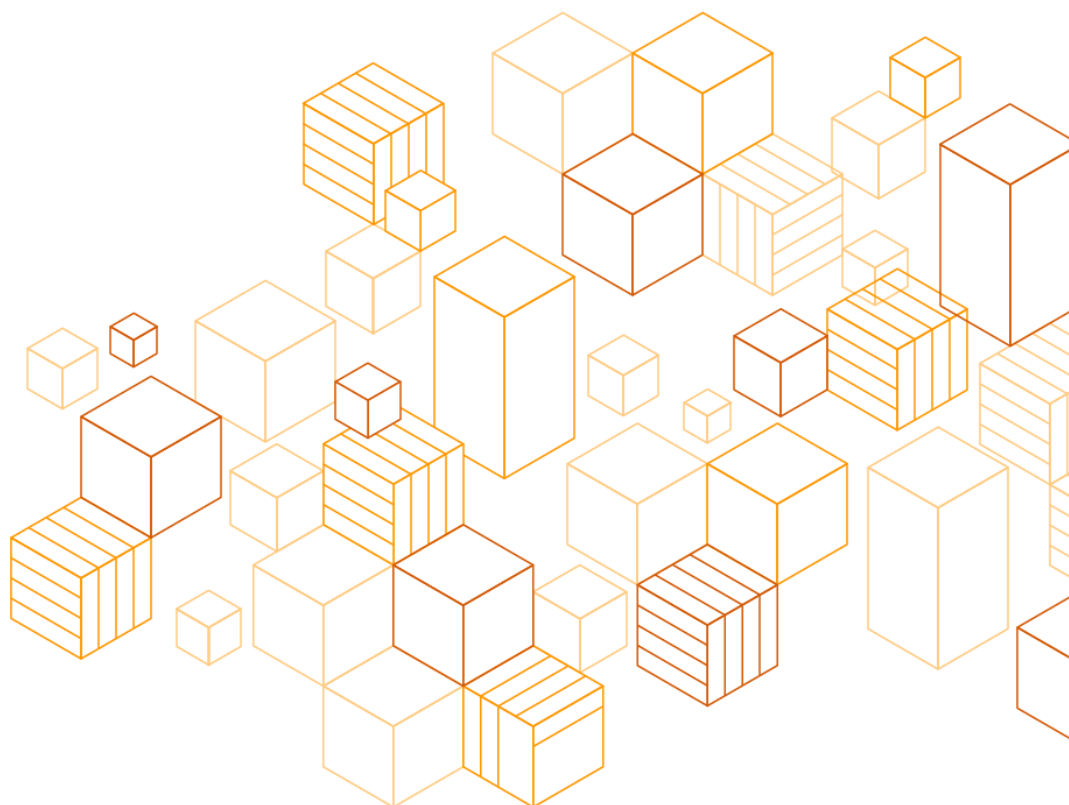


# Running Adobe® Creative Cloud on Amazon AppStream 2.0

## Deployment Guide

*October 2021*



## Notices

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## About this guide

This guide helps cloud architects to build an Amazon AppStream 2.0 environment and deploy Adobe Creative Cloud applications such as Adobe Photoshop, Adobe Premiere Pro to users. Adobe Creative Cloud is a collection of 20+ desktop and mobile apps and services for photography, design, video, web, UX and more. Amazon AppStream 2.0 is a fully managed, secure application streaming service.

This guide is intended for IT decision-makers and infrastructure or networking professionals who are familiar with the basic concepts of networking, operating systems, installing and operating Adobe Creative Cloud products.

## Overview

Adobe Creative Cloud is a collection of 20+ desktop and mobile apps and services for photography, design, video, web, UX and more. Amazon AppStream 2.0 is a fully managed application streaming service.

Accessing Adobe Creative Cloud products in virtualized environments has become increasingly important for educational institutions to provide remote access to students. Educational institutions can use AppStream 2.0 to simplify application delivery and provide every student access to the Adobe Creative Cloud applications they need for education on any computer anywhere.

This guide helps cloud architects quickly deploy a secure and scalable Amazon AppStream 2.0 stack running Adobe Creative Cloud applications.

### 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 VPC.
- Use the [AWS Management Console](#) to perform the basic administrative tasks required to build an AppStream 2.0 environment. Specifically, you'll:
  - Install and configure Adobe Creative Cloud applications for streaming using an [AppStream image builder](#).
  - Provision a fleet of instances to stream your applications. The fleet will use either a Graphics Design or Graphics G4 instance type and adhere to scaling policies set by you to match the number of users that you want to stream applications concurrently.
  - Provision a stack to create a web portal from which users can stream your applications.
  - Configure persistent storage that users can access across application streaming sessions.
  - Create a user pool for authentication and user management for streaming applications.

## Before you begin

You should consider and know the following prior to starting the instructions included in this guide.

- **Skill Level:** You do not need prior experience with AWS to complete these exercises. A basic understanding of core AWS technologies, including Amazon Virtual Private Cloud (VPC), Security Groups, Network Access Control Lists, subnetting, and routing is helpful but not required.
- **Adobe Creative Cloud License:** You will need access to a [named user license](#) for Creative Cloud to install the desired applications such as Adobe Photoshop, Adobe Premiere Pro etc. Education licenses for Creative Cloud can be purchased from [Adobe.com](#) or [Amazon.com](#). [Shared Device License \(SDL\)](#) is not permissible in a virtualized environment at this time. [Request a consultation with Adobe](#)<sup>1</sup> for questions regarding licensing for Education.
- **Adobe Creative Cloud Virtualization Support Policy:** Creative Cloud products are permitted in virtualized environments. Adobe will support technical issues that can be replicated in a virtual environment as well in a supported OS environment. Refer to [Adobe's virtualization policy and support for Adobe's Products in virtual environments](#) for full details.
- **An AWS account:** You would need an AWS account to use AppStream 2.0 and other AWS services. [Refer to this link](#) for information about how to sign up for and activate an AWS account.
- **AWS Privileges:** You would need sufficient privileges to setup and manipulate the required resources involved in this guide. For instructions on setting permissions for AppStream 2.0 resources and operations, see the [Identity and Access Management](#) for Amazon AppStream 2.0 chapter of the Amazon AppStream 2.0 Administrator Guide. AWS recommends applying the principles of Least Privilege when granting access to resources to reduce potential attack surface. This principle entails granting users no more than the minimum amount of privilege required to perform their role.

- **Increase Service Limits:** By default, AWS sets quotas (also referred to as limits) for the resources that you can create and the number of users who can use the service. The service limit quotas for AppStream 2.0, which include various instance types and families are listed [here](#). To request a quota increase, use the [AppStream 2.0 Limits form](#). Also, you can see the current AWS service quotas assigned to your AWS account by using the [Service Quotas console](#). More information about AWS service limits is available [here](#).
- **Supported Availability Zones:** As of writing this guide, Amazon AppStream 2.0 is supported in nine AWS regions across the world. See the [AWS Region Table](#) for current list of supported regions.
- **End user client requirements:** Users can access streaming applications hosted on AppStream 2.0 through an [HTML5-capable web browser](#) such as Google Chrome, Mozilla Firefox, Microsoft Edge or Internet Explorer 11+ on desktop computers such as a Windows, Mac, Chromebook, or Linux computer. AppStream 2.0 streaming is also supported on touch enabled tablet devices such as Chrome or Safari on an iPad (iOS 11 or later), Android tablets (Android 8 or later) and Microsoft Surface Pro (Windows 10) tablets. Also, there is Windows client available for true windows native experience. Refer to [AppStream Supported Clients](#) for details.
- **Bandwidth recommendations:** AppStream 2.0 uses an adaptive streaming protocol (NICE DCV) to deliver an interactive streaming session to users. It is recommended that users have a broadband Internet connection with 5 Mbps bandwidth per user for Graphics applications. For additional information, see [bandwidth recommendations for AppStream 2.0](#). The best user experience is achieved when maximum roundtrip latency is around than 100 ms. and users are located within 2000 miles from the AWS Region where AppStream 2.0 is hosting applications. Although users who have less bandwidth available can still stream their applications, the frame rate or image quality may not be optimal.
- **Creative Cloud Applications on AppStream 2.0:** As of writing, Adobe Fresco and Adobe XD ([known issues](#)) are not compatible or have issues with creating images or streaming on AppStream 2.0.
- **Creative Cloud Applications Installation Method:**
  - Using Creative Cloud Desktop App: For individual or small number of users, Creative cloud applications can be installed by installing the [Creative Cloud Desktop Application](#) on AppStream 2.0 image builder instance. This method is also suitable for building a proof of concept.



- Using Packager: For enterprise licenses, Creative cloud applications can be installed by using [Adobe Packager](#) to create a package and then install the package on image builder instances. Installation using packages provides IT admins with additional control over creative cloud applications, updates and settings.

## Cost

The AWS cost associated depends upon Amazon AppStream 2.0 streaming resources that you provision plus a small monthly fee per streaming user. Streaming resources consist of AppStream 2.0 fleet instances (on-Demand or always-on) and image builder instances. Fleet instances and image builder instances are billed per hour, and the price per hour is based on the instance type and size you select and the selected AWS region where you deploy the resources.

Refer to [AppStream 2.0 pricing](#) for more information on pricing. Also, [AppStream 2.0 pricing tool](#) can be a useful resource to estimate costs.

## Instance types and sizing

Adobe Creative Cloud requires compute from the [AppStream Graphics Instance families](#) which include Graphics Design, Graphics G4 and Graphics Pro. Graphics Design instance family is recommended to run Adobe Creative Cloud applications. Alternately, Graphics G4 instances can be used for higher performance for graphic intensive workloads.

Size of the instances such as large, extra-large dictate the number of vCPU cores, memory and GPU memory available to applications.

This guide uses “**stream.graphics-design.xlarge**” instance type and size in the setup instructions based on [Adobe’s recommendation](#) for Photoshop to use a GPU memory of 2 GiB or more. This instance size offers a good price / performance balance.

G4 instance type (stream.graphics.g4dn.xlarge or above) is recommended for graphic intensive applications such as Adobe Dimension based on [Adobe’s recommendation](#) to have 16GiB GPU memory. Although, Adobe Dimension will still run on “stream.graphics-design.xlarge” as it meets the minimum GPU memory requirements specified by Adobe.

The best size of the instance to use will depend upon the requirements for Adobe Creative Cloud applications you want to run, your users' workload needs and the cost considerations of your organization.

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

## Fleet types and capacity

Amazon AppStream 2.0 offers two fleet types: Always-On and On-Demand. Always-On fleet instances are in a running state, even if no users are connected. This is best when your users need high availability and instant access to their applications. On-Demand fleets instances don't start until a user connects to an instance within the fleet. This fleet type is best when your users can wait up to 2 minutes to start their applications, and for streaming applications that have sporadic use.

The maximum fleet capacity depends upon the simultaneous users that you expect to stream applications concurrently. AppStream 2.0 monitors your fleet utilization and performs automatic adjustments to fleet capacity to meet your user demand. The capacity adjustments are made based on scaling policies that you define based on the current utilization or based on a schedule. Auto scaling applies both to Always-On and On-Demand fleets.

## Architecture overview

Below is an architectural diagram illustrating the AppStream 2.0 environment that you will create:

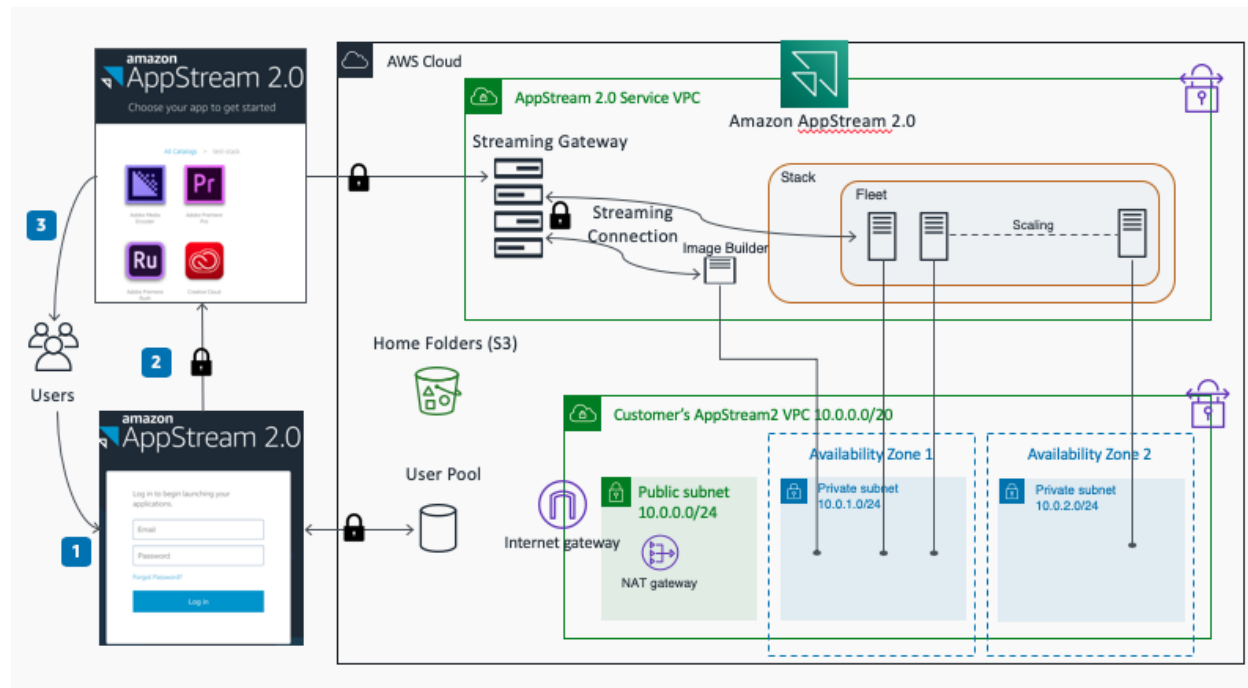


Figure 1 – AppStream 2.0 environment hosting Adobe Creative Cloud Applications

## Getting started

This section describes the steps for provisioning Adobe Creative Cloud Applications on AppStream 2.0:

### Sign in to the AWS Management Console and select an AWS Region

If you do not have an AWS account, [Refer to this link](#) for information about how to sign up for and activate an AWS account.

1. Sign in to the [AppStream 2.0 console](#)
2. Type your email address or your AWS account ID, and choose **Next**
3. Type your AWS account password, and choose **Sign In**.

4. Select one of the following seven Regions in which AppStream 2.0 is available from the menu in the upper right corner of the console. It is recommended to choose the region closest to your user base to provide the best experience.

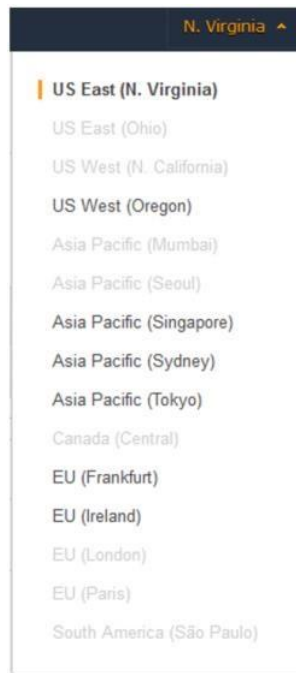


Figure 2 – AWS console region selection menu

## 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 [create and configure a new VPC](#) in the AppStream 2.0 developer guide.

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. By clicking the below mentioned links, AWS CloudFormation console will open, displaying the URL of a template<sup>2</sup> that will be used to create your network resources and the name of the resulting AWS CloudFormation stack.
  - [US East \(N. Virginia\)](#)
  - [US West \(Oregon\)](#)

- [EU \(Frankfurt\)](#)
  - [EU \(Ireland\)](#)
  - [Asia Pacific \(Singapore\)](#)
  - [Asia Pacific \(Sydney\)](#)
  - [Asia Pacific \(Tokyo\)](#)
3. Customize the **Stack name** in the text box shown below. Then, in the bottom right corner of the window, click **Create Stack**. AWS CloudFormation starts creating the resources and displays a status message to indicate progress.

CloudFormation > Stacks > Create stack

### Quick create stack

**Template**

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

Stack description  
-

**Stack name**

Stack name

AppStreamDemoVPC

Stack name can include letters (A-Z and a-z), numbers (0-9), and dashes (-).

**Parameters**

Parameters are defined in your template and allow you to input custom values when you create or update a stack.

**No parameters**

There are no parameters defined in your template

Cancel Create change set **Create stack**

Figure 3 – CloudFormation create stack wizard

4. When the creation process completes, usually within five minutes, the AWS CloudFormation console displays the status **CREATE\_COMPLETE**.

5. Navigate to the [Amazon VPC console](#) by choosing Services->VPC from the services menu in the AWS console.
6. In the navigation pane, under **Virtual Private Cloud**, choose **Your VPCs**.
7. 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).

<input type="checkbox"/>	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.

8. 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:

<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.

You have now successfully created your network resources by using AWS CloudFormation. You can proceed to deploy an image builder to install Adobe Creative Cloud applications.

## Create an AppStream 2.0 image builder

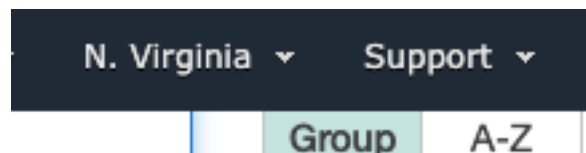
AppStream 2.0 uses Amazon EC2 instances to stream applications. To create your own custom image, you connect to an image builder instance, install and configure your applications for streaming, and then create your image by creating a snapshot of the image builder instance.

To install and configure Adobe Creative Cloud applications to stream to your users, you must create and configure an image builder instance. In this section, you will

- Deploy an image builder instance to install applications
- Connect to the image builder instance
- Configure Image Builder Settings
  - Disable Internet Explorer Enhanced Security Configuration
  - Configure Privacy Settings for Microphone Access

### Deploy an image builder instance to install applications

1. Open the [AppStream 2.0 console](#) by choosing Services->AppStream 2.0 from the services menu in the AWS console.
2. Choose or verify that you are still in the desired AWS region from the top right menu bar.



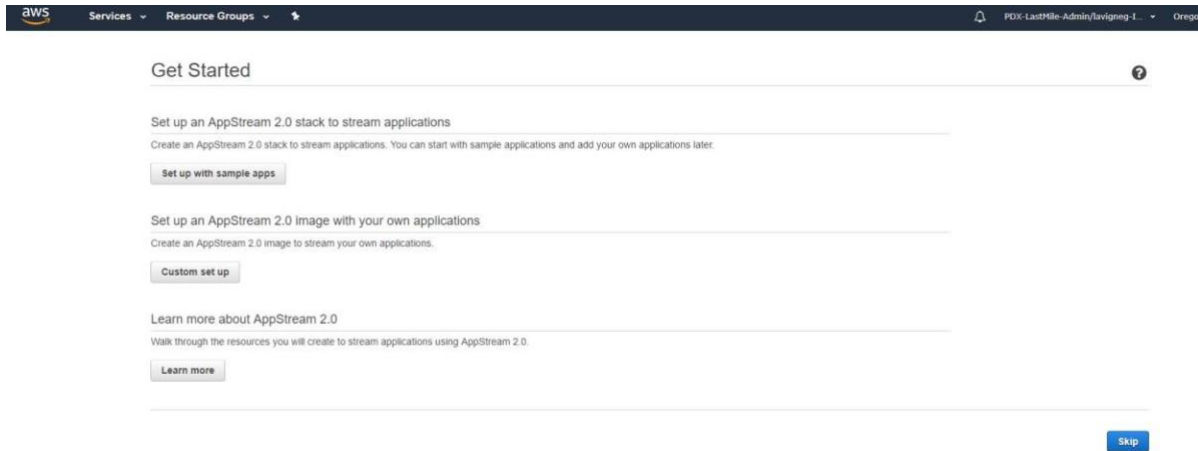
3. If you have not previously configured any AppStream 2.0 settings, the following page appears:



**Note:** If the AppStream 2.0 navigation page appears instead, skip to step 6.

4. Choose Get started.

5. 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).



6. In the right navigation pane, choose Images->Image Builder -> Launch Image Builder.
7. In Step1: **Choose Image** of Launch an AppStream 2.0 Image Builder, in the list of images, select the image builder with the name AppStream-Graphics-Design-WinServer2019-mm-dd-YYYY or AppStream-Graphics-G4dn-WinServer2019-mm-dd-YYYY, where mm-dd-yyyy 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 [before you begin section](#) of this guide for 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.
8. Choose **Next** at the bottom of the page after selecting the appropriate image.
9. In Step2: **Configure Image Builder**, enter the following information:



Option	Value
<b>Name</b>	Provide a unique name identifier for the image builder, such as Adobe-CC_Image_v1_mmddyyyy, using any of the following characters: a-Z, 0-9, -, _.
<b>Display Name</b>	Provide an optional name, such as “Adobe CC Image v1 June 2020”, to be displayed in the console for easier reference and readability.
<b>Instance Type</b>	Choose the size of the instance type from available size options that best matches your organizations cost and your users performance criteria. For purposes of this guide, we will use “stream.graphics-design.xlarge”.

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

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

11. Choose **Review** and confirm the details for the image builder. To change the configuration for any section, choose **Edit** and make your changes.
12. 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](#).

13. 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.
14. 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.

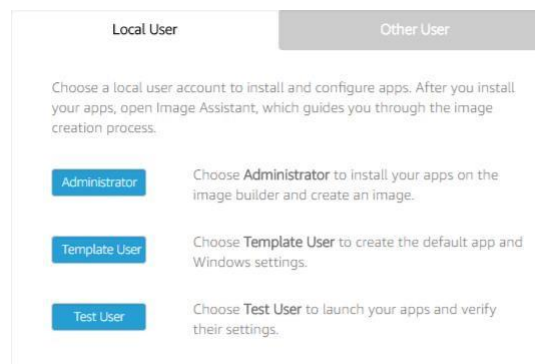
Note: Charges accrue for an image builder instance while it is running, even if no user is actively connected. You can stop or delete the image builder at any time. No user fees are incurred when users connect to an image builder. For more information, see [AppStream 2.0 Pricing](#).

## Connect to the image builder instance

1. Open the [AppStream 2.0 console](#) by choosing Services->AppStream 2.0 from the services menu in the AWS console
2. In the navigation pane, choose **Images, Image Builder**.
3. Select the image builder instance that you created earlier (Adobe-CC\_Image\_v1\_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. A 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. You are now connected to the image builder instance with administrator rights.

## Configure Image Builder Settings

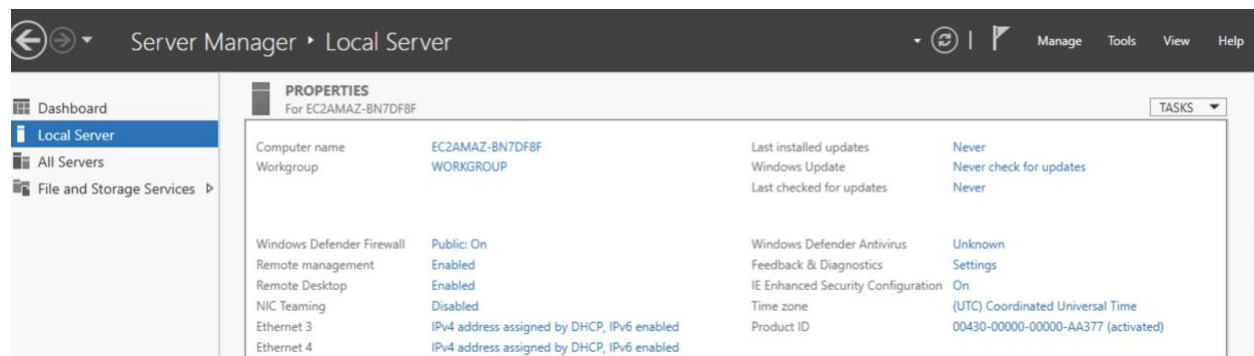
In this step, we will configure settings that are required for proper functioning of Adobe Creative Cloud apps.

### Disable Internet Explorer Enhanced Security Configuration

By default, [Internet Explorer Enhanced Security Configuration](#) is enabled on Windows Server by Microsoft. Internet Explorer Enhanced Security Configuration places servers and Internet Explorer in a configuration that limits exposure to the internet. However, this configuration can impact Adobe Creative Cloud applications. Adobe Creative Cloud applications require internet access to validate license, download creative cloud templates and provision Adobe Creative Cloud files.

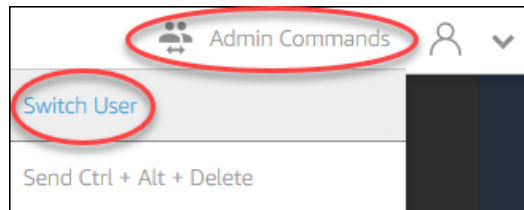
AppStream administrators can either disable Internet Explorer Enhanced Security Configuration or whitelist the [appropriate Adobe domains](#) as per their organizations security policy. For purposes of this guide, we will disable Internet Explorer Enhanced Security configuration.

1. [Connect to the image builder instance](#) with administrator rights.
2. Open Server Manager. Choose the Windows Start button, and then choose Server Manager.
3. In the left navigation pane, choose Local Server.
4. In the right properties pane, choose the “On” link next to IE Enhanced Security Configuration.



5. In the Internet Explorer Enhanced Configuration dialog box, choose the Off option under Administrators and Users, then choose OK.

6. In the upper right area of the image builder desktop, choose Admin Commands, Switch User.

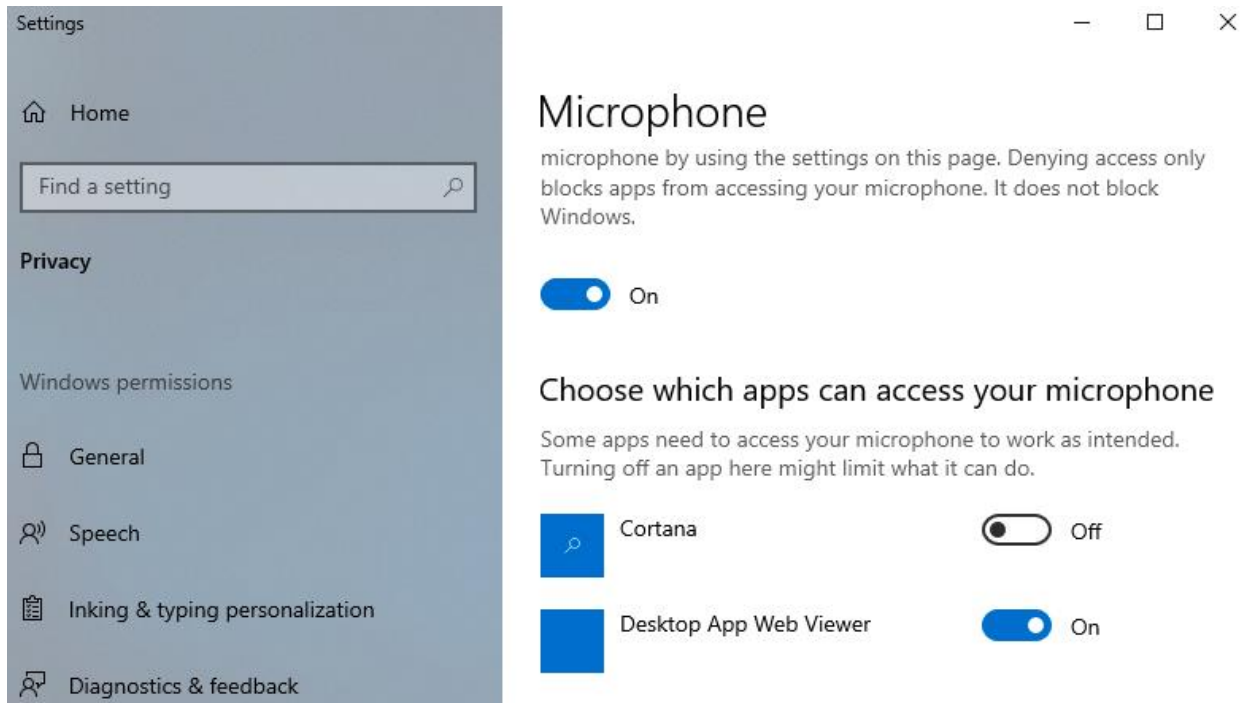


7. From Local User tab, choose Template User.
8. Open Internet Explorer and reset your settings by doing the following:
  - a. In the upper right area of the Internet Explorer browser window, choose the Tools icon, then choose Internet options.
  - b. Choose the Advanced tab, then choose Reset.
  - c. When prompted to confirm your choice, choose Reset again.
  - d. When the Reset Internet Explorer Settings message displays, choose Close.
9. Choose Admin Commands, Switch User, and then choose Administrator.

### Configure Privacy Settings for Microphone Access

Adobe Creative Cloud apps require microphone access to allow creating and editing of audio content. Without the appropriate microphone access, you may receive MMI interface errors during running Adobe Creative Cloud applications.

1. [Connect to the image builder instance](#) with administrator rights.
2. In the upper right area of the image builder desktop, choose Admin Commands, Switch User.
3. From Local User tab, choose Template User
4. Select Microphone Privacy Settings from Start->Settings
5. Enable microphone access
6. Enable microphone access for Desktop App Web Viewer.



7. Choose Admin Commands, Switch User, and then choose Administrator.

## Install Adobe Creative Cloud applications

After provisioning an image builder, you can install and configure the Adobe Creative Cloud applications that you wish to stream to your users on the image builder.

Creative Cloud applications can be installed on the AppStream 2.0 image builder instance by the following methods -

1. **Install using Adobe Creative Cloud Desktop Application.**

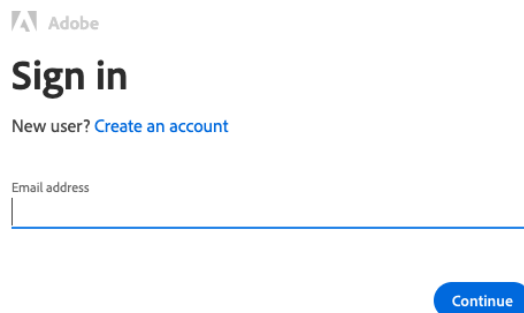
This method is suitable for individual or small number of users.

2. **Install using Adobe Creative Cloud Packager (Enterprise License)**

Adobe Packager requires an enterprise Creative Cloud license and allows IT admins [to create packages](#) with desired Creative Cloud applications with custom preferences. Installation using packages provides IT admins with additional control over creative cloud applications, updates and settings. Refer to the [Adobe Packager User Guide](#) to learn how to create packages with the desired applications

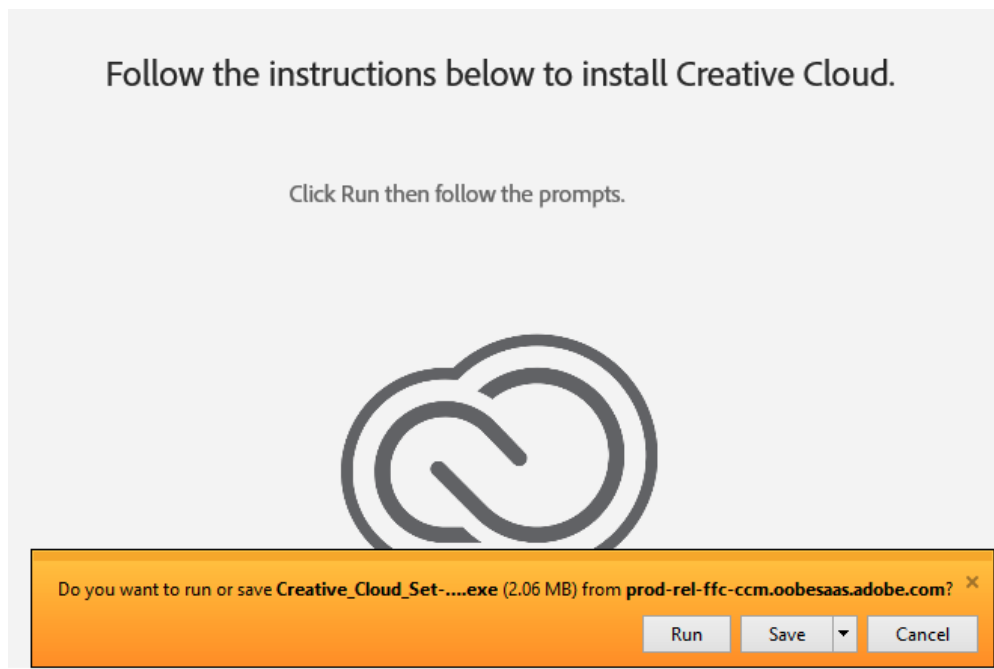
## Install using Adobe Creative Cloud Desktop Application

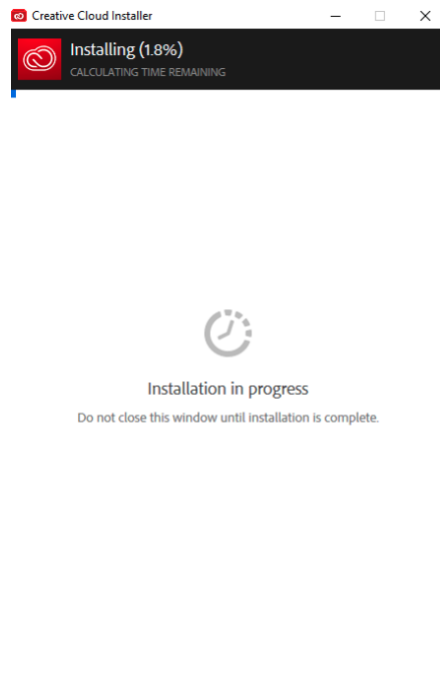
1. [Connect to the image builder instance](#) with administrator rights.
2. Open Internet Explorer and navigate to [Adobe Create Cloud](#).
3. Select Download from the top right menu to download Adobe Creative Cloud installer.
4. You will be asked to sign in using your Adobe ID. If you do not have an Adobe ID then use the **Create an account** to create an account.



The image shows the Adobe sign-in interface. At the top left is the Adobe logo. Below it, the text "Sign in" is prominently displayed. Underneath "Sign in" is a link that says "New user? Create an account". Below this is a text input field labeled "Email address". At the bottom right of the form is a blue button labeled "Continue".

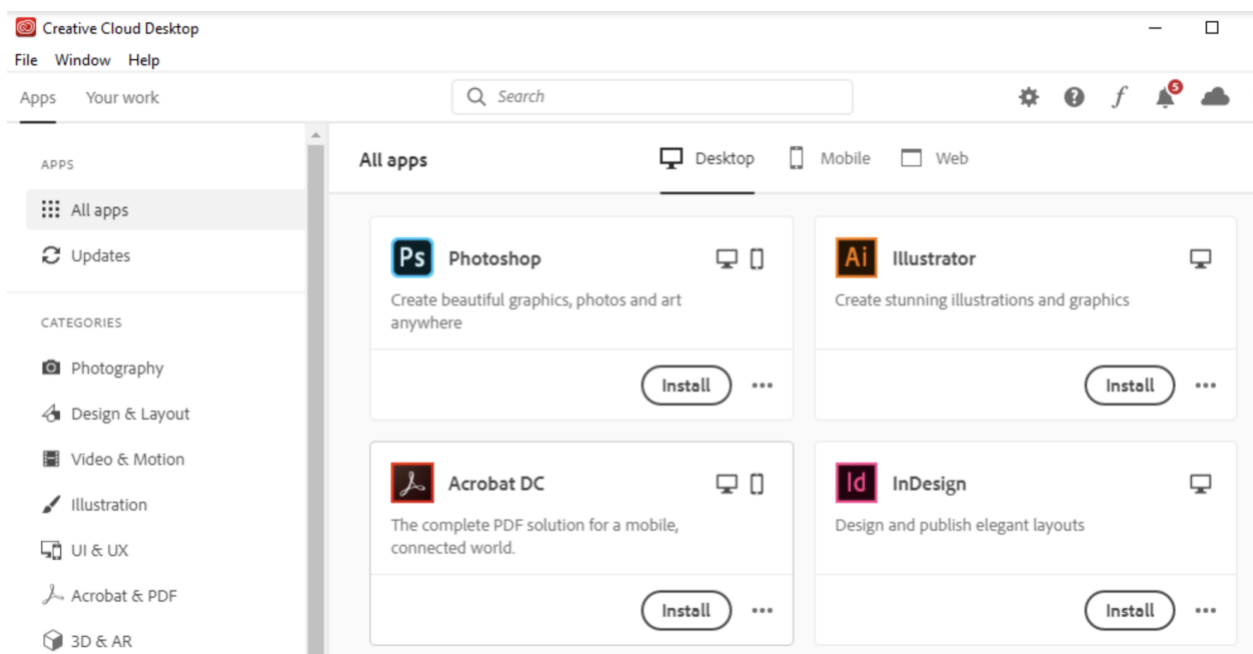
5. Once signed in, then follow the prompts to download and install Creative Cloud.





- Once installation is completed, login to Creative Cloud using your Adobe credentials. After logging in, install the desired applications from the *All apps* menu by clicking on the Install button as shown below. For purposes of this guide, we will install PhotoShop, Premiere Pro and Rush applications.

**Note:** As of writing, Adobe Fresco and Adobe XD ([known issues](#)) are not compatible or have issues streaming on AppStream 2.0.



## Install using Adobe Creative Cloud Packager (Enterprise License)

1. [Connect to the image builder instance](#) with administrator rights.
2. Open Internet Explorer and navigate to [Adobe Admin Console](#)
3. Follow the instructions to [create a named user license package](#) with the desired Creative Cloud applications.
4. After configuration is complete, download the package and install by double clicking on the package.

## Create an image with Adobe Creative Cloud applications

At this point, you have launched an image builder instance and installed desired Adobe Creative Cloud applications 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.
- Configure apps for any default values to be used for users
- 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.

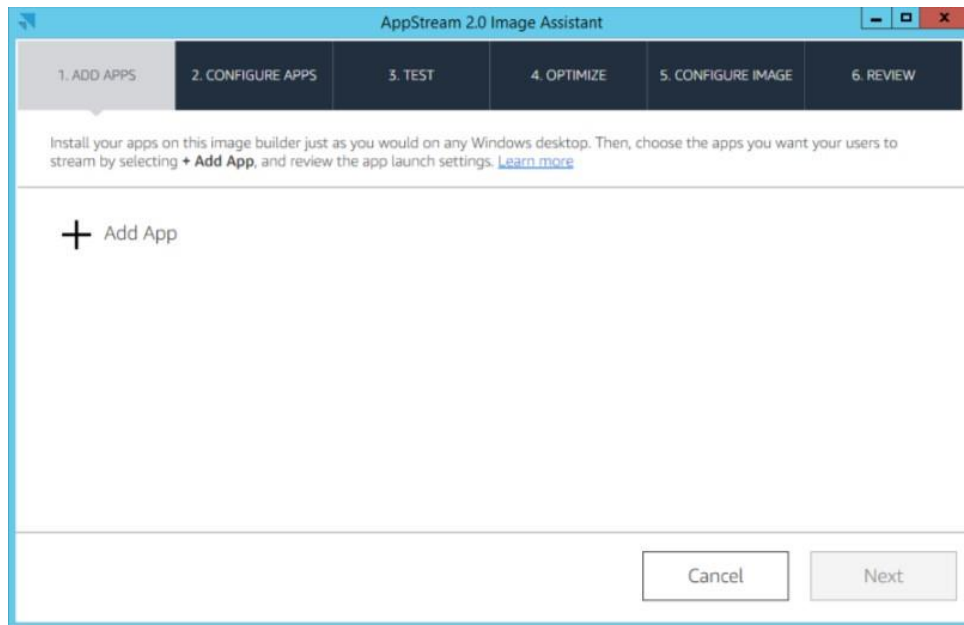
### Step1: Create your AppStream 2.0 application catalog

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.

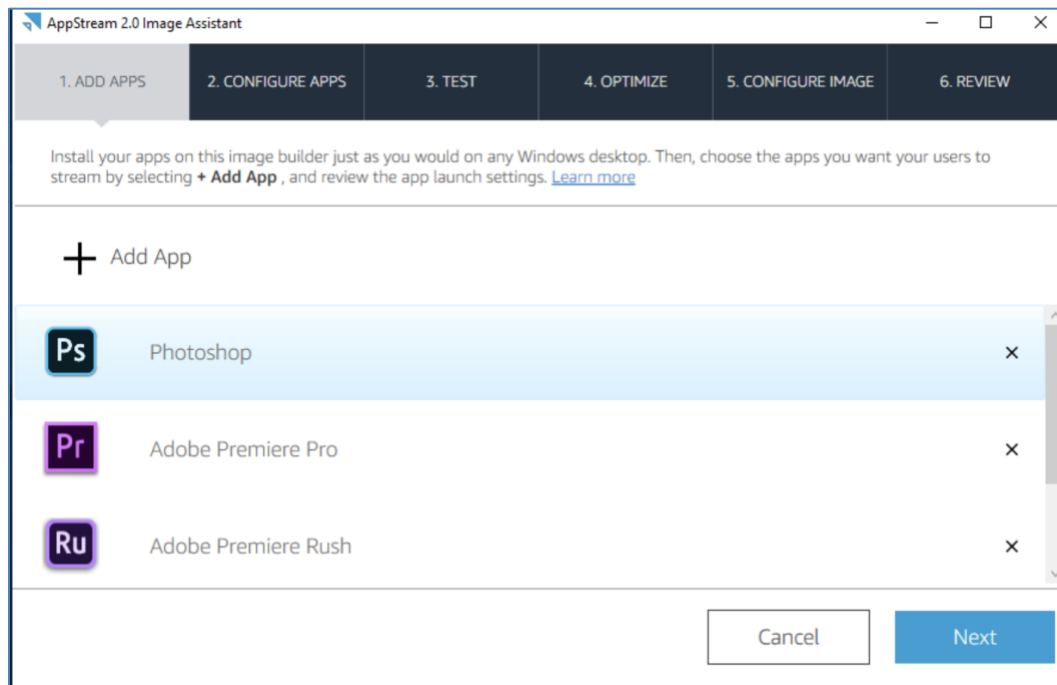
1. Open Image Assistant from the image builder desktop



2. In the Add Applications to Image dialog box, on the Add Apps tab, choose **Add App**.



3. For purposes of this guide, we will use our previously installed applications Adobe Photoshop, Adobe Premiere Pro and Adobe Rush.
4. Adobe Creative Cloud Applications are installed in C:\Program Files\Adobe. Navigate to the install location for Photoshop application (usually C:\Program Files\Adobe\Adobe Photoshop 2020). Select the Adobe Photoshop executable (Photoshop.exe) and then choose **Open**.
5. In **App Launch Settings**, customize the default values, if needed, and choose **Save**.
6. Repeat Steps 2 through 5 for Adobe Premiere Pro and Adobe Rush applications or other desired applications.

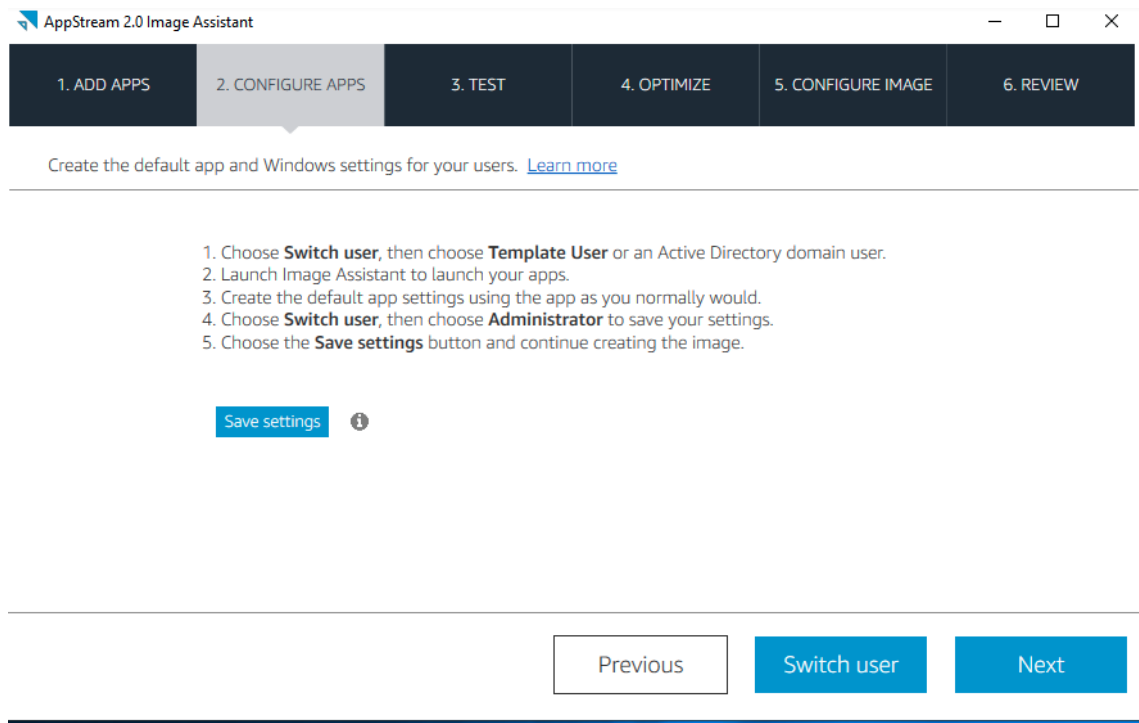


7. Now that you have added Photoshop, Premiere Pro and Rush applications to your catalog, choose **Next**.

## Step 2: Configure Apps

During this step, we will configure any default values that we want to use for the applications.

1. Select **Switch User** and select **Template User** from the local user tab



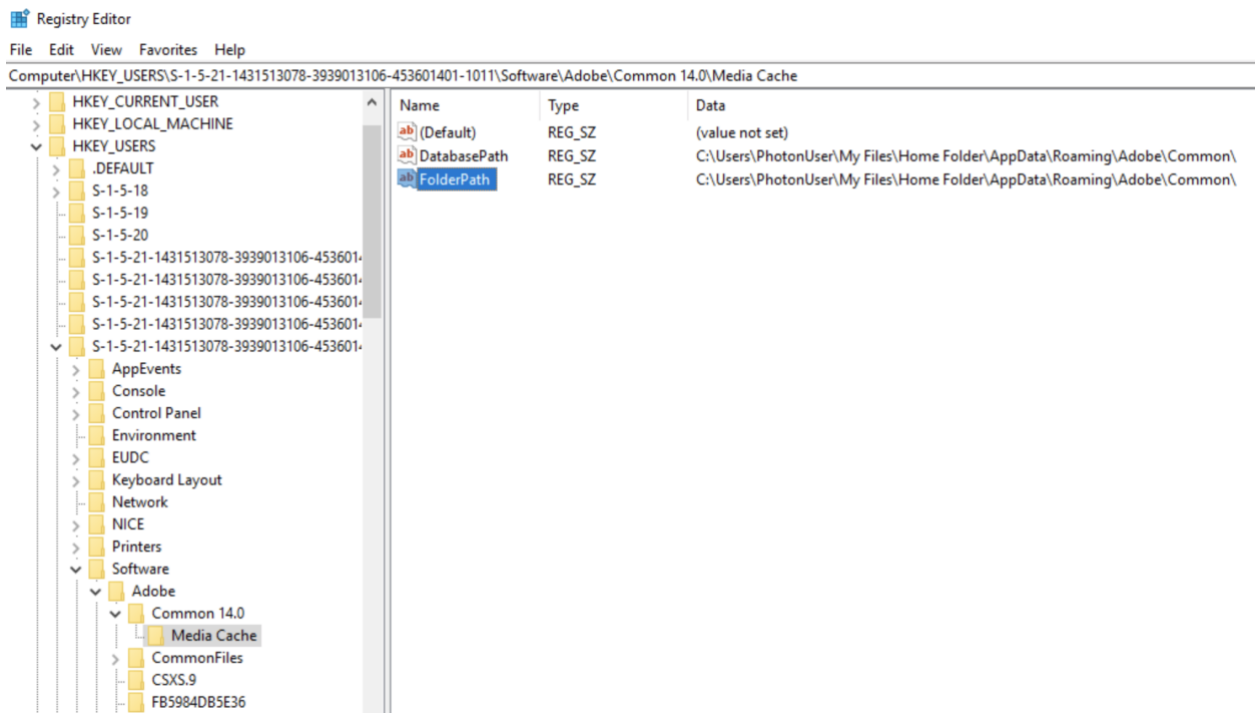
2. Open Image Assistant
3. Launch the installed creative cloud applications to ensure they are working properly.
4. After verification, open regedit and find the following two keys (FolderPath) and (DatabasePath) in this path for Adobe Media Cache and update them to map to a persistent storage. For purposes of this guide, we will update the location to be on AppStream home folder. See [AppStream Home Folder administering](#) for more details.

**Note:** The regedit has to be done in the template user profile.

```
Registry Path = Computer\HKEY_USERS\<UUID>\Software\Adobe\Common
14.0\Media Cache
```

```
DatabasePath = C:\Users\PhotonUser\My Files\Home
Folder\AppData\Roaming\Adobe\Common\
```

```
FolderPath= C:\Users\PhotonUser\My Files\Home
Folder\AppData\Roaming\Adobe\Common\
```



5. Choose **Switch User** from the Image Assistant dialog box.
6. Return to the **Administrator** account, and once again, proceed to the **Configure** step of the **Image Assistant**, and **Save Settings**

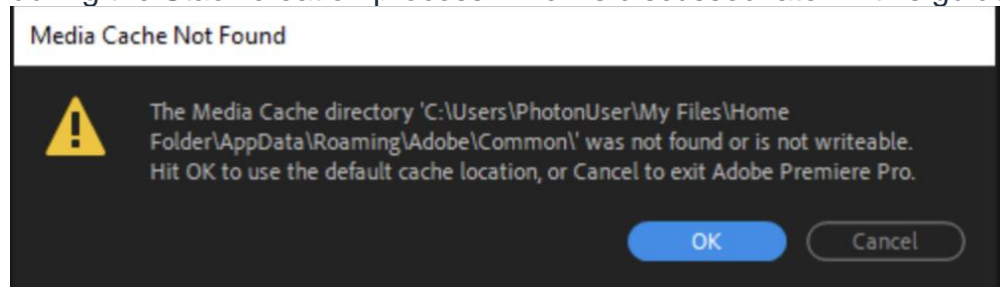
## Step 3: Test your application by using a local user account

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 instance as a local user who has regular (non-administrative) user rights.
2. Open Image Assistant. In Test Applications, Adobe Creative Cloud applications (Photoshop, Premiere Pro and Rush) are displayed.
3. Choose the desired application to open it.
4. After successful authentication with Adobe Creative Cloud sign in service, 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.

Note: You can click OK to dismiss the below mentioned warning about MediaCache directory while testing. This warning is because the home folders are provisioned during the Stack creation process which is discussed later in this guide.



## Step 4: 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 Photoshop, Launch.
2. Wait for Photoshop 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,
4. Repeat Steps 1 through 3 for Premiere Pro, Rush and other installed Adobe Creative applications.
5. choose Continue.

## Step 5: Configure the image

1. Minimize the Image Assistant window.
2. Click Start, right click on PowerShell, select More and Run as administrator.
3. Run the following command to remove AdobeNotificationClient package which is not compatible with Sysprep command.

```
Get-AppxPackage -AllUsers AdobeNotificationClient | Remove-AppxPackage -AllUsers
```

4. Once -AppxPackage command is complete, close PowerShell & return to Image Assistant=>Configure Image.
5. On the **Configure Image** tab, type the following information.

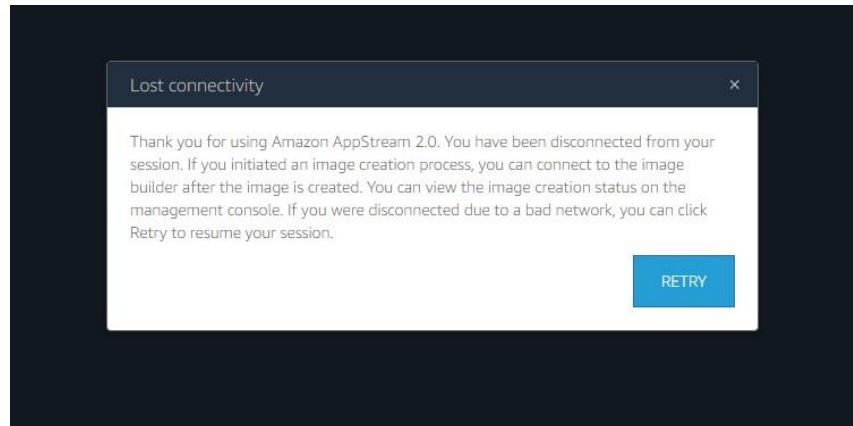
Option	Value
<b>Name</b>	The unique name identifier for the image, such as <i>AdobeCC_Image_v1_mmddyyyy</i> , using any of the following characters: a-Z,0-9,-,_,.  Note: The name cannot begin with "Amazon," "AWS," or "AppStream."
<b>Display Name</b>	A user-friendly name to display in the console
<b>Description</b>	An optional description for the image: for example, <i>Image v1 created by (your initials or name) on mm/dd/20yy</i> .
Option	Value
<b>Always use latest agent version</b>	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 <a href="#">Amazon AppStream 2.0 Agent Version History</a> .

## Step 6: 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.

## 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](#)
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
<b>Name</b>	The unique name identifier for the fleet, such as <i>AdobeCC_Fleet_v1_mmddyyyy</i> , using any of the following characters: a-Z,0–9,-,_,.  Note: The name cannot begin with "Amazon," "AWS," or "AppStream."
<b>Display Name</b>	The name displayed in the console, such as <i>AdobeCC Fleet v1 July 2020</i> .
<b>Description</b>	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

1. 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:
4. **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.
5. **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.
6. For this exercise, select the **Always-on** option.
7. 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.
8. **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)
9. **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)
10. Configure your **Fleet capacity**.
11. 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.
12. The minimum capacity for your fleet is the minimum number of users who are expected to be streaming at the same time (for example 2).
13. The maximum capacity for your fleet is the maximum number of users who are expected to be streaming at the same time (for example 6).
14. 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.  
  
**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](#).
9. 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**.
10. After the status changes to **Running**, the fleet is available and you can use it to create a stack.

## Create an AppStream 2.0 stack

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.

## Provide stack details and associate the stack with a fleet

1. Open the [AppStream 2.0 console](#)
2. In the navigation pane, choose **Stacks**, **Create Stack**.
3. For **Step1: Stack Details**, type the following information and choose **Next**.

Option	Value
<b>Name</b>	The unique name identifier for the stack, such as AdobeCC_Stack_mmddyyyy, using any of the following characters: a-Z,0–9,-,_. Note: The name cannot begin with "Amazon," "AWS," or "AppStream."
<b>Display Name</b>	The name displayed in the console, such as AdobeCC Stack July 2020.
<b>Description</b>	An optional text box where you can enter details of the stack:
<b>Redirect URL (Optional)</b>	An optional URL to which users are redirected at the end of their streaming session. Type: https://aws.amazon.com
<b>Feedback URL (Optional)</b>	An optional URL for your users to submit feedback Type: https://aws.amazon.com
<b>Fleet</b>	Select the fleet that you created previously.

## 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. For better performance, we recommend to not use applications persistence. Ensure that **Enable applications settings persistence** box is unchecked.
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**.
6. After a few moments, the **Stacks** list reappears. Your stack is listed with a status of **Active**.

## 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](#)
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.

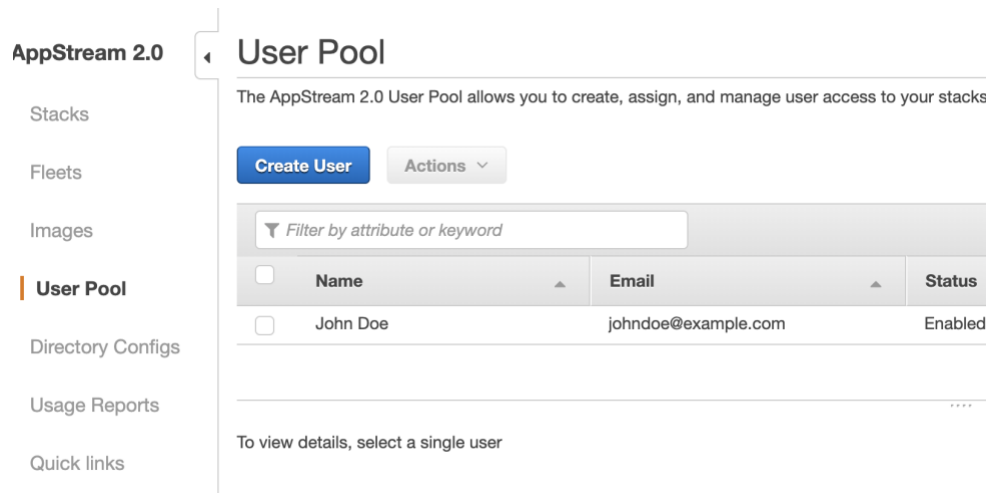


Figure 4 - The User Pool dashboard showing the newly created user.

## Assign a stack to the user

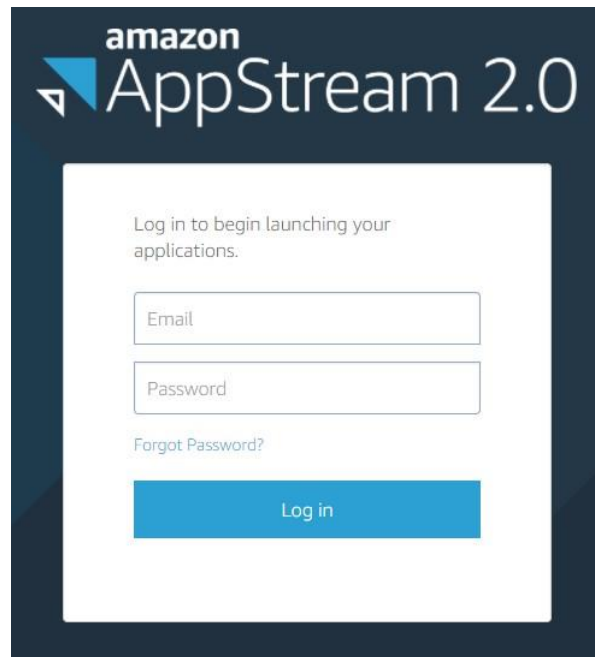
1. In the navigation pane, choose **User Pool**, and select the user that you created.
2. Choose **Actions, Assign Stack**.
3. In the **Assign Stack** dialog box, for **Stack**, select the stack that you created earlier.
4. Leave the **Send email notification to user** option selected.
5. Choose **Assign 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 AWS AppStream 2.0 console interface. On the left is a navigation sidebar with links for Stacks, Fleets, Images, **User Pool** (highlighted), Directory Configs, and Quick links. The main content area is titled 'User Pool' and includes a description: 'The AppStream 2.0 User Pool allows you to create, assign, and manage user access to your stacks.' Below this are buttons for 'Create User' and 'Actions'. A table lists users, with one entry for 'John Doe' having the email 'johndoe@example.com' and status 'Enabled'. Below the table is a 'User Details' section for John Doe, showing his name, email, status, and a 'Resend welcome email' button. At the bottom, it shows the user is assigned to the stack 'DemoCo\_Stack\_04182018'.

## 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.

## Take the next step with AppStream 2.0

Congratulations, you have now successfully created an AppStream 2.0 environment to stream applications.

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. 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](#).
5. This guide uses default settings for Security Group. Review the [Security Group best practices for AppStream 2.0](#) to manage and setup security policies to meet your organizational needs.

**Important:** Remember to delete the resources that you created in these exercises to avoid further charges to your AWS account. See [Clean up your AppStream 2.0 resources](#) for information about how to delete AppStream 2.0 resources.

## Troubleshooting and best practices

### I am having trouble with the Image Builder

- Review the [Image Builder Troubleshooting guide](#)
- Run the below mentioned command to check if Adobe Notification Client is present. Follow the steps in [this section](#) to remove Adobe notification client, if present.

```
Get-AppxPackage -AllUsers AdobeNotificationClient
```

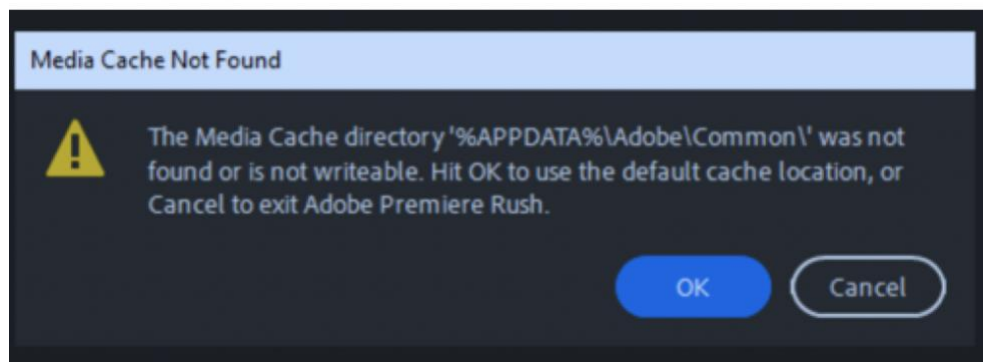
- Review the logs in C:\Windows\System32\Sysprep\Panther folder for issues.

### Users receive Audio MMI errors or no sound when working in Creative Cloud Applications such as Premiere Pro, Rush etc.

- Review that Microphone privacy settings are setup to allow microphone access as described in [Configure Privacy Settings for Microphone Access](#) section.
- Alternately per your organizations security policy, you can setup an administrative policy (group policy) within windows to force allow microphone access for Adobe apps under Configuration->Administrative Templates->Windows Components-> App Privacy.

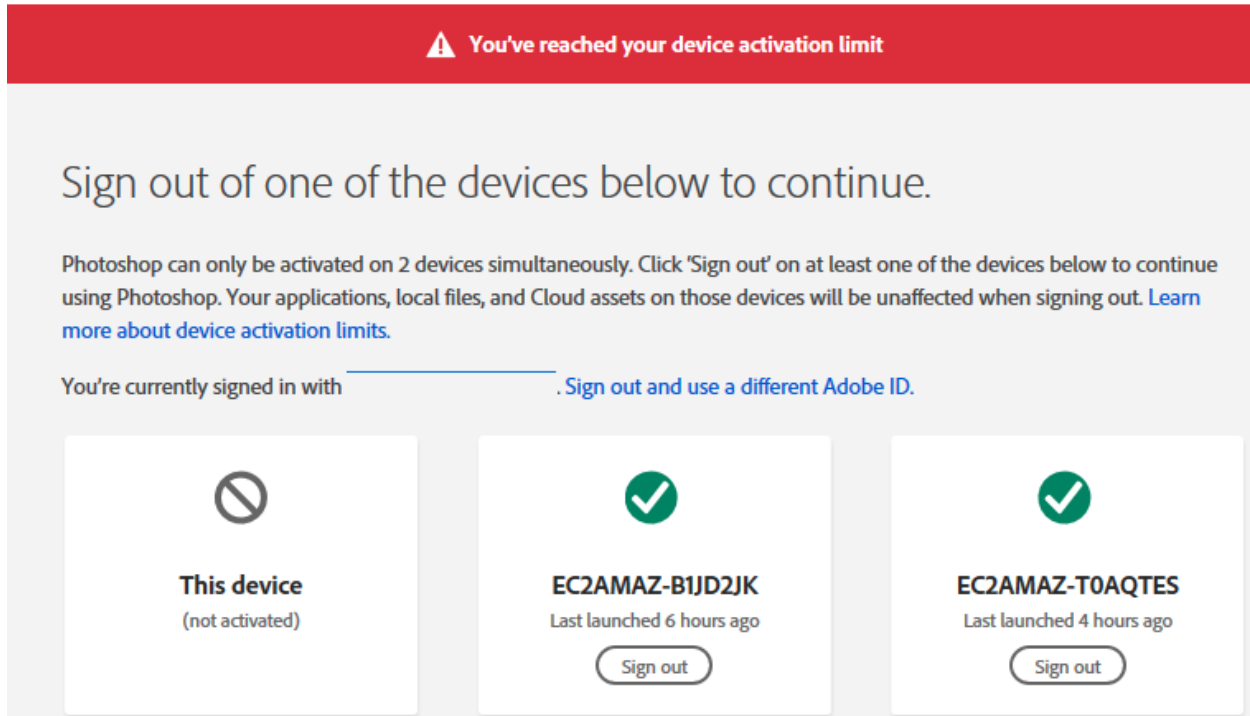
### Users receive Media Cache directory access errors

Review that you have correctly configured the Media Cache directories and replaced %AppData using regedit as described in [Step 2:Configure Apps](#). Also, confirm that Home Folders is enabled in Stack settings.



### Users receive Adobe Creative Cloud Activation limit reached

As a best practice, ask your users to sign out of Creative Cloud Desktop application before ending their streaming session. Alternately, customers can sign out of any of their earlier sessions using the interstitials that pops up during their subsequent sign-ins into Creative Cloud on AppStream 2.0. Refer to [Creative Cloud Activation limit](#) reached for details.



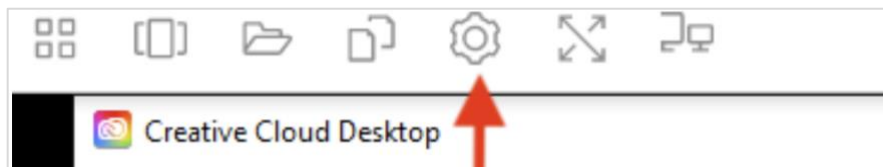
### On-Demand fleet for Adobe Creative Cloud slows down workflow

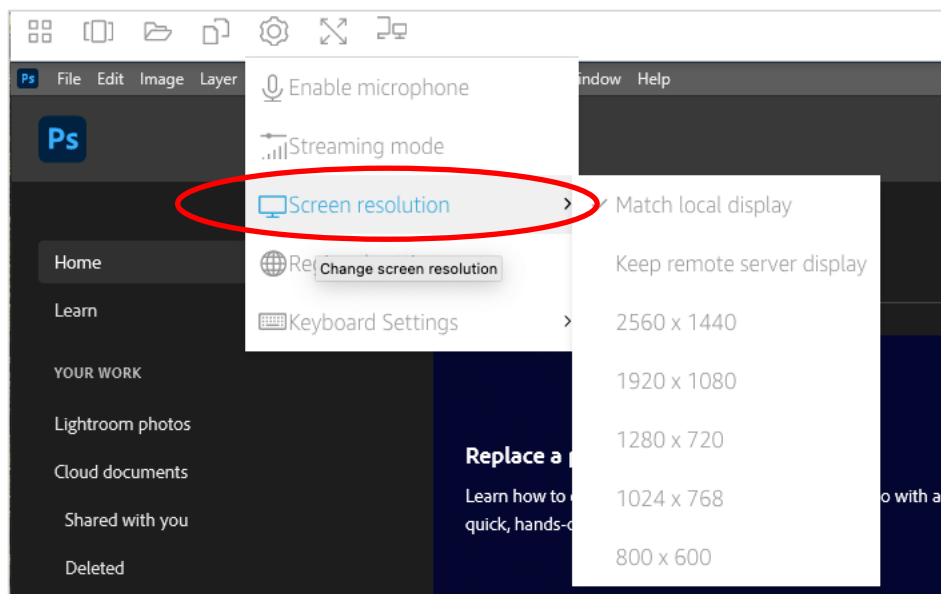
With On-Demand fleets, AppStream 2.0 users must wait up-to 2 minutes (120 seconds) to access the software title from the Adobe Creative Cloud suite.

To avoid this wait time, AppStream 2.0 fleets must be set to Always On. [AWS whitepaper](#) outlines advantages of Always on option vs OnDemand. Recommendations is to use Always-On fleet instances to address above use case where AppStream devices are in a running state, even if no users are connected. This is best when your users need high availability and instant access to their applications

### Pop-up tools within Adobe Creative Cloud software titles will appear with a different resolution setting than expected.

By default, AppStream 2.0 sessions will match the local display resolution on primary monitor. Users have the option to modify the resolution by using the AppStream 2.0 configuration menu. See below.



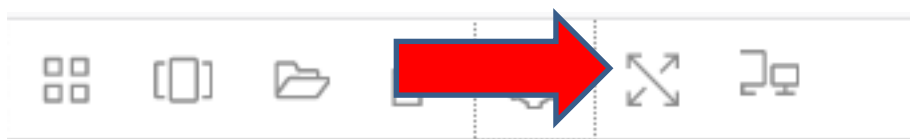


**Internet Explorer can be launched using the “Help” option of any Adobe Creative Cloud software title. This can lead to users launching unapproved applications to access the world wide web.**

To prevent users from launching unauthorized applications, AppStream 2.0 administrators can leverage native OS tools such as Microsoft AppLocker. Microsoft AppLocker can be implemented to prevent users from launching unauthorized applications, Windows installer packages, scripts, and additional packages. For additional information on Microsoft AppLocker, please see documentation, [Using Microsoft AppLocker to manage application experience on Amazon AppStream 2.0](#)

**Adobe Creative Cloud product menu is difficult for users to access.**

AppStream 2.0 users are provided a full screen option, which eliminates the issue described. For best results instruct AppStream 2.0 users to leverage full screen mode by selecting the following option from the AppStream 2.0 menu. This will display the application and/or desktop in full screen mode on their browser session.

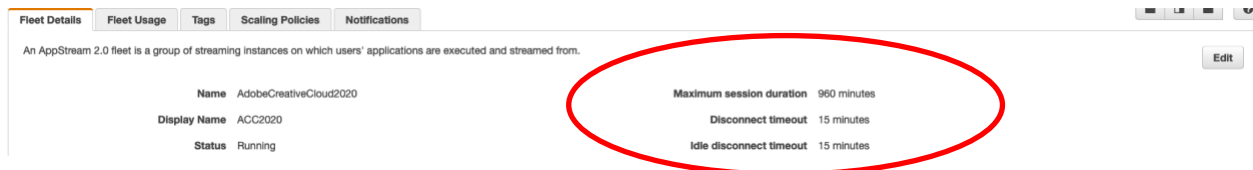


## AppStream 2.0 Adobe Creative Cloud sessions expire quickly and user sessions are terminated.

AppStream 2.0 administrators are provided options to set policy thresholds for the following: Maximum session duration, Disconnect timeout, and Idle disconnect time.

[AppStream 2.0 Time out reference.](#)

AppStream 2.0 administrator console.



## Google Drive enabled on Amazon AppStream 2.0 stack will not allow users to save files to alternative locations.

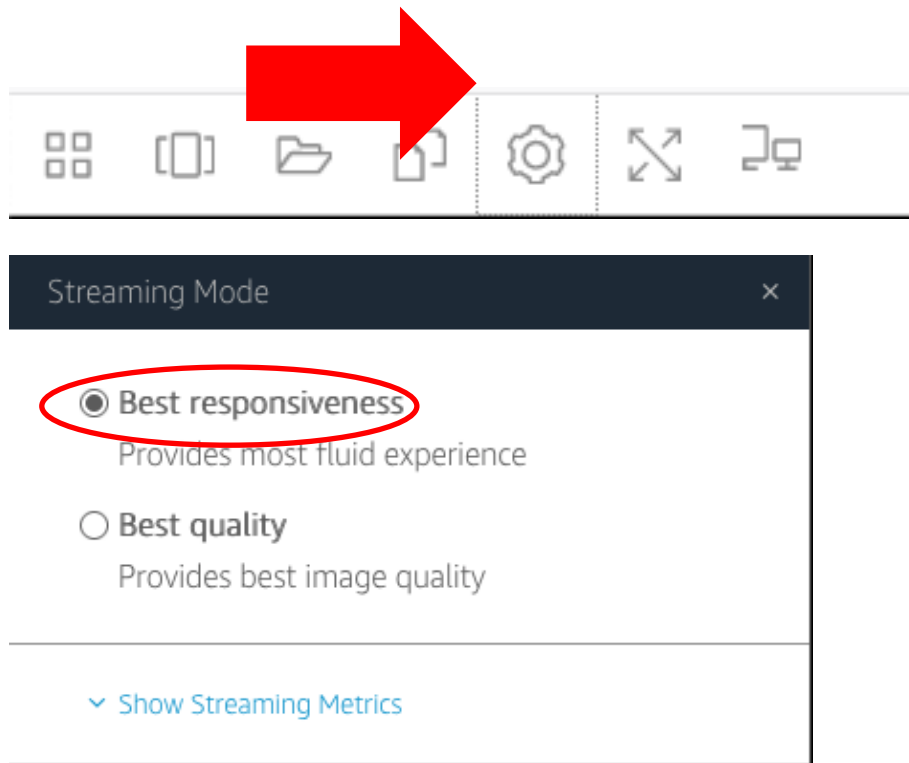
Amazon AppStream 2.0 supports local file system redirection with the AppStream 2.0 client (Windows). This feature lets your users seamlessly open or save files on their local computer from within their streaming session. To use this feature, users link the local drives and folders that they want to access from within their streaming session. After their local drives and folders are linked, users can access these resources in File Explorer when performing file system operations such as File Open, File Save, and File Save As. This feature is only available through the AppStream 2.0 client for Windows. There are no additional charges for this feature. To learn more, see [Enable File System Redirection for Your AppStream 2.0 Users](#).

## The current process for signing into VI doesn't autofill any information, forcing users to manually enter and remember certain passwords.

Amazon AppStream 2.0 offers Application settings persistence settings. When you enable application settings persistence, your users' application customizations and Windows settings are saved after each streaming session and applied during the next session. These settings are saved to an Amazon S3 bucket in your AWS account, so the AppStream 2.0 fleet associated with this stack must allow access to S3 via the internet or an Amazon VPC endpoint for S3. [Learn more.](#)

## Input delay can be notable with Adobe tools that require instant feedback such as brushes.

Amazon AppStream 2.0 offers flexibility to end users that do not have a consistent internet connection. To optimize the performance of AppStream 2.0, make sure that your network bandwidth and latency can sustain your users' needs. Additionally, the end user can select “Best responsiveness” as the Streaming Mode. See shots below to access Streaming Mode.



## 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. 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](#)
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**.

## Conclusion

Using Amazon AppStream to stream Adobe Creative Cloud applications simplifies the IT management and overhead required to manage streaming applications while providing remote virtualized access to Adobe Creative Cloud applications anywhere, on the go and on low powered devices.

This implementation guide provides a guided approach to setup Adobe Creative Cloud applications on Amazon AppStream to evaluate the setup for your organizations business objectives.

## Contributors

Contributors to this document include:

- Anuj Ratra, Sr. Solutions Architect, AWS Business Applications
- Jesse Molano, Specialty Solutions Architect, AWS End User Computing
- Kenny Rajan, Sr. Partner Solution Architect, AWS Strategic ISVs
- Bridget Concannon, Solutions Architect, AWS Strategic
- Breckan Coleman, Project Intern, Adobe

## Additional resources

For additional information, see:

- [AWS AppStream Troubleshooting](#)<sup>3</sup>
- [Adobe best practices for Creative Cloud deployment on VDI](#)<sup>4</sup>
- [Adobe Creative Cloud licensing for Education](#) (Students/Teachers, K-12 Schools and Higher ED)<sup>5</sup>
- [AppStream 2.0 Time out reference](#) (Configuration options)
- [How Application SSettings Persistence Works](#)
- [Using Microsoft AppLocker to manage application experience on Amazon AppStream 2.0](#)



- [GPO's to hide drives](#) (group policy objects to hide specified drives)
- [Adobe Best Practices Guide](#)

## Document revisions

Date	Description
<b>October 2021</b>	Revision I, to include additional troubleshooting guidance
<b>June 2021</b>	First Publication

## Notes

<sup>1</sup> <https://www.adobe.com/creativecloud/buy/education.html#edu-rfi>

<sup>2</sup> <https://s3.amazonaws.com/appstream-demo-vpc-cfn-template/AppStreamDemoVPCTemplate.template>

<sup>3</sup> <https://docs.aws.amazon.com/appstream2/latest/developerguide/troubleshooting.html>

<sup>4</sup> <https://helpx.adobe.com/enterprise/using/creative-cloud-deployment-on-vdi.html>

<sup>5</sup> <https://www.adobe.com/creativecloud/buy/education.html>