Create a new AWS account**.
3. On the **Create an AWS Account** page, type a valid email address, a password and password confirmation, and an AWS account name.
4. You must note the account name, email address, and password that you choose for your AWS account because you need these credentials to sign in to AWS.
5. Choose **Continue**.
6. On the **Contact Information** page, the option to choose a company account or personal account is available. These two account types function identically. For the exercises in this guide, choose **Personal Account**, and then enter the requested contact information.
7. Review the **AWS Customer Agreement** and select the corresponding check box.
8. Choose **Create Account and Continue**.

Note: After you receive an email to confirm that your account is created, you can sign in to your new account by using the email address and password that you provided. However, you must continue with the activation process before you can use AWS services.

Add a payment method

On the **Payment Information** page, type the requested information associated with your payment method. If the address for your payment method is the same as the address you provided for your account, choose **Secure Submit**.

Otherwise, choose **Use a new address**, type the billing address for your payment method, and then choose **Secure Submit**.

Verify your phone number

1. On the **Phone Verification** page, type a phone number that you can use to accept incoming calls.
2. Type the code displayed in the captcha.
3. When you're ready to receive the call, choose **Call me Now**. In a few moments, you'll receive an automated call from AWS that prompts you to enter your PIN to validate the AWS account.
4. When you receive the call, enter the provided PIN on your phone's keypad.
5. After the process is complete, choose **Continue**.

Choose an AWS Support plan

On the **Select a Support Plan** page, choose **Basic**. For information about AWS Support, see [AWS Support Features](#).

After you choose a Support plan, a confirmation page indicates that your AWS account is being activated. Accounts are usually activated within a few minutes, but the process may take up to 24 hours. If you attempt to sign in to the AWS Management Console before your account is active, the following message appears:

Your service sign-up is almost complete!

Thanks for signing up with Amazon Web Services. Your services may take up to 24 hours to fully activate. If you're unable to access AWS services after that time, here are a few things you can do to expedite the process:

1. Make sure you provided all necessary information during signup. [Complete your AWS registration](#).
2. Check your email to see if you have received any requests for additional information. If you have, please respond to those emails with the information requested.
3. Verify your [credit card information](#) is correct. Also, check your credit card activity to see if there's a \$1 authorization (this is not a charge). You may need to contact your card issuer to approve the authorization.

If the problem persists, please contact Support:

Contact Support

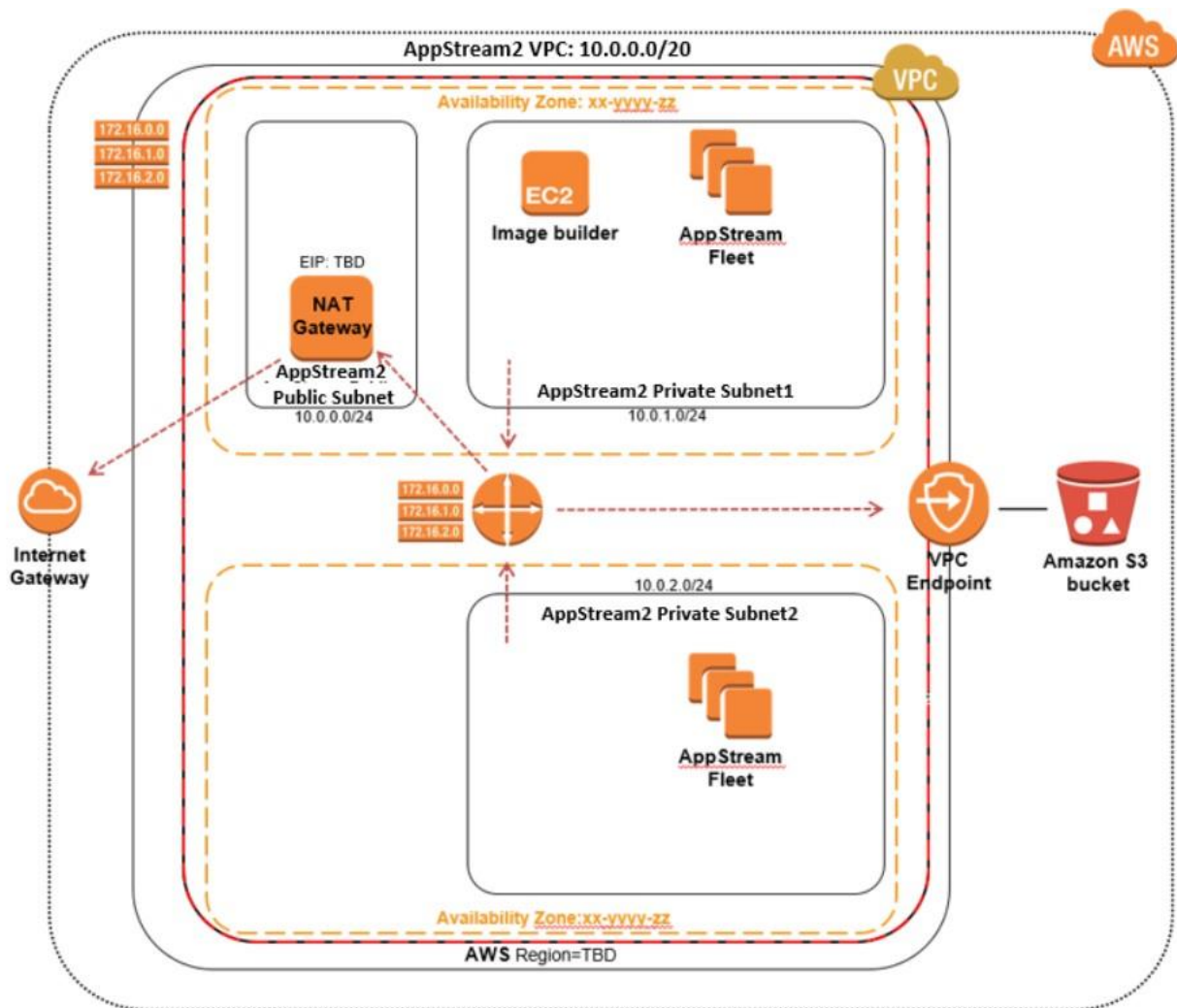
Watch for three AWS account confirmation emails

When you sign up for your account, you receive three account confirmation emails:

- The first email, with a subject line of "Welcome to Amazon Web Services," confirms the creation of your AWS account and is sent almost immediately after you verify your phone number.
- The second email, with a subject line of "AWS Support (Basic) Sign-Up Confirmation," confirms the AWS Support option that you selected during the account creation process.
- The third email, with a subject line of "Your AWS Account is Ready - Get Started Now," is sent after your AWS account ID is ready to use. After you receive this email, you can access AWS services by using the [AWS Management Console](#).

Appendix B. Manually create and configure network resources

Step 2 of this guide described how to use a CloudFormation template to automatically create and configure the necessary network resources for your AppStream 2.0 environment. To manually create and configure network resources, follow the steps in this appendix. At the end of this appendix, the topology of your "DemoCo" VPC should look similar to the following diagram:



Note: The CIDR block assignments for the private subnets might be reversed depending on the availability zones used by the VPC wizard.

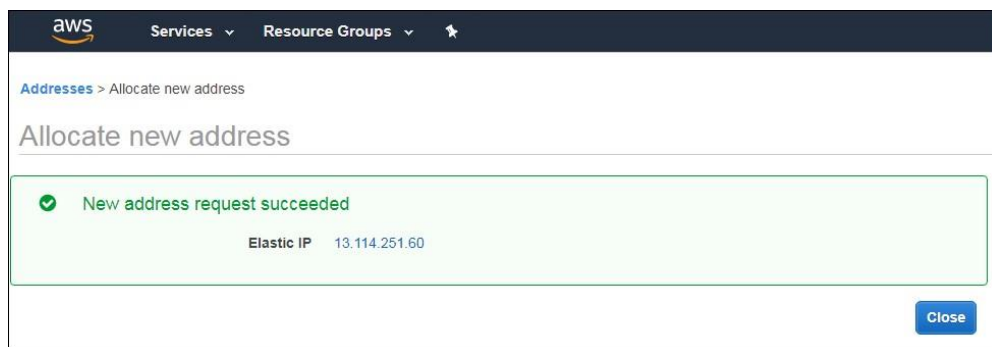
AppStream VPC requirements

At a minimum, AppStream 2.0 requires a VPC that includes one public subnet and two private subnets. A public subnet has direct access to the internet through an internet gateway. A private subnet requires a Network Address Translation (NAT) gateway or NAT instance to access the internet.

Allocate an Elastic IP address

Before you create your VPC, you must allocate an Elastic IP address in your AppStream 2.0 region. An Elastic IP address enables your streaming instances to be accessible through an internet gateway.

1. Open the Amazon EC2 console at <https://console.aws.amazon.com/ec2>.
2. In the navigation pane, under **Network & Security**, choose **Elastic IPs**.
3. Choose **Allocate New Address** and then choose **Allocate**.
4. Note the Elastic IP address and then choose **Close**.



Create a VPC by using the VPC Wizard

The easiest way to start building your VPC environment is to use the VPC Wizard. The wizard guides you through the process of creating a public subnet, private subnet, NAT gateway, and internet gateway, with the correct route table configurations.

1. Open the Amazon VPC console at <https://console.aws.amazon.com/vpc/>.
2. In the navigation pane, choose **VPC Dashboard**, **Start VPC Wizard**.
3. In **Step 1: Select a VP Configuration**, choose **VPC with Public and Private Subnets**, **Select**.

Services
Resource Groups

Step 1: Select a VPC Configuration

VPC with a Single Public Subnet

VPC with Public and Private Subnets

VPC with Public and Private Subnets and Hardware VPN Access

VPC with a Private Subnet Only and Hardware VPN Access

In addition to containing a public subnet, this configuration adds a private subnet whose instances are not addressable from the Internet. Instances in the private subnet can establish outbound connections to the Internet via the public subnet using Network Address Translation (NAT).

Creates:

A /16 network with two /24 subnets. Public subnet instances use Elastic IPs to access the Internet. Private subnet instances access the Internet via Network Address Translation (NAT). (Hourly charges for NAT devices apply.)

Select

4. In **Step 2: VPC with Public and Private Subnets**, type the following information and then choose **Create VPC**.

Option	Value
IPv4 CIDR block	10.0.0.0/20
IPv6 CIDR block	Accept the default value: No IPv6 CIDR Block
VPC Name	AppStream2 VPC
Public subnet's IPv4 CIDR	Accept the default value: 10.0.0.0/24
Availability Zone	Accept the default value: No Preference
Public subnet name	AppStream2 Public Subnet
Private subnet's IPv4 CIDR	Accept the default value: 10.0.1.0/24
Availability Zone	Accept the default value: No Preference
Private subnet name	AppStream2 Private Subnet1

Option	Value
Elastic IP Allocation ID	Click in the text box and select the value that corresponds to the Elastic IP address you created. This address is assigned to the NAT gateway.
Service endpoints	Choose Add Endpoint .
Service	Select the entry in the list that ends with "s3" (the <code>com.amazonaws.xx-rrrr-x.s3</code> service that corresponds to the region in which the VPC is being created). Note: This is not the default value.
Subnet	Select <i>Private subnet</i> .
Policy	Accept the default value: <i>Full Access</i>
Enable DNS hostnames	Accept the default value: <i>Yes</i>
Hardware tenancy	Accept the default value: <i>Default</i>

Note: The VPC names and subnet names are for identification purposes only. You can use different names.

- After a few minutes, when a message in the VPC dashboard notifies you that the VPC is created, choose **OK**.

Add a second private subnet

- In the navigation pane, choose **Subnets**.
- Select the subnet with the name **AppStream2 Private Subnet1**. On the **Summary** tab, below the list of subnets, make a note of the Availability Zone for this subnet.

Search Subnets and their projects

<< 1 to

Name	Subnet ID	State	VPC	IPv4 CIDR	Available IPv4	IPv6 CIDR	Availability Zone
AppStream2 Private Subnet2	subnet-fd405299	available	vpc-d6ff74ad AppStream2 VPC	10.0.2.0/24	251		us-east-1b
	subnet-3d64f812	available	vpc-c98ab7b1	172.31.80.0/20	4091		us-east-1c
	subnet-2feeb464	available	vpc-c98ab7b1	172.31.16.0/20	4091		us-east-1d
	subnet-ff4827c0	available	vpc-c98ab7b1	172.31.64.0/20	4091		us-east-1e
	subnet-d3b7278e	available	vpc-c98ab7b1	172.31.32.0/20	4091		us-east-1a
	subnet-b23161d6	available	vpc-c98ab7b1	172.31.0.0/20	4091		us-east-1b
AppStream2 Private Subnet1	subnet-c175b38b	available	vpc-d6ff74ad AppStream2 VPC	10.0.1.0/24	250		us-east-1d

subnet-c175b38b | AppStream2 Private Subnet1

Summary | Route Table | Network ACL | Flow Logs | Tags

Subnet ID: subnet-c175b38b | AppStream2 Private Subnet1

IPv4 CIDR: 10.0.1.0/24

IPv6 CIDR:

State: available

VPC: vpc-d6ff74ad | AppStream2 VPC

Available IPs: 250

Availability Zone: us-east-1d

Route table: rtb-831e9aff | AppStream2 Private Route Table

Network ACL: acl-c0a140ba

Default subnet: no

Auto-assign Public IP: no

Auto-assign IPv6 address: no

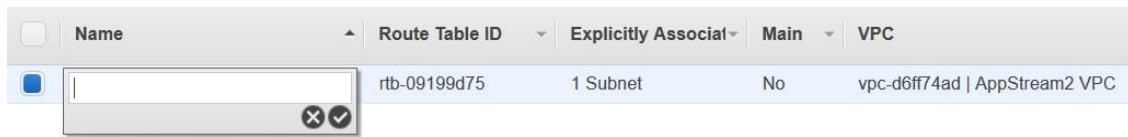
- At the top of the same page, choose **Create Subnet**. Enter the following information in the **Create Subnet** dialog box and then choose **Yes, Create**.

Option	Value
Name tag	<i>AppStream2 Private Subnet2</i>
VPC	Select the VPC with the name <i>AppStream2 VPC</i> .
Availability Zone	Select an Availability Zone other than the one you are using for AppStream2 Private Subnet1. Selecting a different Availability Zone increases fault tolerance.
IPv4 CIDR block	<i>10.0.2.0/24</i> (This is a subset of the CIDR block for your VPC.)

Modify the subnet route tables

- In the navigation pane, choose **Subnets**, and then select the subnet with the name **AppStream2 Public Subnet**.
- On the **Route Table** tab, note the ID of the route table (similar to *rtb-XXXXXXXXXX*).
- In the navigation pane, choose **Route Tables** and select the route table with the ID that you noted in the previous step.

4. For **Name**, open the empty field, type *AppStream2 Public Route Table*, and then select the check mark to save your changes.



5. Make sure that **AppStream2 Public Route Table** is still selected. On the **Routes** tab, verify that the route table includes the following two routes:

Destination	Target
10.0.0.0/20	local
0.0.0.0/0	igw-XXXXXXXXXX

These two routes function as follows for all resources within a subnet that is associated with the route table:

- Local: All traffic from the resources destined for IPv4 addresses within the 10.0.0.0/20 CIDR block is routed locally within the VPC.
- Outbound: Traffic destined for all other IPv4 addresses is routed to the internet gateway (identified by *igw-XXXXXXXXXX*) that was created by the VPC Wizard.

To modify the route table, choose **Edit** and make the needed changes. For more information, see [Route Tables](#).

6. In the navigation pane, choose **Subnets** and select the subnet named **AppStream2 Private Subnet1**.
7. On the **Route Table** tab, note the ID of the route table (similar to *rtb-XXXXXXXXXX*).
8. In the navigation pane, choose **Route Tables** and select the route table with the ID you noted in the previous step.
9. For **Name**, open the empty field, type *AppStream2 Private Route Table*, and then select the check mark to save your changes.

<input type="checkbox"/>	AppStream2 Public Route Table	rtb-09199d75	1 Subnet	No	vpc-d6ff74ad AppStream2 VPC
<input checked="" type="checkbox"/>	AppStream2 Private Route Table	rtb-831e9aff	0 Subnets	Yes	vpc-d6ff74ad AppStream2 VPC
<input type="checkbox"/>		rtb-c7d654ba	0 Subnets	Yes	vpc-c98ab7b1

10. Make sure that **AppStream2 Private Route Table** is still selected, and on the **Routes** tab, verify that the route table includes the following routes:

Destination	Target
10.0.0.0/20	<i>local</i>
0.0.0.0/0	<i>nat-XXXXXXXXXXXXXXXXXXXX</i>
pl-YYYYYYYYY (com.amazonaws.<region>-<#>.s3)	<i>vpce-ZZZZZZZZ</i>

These three routes function as follows for all resources within a subnet that is associated with the route table:

- Local: All traffic from the resources destined for IPv4 addresses within the 10.0.0.0/20 CIDR block is routed locally within the VPC.
- Storage: Traffic destined for S3 buckets is routed to the S3 endpoint (identified by *vpce-ZZZZZZZZ*).
- Outbound: Traffic destined for all other IPv4 addresses is routed to the NAT gateway (identified by *nat-XXXXXXXX*).

To modify the route table, choose **Edit** and make the needed changes. For more information, see [Route Tables](#).

11. In the navigation pane, choose **Subnets** and select the subnet with the name **AppStream2 Private Subnet2**.
12. On the **Routes** tab, verify that the route table is the one named AppStream2 Private Route Table. If the route table is different, choose **Edit** and select this route table.

Appendix C. Clean up your AppStream 2.0 resources

Although you can continue to use this AppStream 2.0 environment, keep in mind that you pay for your running resources. For more information, see [Amazon AppStream 2.0 Pricing](#).

Cleaning up the resources that you created frees up resources and helps you avoid unintended charges to your account.

Stop and delete your image builder

1. Open the AppStream 2.0 console at <https://console.aws.amazon.com/appstream2>.
2. In the navigation pane, choose **Images, Image Builder**.
3. Confirm whether the image builder that you created in Step 3 in this guide is in a stopped state. If not, select the image builder and choose **Actions, Stop**. If you created multiple image builders, repeat this step for each image builder that you created.
4. After the image builder has stopped, choose **Actions, Delete**. Repeat this step for each image builder that you created.

Revoke stack permissions for users in the user pool

1. In the navigation pane, choose **User Pool**.
2. Select the user you created in Step 9 in this guide and choose **Actions, Unassign stack**. This action revokes the stack permissions for the user.

Disassociate your fleets from your stack and delete your stack

1. In the navigation pane, choose **Stacks**.
2. Select the stack you created and choose **Actions, Dissociate Fleet**. This action dissociates the fleet from the stack.
3. To delete the stack, choose **Actions, Delete**.

Stop and delete your fleet

1. In the navigation pane, choose **Fleets**.
2. Confirm whether the fleet that you created in Step 6 in this guide is in a stopped state. If not, select the fleet and choose **Actions, Stop**.

3. After the fleet has stopped, choose **Actions, Delete**.

Appendix D. Troubleshooting

1. **Cursor Latency:** As AutoCAD does not use the default system cursor, users may experience latency in the movement of the cursor using AutoCAD in a virtualized environment. Setting the CURSORTYPE system variable to 1 replaces the AutoCAD crosshairs cursor with the Microsoft Windows® mouse pointer and may reduce latency. [Learn more about CURSORTYPE here.](#)
2. **Full-Screen and the “Esc” key:** Many users will prefer to use AutoCAD on AppStream with AppStream in “Full Screen” mode. However, if the user enters full-screen mode by clicking the corresponding symbol on the AppStream Toolbar, then the “Esc” key will exit out of full-screen mode. This may be undesirable as the “Esc” key is commonly used in AutoCAD. There are workarounds for this for users on both Windows and Mac computers.
 - **Windows:** Enter full-screen mode using the button on the AppStream toolbar, then exit using the “F11” key instead of “Esc”. Hitting “F11” a second time will then bring the window back to full-screen, but “Esc” will not exit this view. The AppStream toolbar will remain at the top of the window, but the browser UI will be hidden.
 - **Mac:** Use the green “Maximize” button to enter full-screen mode. The AppStream toolbar will remain at the top of the window, but “Esc” will not exit full-screen mode.

Appendix E. Additional resources

1. For more information about Autodesk’s Virtualization Policy and support for Autodesk Products in virtual environments, please visit the [Autodesk Virtualization Policy](#)
2. For more information about AppStream 2.0, please visit the following resources:
 - [Amazon AppStream 2.0 Product Details](#)
 - [Amazon AppStream 2.0 Pricing Details](#)
 - [Amazon AppStream 2.0 FAQs](#)

- [Amazon AppStream 2.0 Developer Guide](#)
- [Amazon AppStream 2.0 API Reference](#)
- [Amazon AppStream 2.0 CLI Reference](#)
- [Amazon AppStream 2.0 Try It Now Demo](#)
- [Amazon AppStream 2.0 Resources](#)