Amazon AppStream 2.0: AutoCAD Deployment Guide

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

April 2023

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 *Note: For high-performance 2D-only workflows, stream.graphics-pro.4xl may provide slightly improved performance over the graphics-design instance type*

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.

Contents

Welcome 2

Step 1. Sign in to the AWS Management Console and select an AWS Region 7

Step 2: Create network resources 7

Step 3: Set up the license server and jump (Bastion) host 10

Configure an EC2 instance that will function as the license server 10

Configure an EC2 instance that will act as the jump host to enable remote license server administration 16

Configure an EC2 instance that will function as the license server 16

Install and configure the Autodesk Network License Manager 24

Configure Windows Firewall to open up the license server ports 32

Step 4: Create an AppStream 2.0 image builder 38

Deploy an image builder instance to install applications 38

Step 5: Connect to the image builder and install AutoCAD 47

Connect to the image builder instance 47

Add the license server hostname to the host list 48

4. Switch to the AppStream 2.0 image builder. On the image builder, launch **PowerShell** using the **Run as Administrator** option. 49

5. Browse to C:\Windows\system32\drivers\etc and open the hosts file by using the command notepad hosts. 49

6. Add the IP address and computer name to the hosts file as shown in the following screenshot, and then save the file. 50

Install AutoCAD 50

Step 6: Use Image Assistant to create an AppStream 2.0 image 51

Create your AppStream 2.0 application catalog 51

Disable Internet Explorer enhanced security configuration 53

Configure multi-user licensing (if applicable) 55

Test your application by using a local user account 57

Optimize the launch performance of your applications 57

Configure the image 58

Finish creating the image 58

Step 7: Provision a fleet 59

Provide fleet details 59

Configure the network 62

Step 8: Create an AppStream 2.0 stack and a streaming URL 63
Provide stack details and associate the stack with a fleet 63
Enable persistent storage for the stack 65
Step 9: Manage user access with an AppStream 2.0 user pool 67
Create a user 67
Assign a stack to the user 68
Step 10: Test the end user authentication and application streaming experience 68
Step 11: Take the next step with AppStream 2.0 71
Contributors 71
Appendix A: Create and activate an AWS account 72
Create your AWS account 72
Add a payment method 73
Verify your phone number 73
Choose an AWS Support plan 73
Watch for three AWS account confirmation emails 74
Appendix B. Manually create and configure network resources 75
AppStream VPC requirements 75
Create a VPC by using Create VPC 75
Appendix C. Clean up your AppStream 2.0 resources 80
Stop and delete your image builder 80
Revoke stack permissions for users in the user pool 80
Disassociate your fleets from your stack and delete your stack 80
Stop and delete your fleet 80
Appendix D. Troubleshooting 81
Appendix E. Additional resources 81

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 hosts services in regions and availability zones covering multiple geographical areas. This document will use N. Virginia (us-east-1).

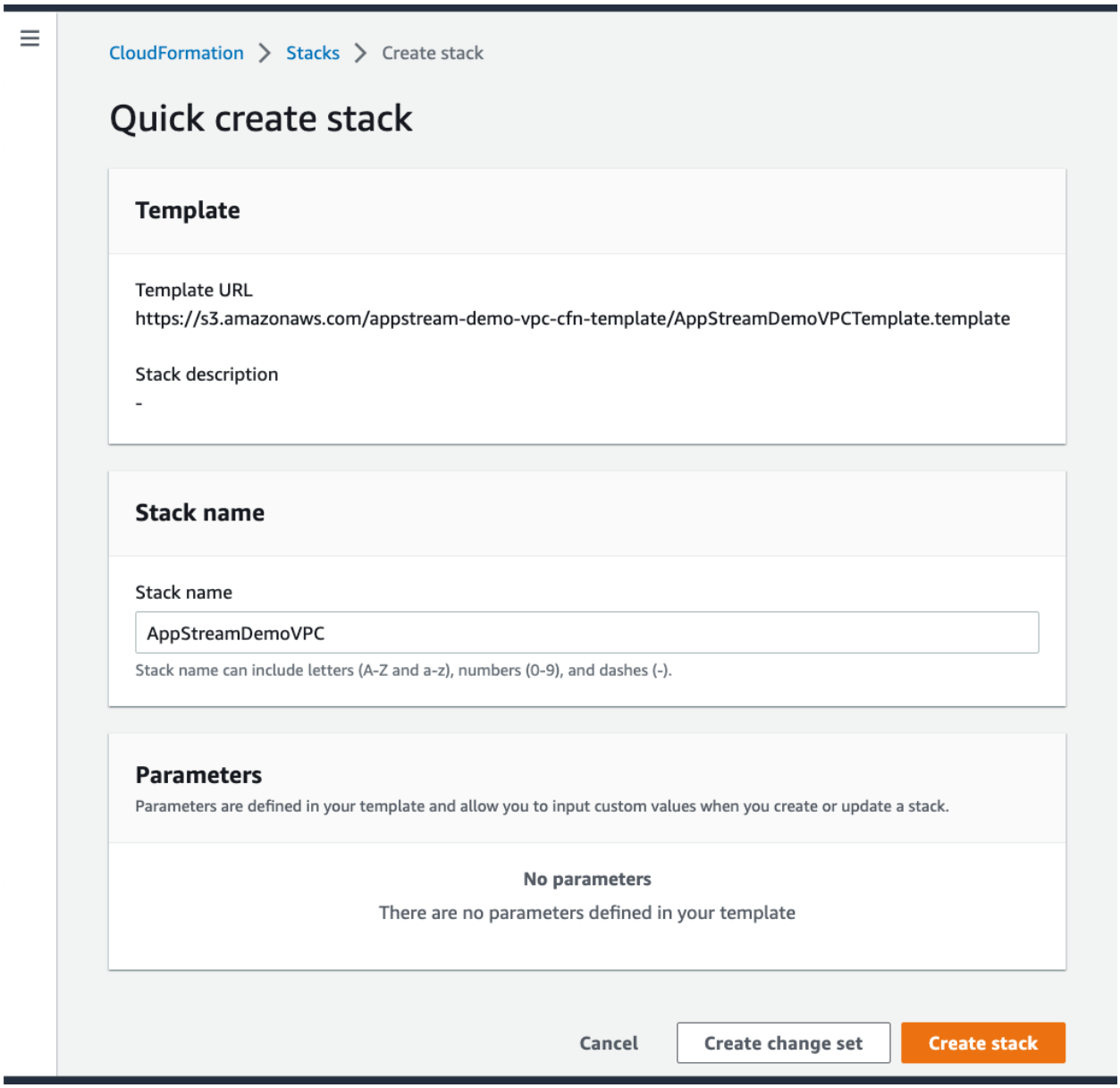
5. Select one of the following seven Regions in which AppStream 2.0 is available: Choose the AWS region that is closest to your end users who will be streaming AutoCAD for best performance and user experience. AWS Regional Services lists services available in each region.

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. 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. 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 using CloudFormation.
   - US East (N. Virginia)
   - US West (Oregon)
   - EU (Frankfurt)
   - EU (Ireland)
   - Asia Pacific (Singapore)
   - Asia Pacific (Sydney)
   - Asia Pacific (Tokyo)

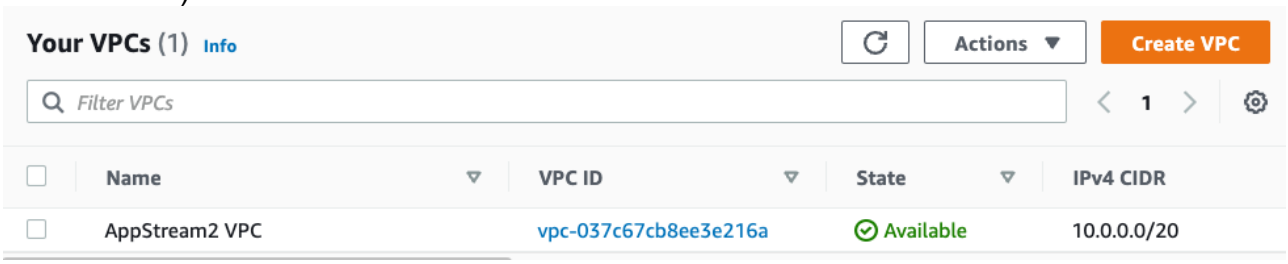
3. The Quick create stack will be presented and in the bottom right corner of the window, choose **Create**. AWS CloudFormation starts creating the resources and displays a status message to indicate progress.



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

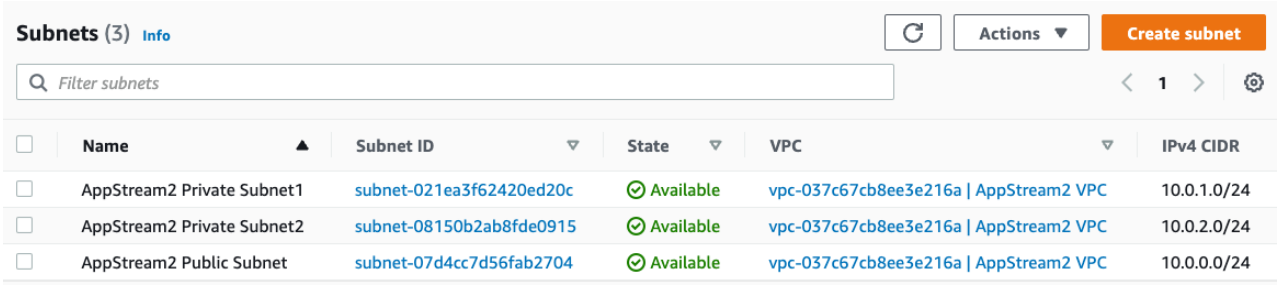
5. Navigate to the Amazon VPC console at https://console.aws.amazon.com/vpc/.

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).



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:



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 and jump (Bastion) host

We will now deploy the Autodesk Network License Manager (NLM) using an AWS EC2 instance. 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 allow 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: Name the instance **Autodesk Network License Manager**
4. In Step 2: In the **Application and OS Images (Amazon Machine Image)** section, select Windows – Microsoft.
5. In Step 3: Choose an Amazon Machine Image (AMI), use the drop-down and select **Microsoft Windows Server 2019 Base** image.
6. In Step 4: **Choose an Instance Type**, select t3.large as the instance type

EC2 > Instances > Launch an instance

Launch an instance Info

Amazon EC2 allows you to create virtual machines, or instances, that run on the AWS Cloud. Quickly get started by following the simple steps below.

Name and tags Info

Name

Autodesk Network License Manager 1

Add additional tags

Application and OS Images (Amazon Machine Image) Info

An AMI is a template that contains the software configuration (operating system, application server, and applications) required to launch your instance. Search or Browse for AMIs if you don't see what you are looking for below

Search our full catalog including 1000s of application and OS images

Recents | Quick Start

2

Amazon Linux | macOS | Ubuntu | Windows | Red Hat | SUSE

Browse more AMIs

Including AMIs from AWS, Marketplace and the Community

Amazon Machine Image (AMI)

3

Microsoft Windows Server 2019 Base — Free tier eligible
ami-0c644f818f60ae4f3 (64-bit (x86))
Virtualization: hvm ENA enabled: true Root device type: ebs

Description

Microsoft Windows Server 2019 with Desktop Experience Locale English AMI provided by Amazon

Architecture	AMI ID	
64-bit (x86)	ami-0c644f818f60ae4f3	Verified provider

Instance type Info

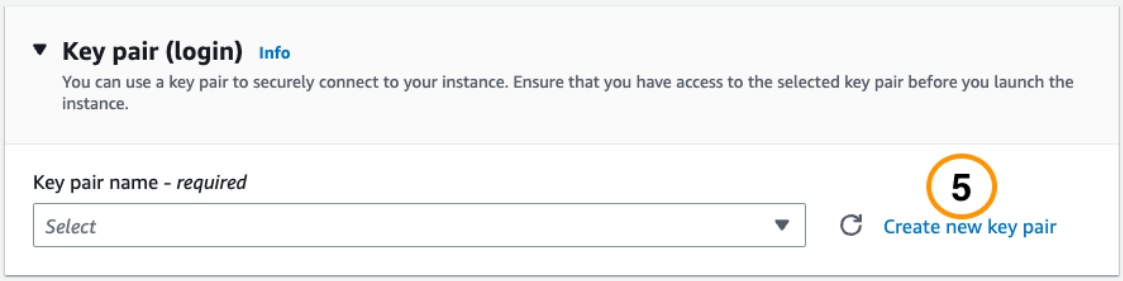
Instance type

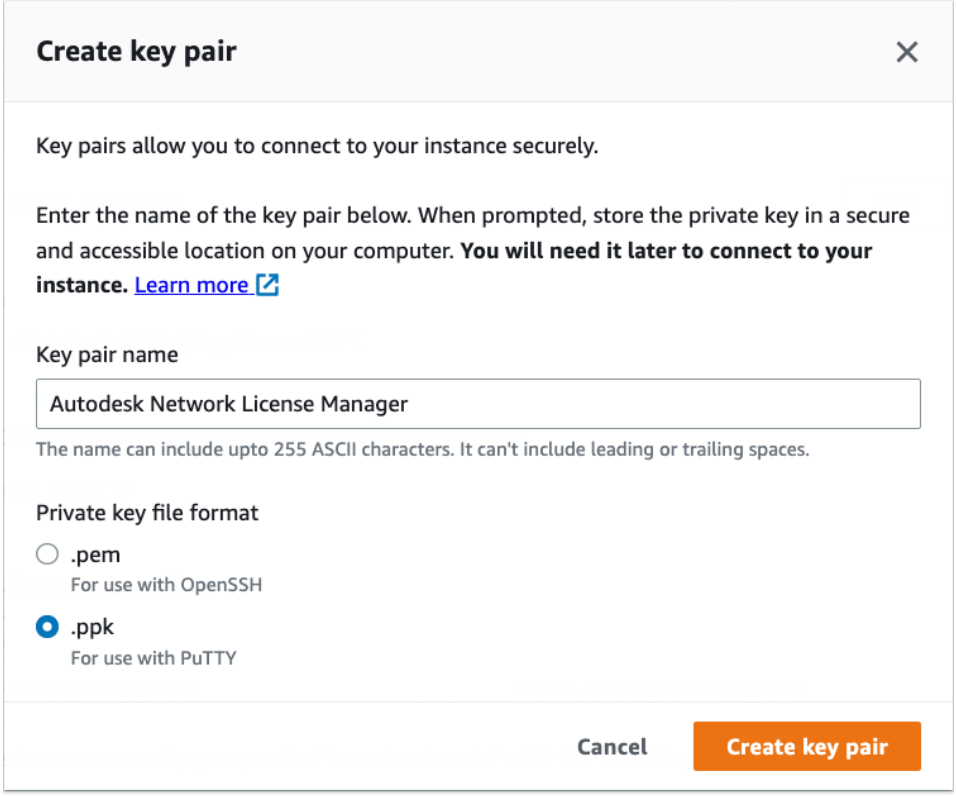
4

t3.large
Family: t3 2 vCPU 8 GiB Memory On-Demand Linux pricing: 0.0832 USD per Hour
On-Demand Windows pricing: 0.1108 USD per Hour

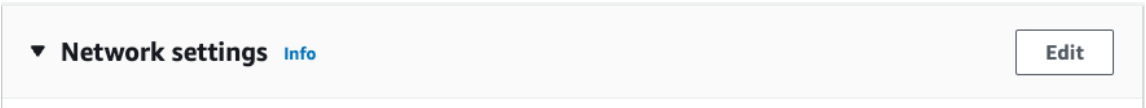
Compare instance types

7. In Step 5: **Create a new key pair (or select an existing key pair).** Choose Create a new key pair named **Autodesk Network License Manager** and the key format as. ppk. Click **Create key pair** and the key pair file will automatically download. Store the downloaded key pair securely for future reference.





8. In Step 6: In the Network Settings section, click **Edit**. The settings should have VPC:**AppStream2 VPC** and Subnet: **AppStream2 Private Subnet** (1 or 2).



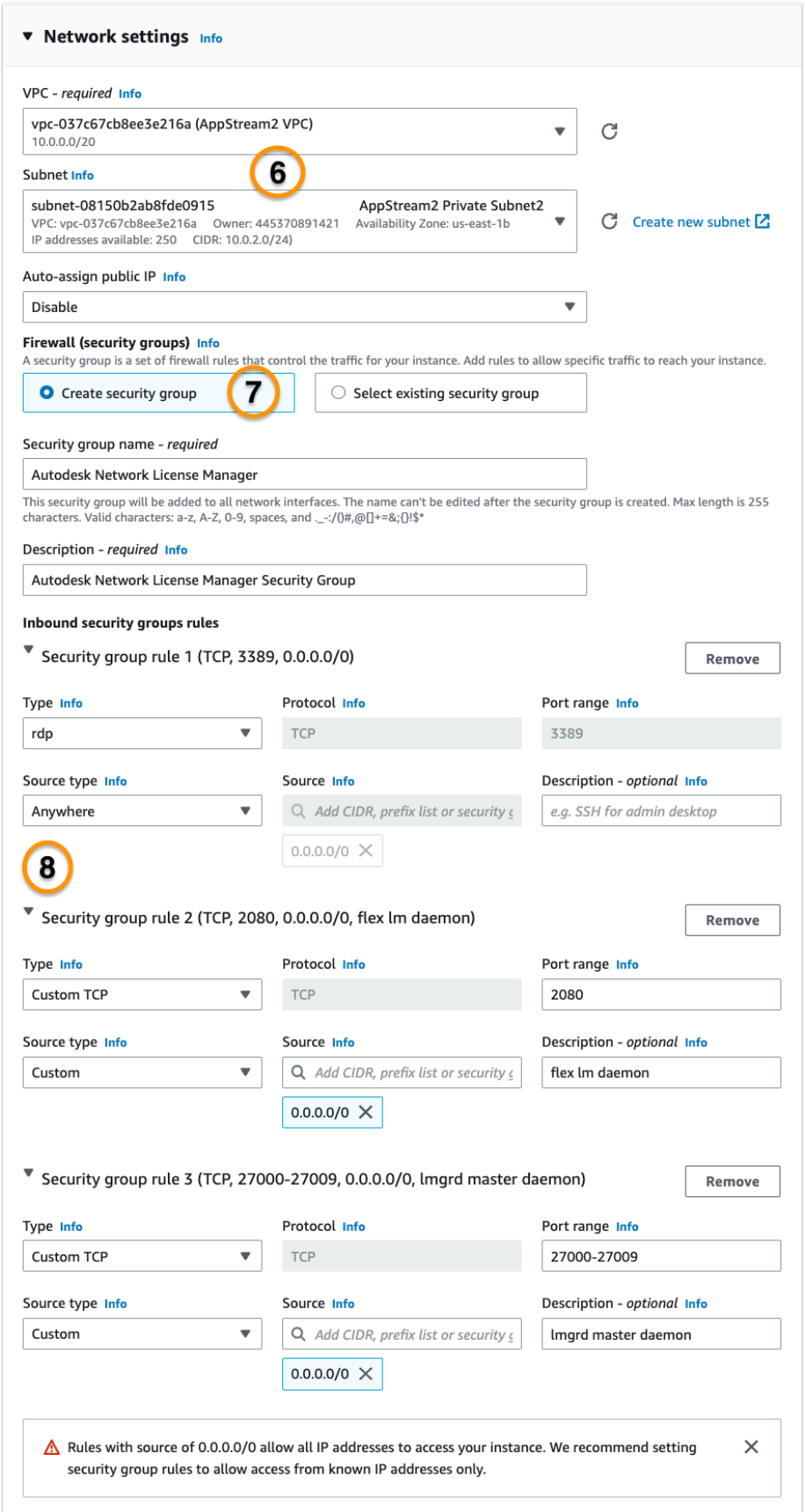
9. In Step 7: In the Firewall (security groups) section, select Create security group and choose your own name or use Security group name: **Autodesk Network License Manager** with a Description: **Autodesk Network License Manager Security Group**.

10. In Step 8: Add two **Inbound security group rules** to allow AutoCAD applications to communicate with the AutoCAD license server. For more information, read about ports used by the Autodesk Network License Manager.

    The FLEXlm® based version uses the following incoming ports:
    - TCP ports 2080 for the adskflex vendor daemon
    - TCP ports 27000 to 27009 for the lmgrd master daemon, which uses the first open port in the range

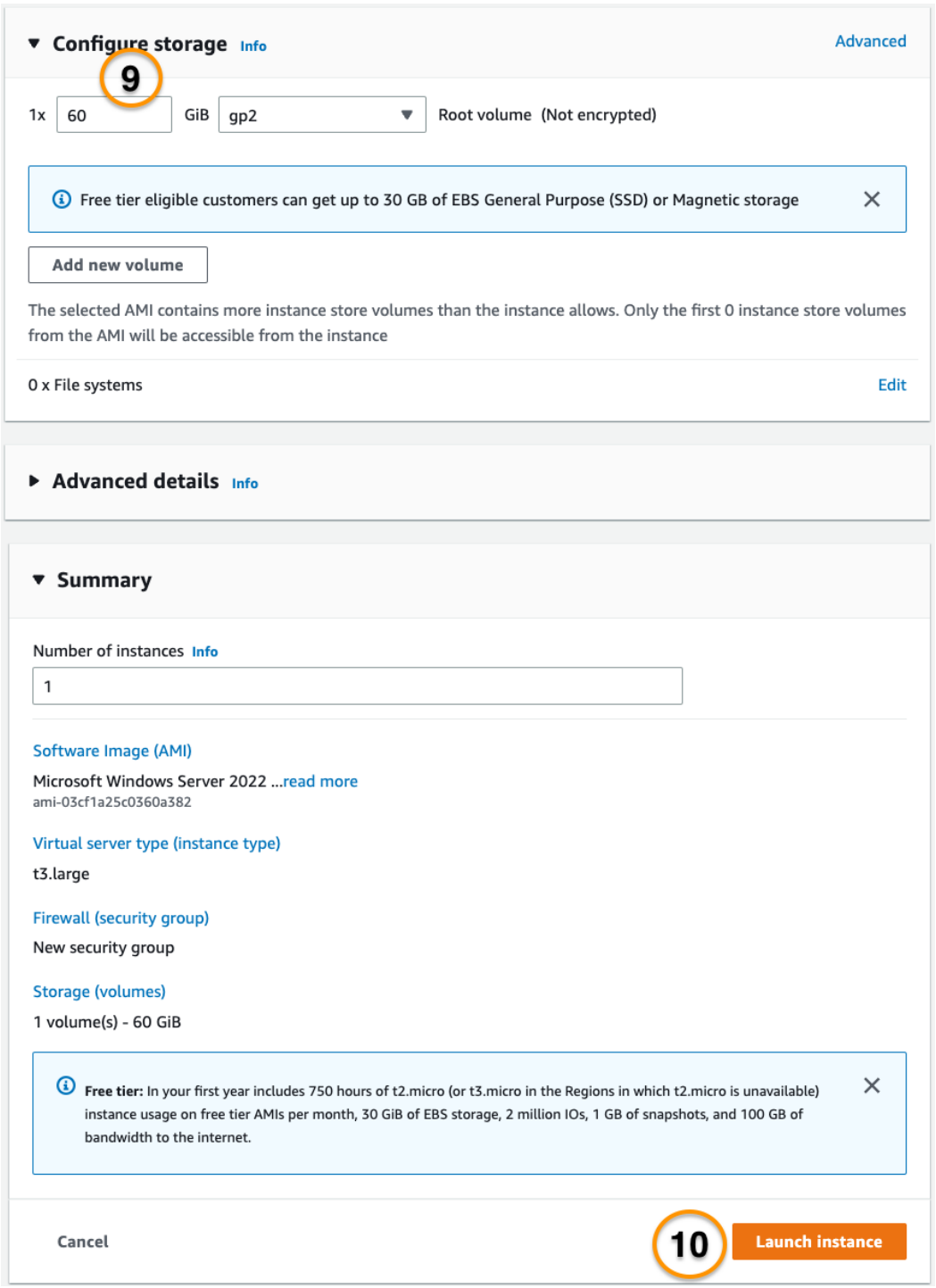
    Inbound security group rule 1
    Type: Custom TCP
    Protocol: TCP
    Port range: 2080
    Source type: Custom
    Source: 0.0.0.0/0
    Description: flex lm daemon

    Inbound security group rule 2
    Type: Custom TCP
    Protocol: TCP
    Port range: 27000-27009
    Source type: Custom
    Source: 0.0.0.0/0
    Description: lmgrd master daemon


Network settings Info
VPC - required Info
vpc-037c67cb8ee3e216a (AppStream2 VPC)
10.0.0.0/20
6
Subnet Info
subnet-08150b2ab8fde0915 AppStream2 Private Subnet2
VPC: vpc-037c67cb8ee3e216a Owner: 445370891421 Availability Zone: us-east-1b
IP addresses available: 250 CIDR: 10.0.2.0/24)
Create new subnet
Auto-assign public IP Info
Disable
Firewall (security groups) Info
A security group is a set of firewall rules that control the traffic for your instance. Add rules to allow specific traffic to reach your instance.
Create security group
7
Select existing security group
Security group name - required
Autodesk Network License Manager
This security group will be added to all network interfaces. The name can't be edited after the security group is created. Max length is 255 characters. Valid characters: a-z, A-Z, 0-9, spaces, and ._-:/()#,@[]+=&;{}!$*
Description - required Info
Autodesk Network License Manager Security Group
Inbound security groups rules
Security group rule 1 (TCP, 3389, 0.0.0.0/0)
Remove
Type Info
rdp
Protocol Info
TCP
Port range Info
3389
Source type Info
Anywhere
Source Info
Add CIDR, prefix list or security
0.0.0.0/0
Description - optional Info
e.g. SSH for admin desktop
8
Security group rule 2 (TCP, 2080, 0.0.0.0/0, flex lm daemon)
Remove
Type Info
Custom TCP
Protocol Info
TCP
Port range Info
2080
Source type Info
Custom
Source Info
Add CIDR, prefix list or security
0.0.0.0/0
Description - optional Info
flex lm daemon
Security group rule 3 (TCP, 27000-27009, 0.0.0.0/0, lmgrd master daemon)
Remove
Type Info
Custom TCP
Protocol Info
TCP
Port range Info
27000-27009
Source type Info
Custom
Source Info
Add CIDR, prefix list or security
0.0.0.0/0
Description - optional Info
lmgrd master daemon
Rules with source of 0.0.0.0/0 allow all IP addresses to access your instance. We recommend setting security group rules to allow access from known IP addresses only.

11. In Step 9: **Add Storage**, in Size (GiB), enter **60** with **gp2** selected for the Root volume.

12. In Step 10: Review the **Summary** and click **Launch instance**.



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

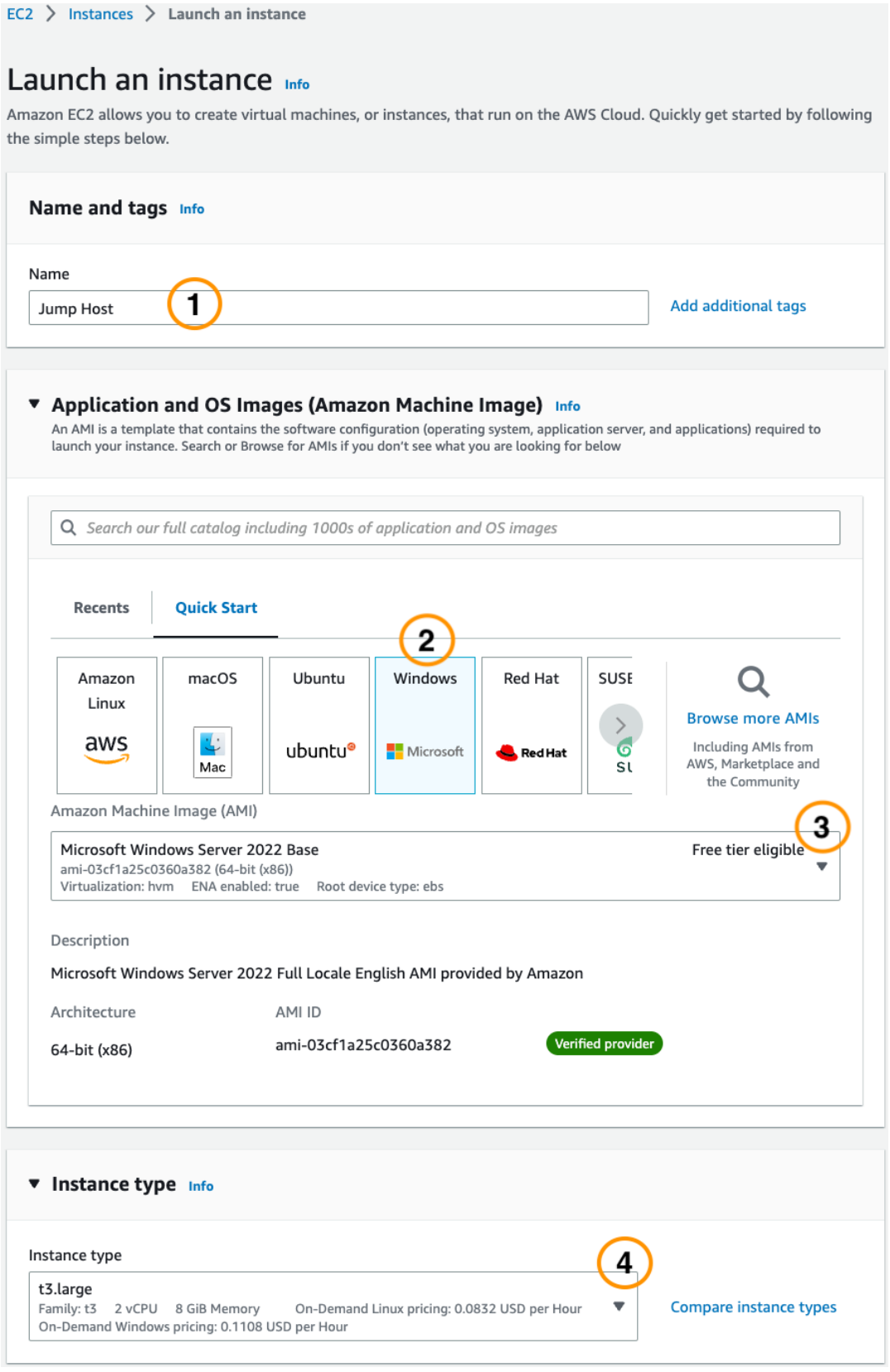
1. We will repeat several steps from the “Configure an EC2 instance that will function as the Autodesk license server” procedure to launch a second instance, but this EC2 will be in the public subnet, functioning as a jump host to configure the NLM remotely. There are different ways to remotely manage EC2 instances. Make sure using a public jump host meetings your organizations requirements.
   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.

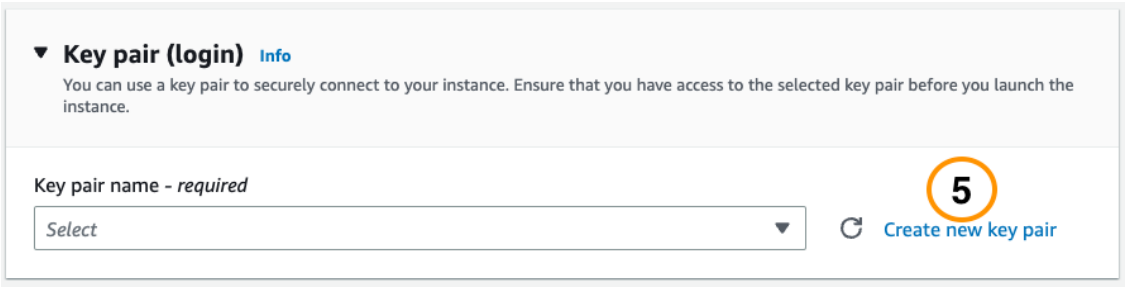
Configure an EC2 instance that will function as the license server

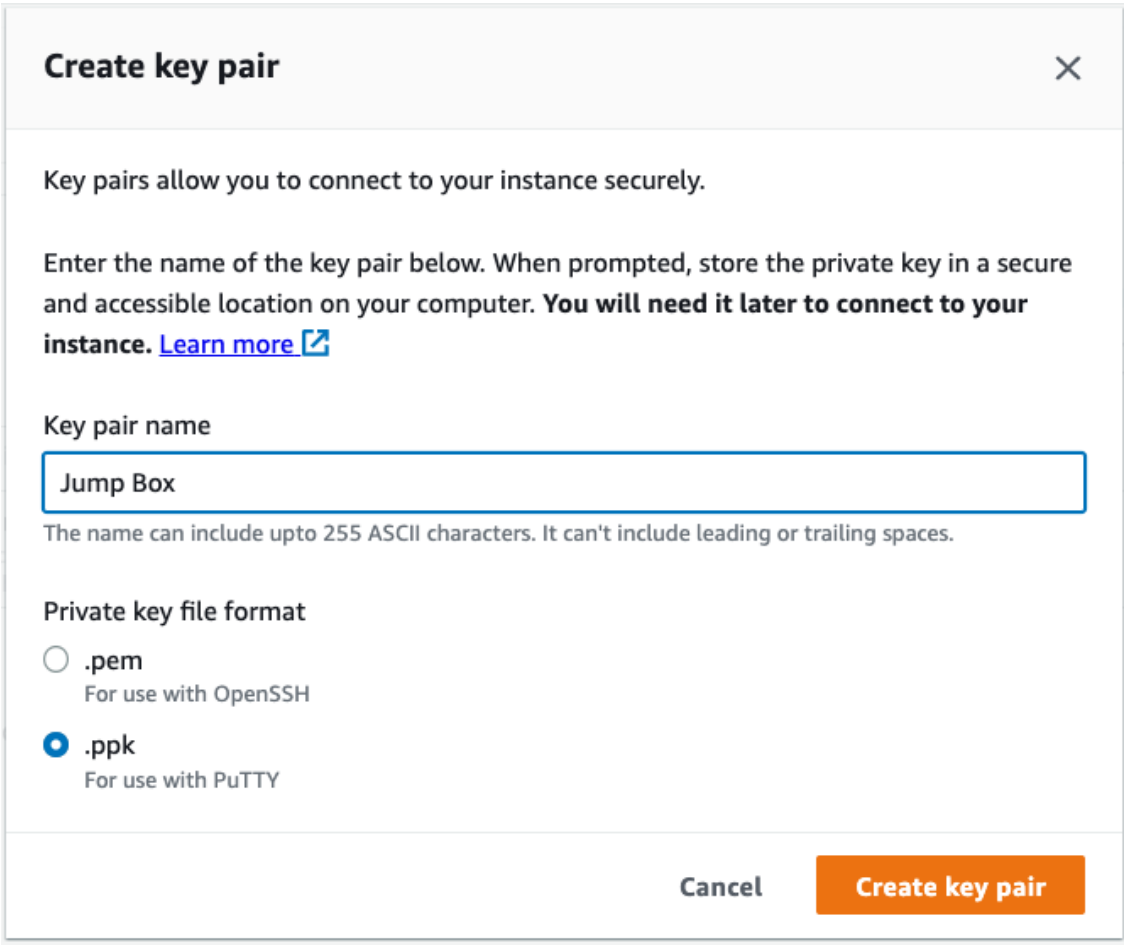
1. Open the Amazon EC2 console at https://console.aws.amazon.com/ec2/.
2. Click Launch Instance.
3. In Step 1: Name the instance **Jump Host**
4. In Step 2: In the **Application and OS Images (Amazon Machine Image)** section, select Windows – Microsoft.
5. In Step 3: Choose an Amazon Machine Image (AMI), use the drop-down and select **Microsoft Windows Server 2022 Base** image.

6. In Step 4: **Choose an Instance Type**, select **t3.large** as the instance type.

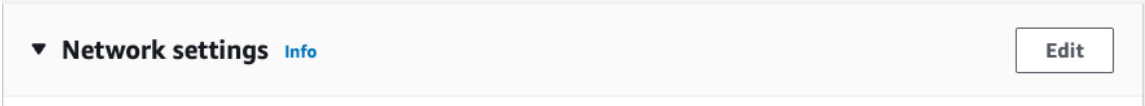


7. In Step 5: **Create a new key pair (or select an existing key pair).** Choose Create a new key pair named **Jump Host** and the key format as **.ppk**. Click **Create key pair** and the key pair file will automatically download. Store the downloaded key pair securely for future reference.





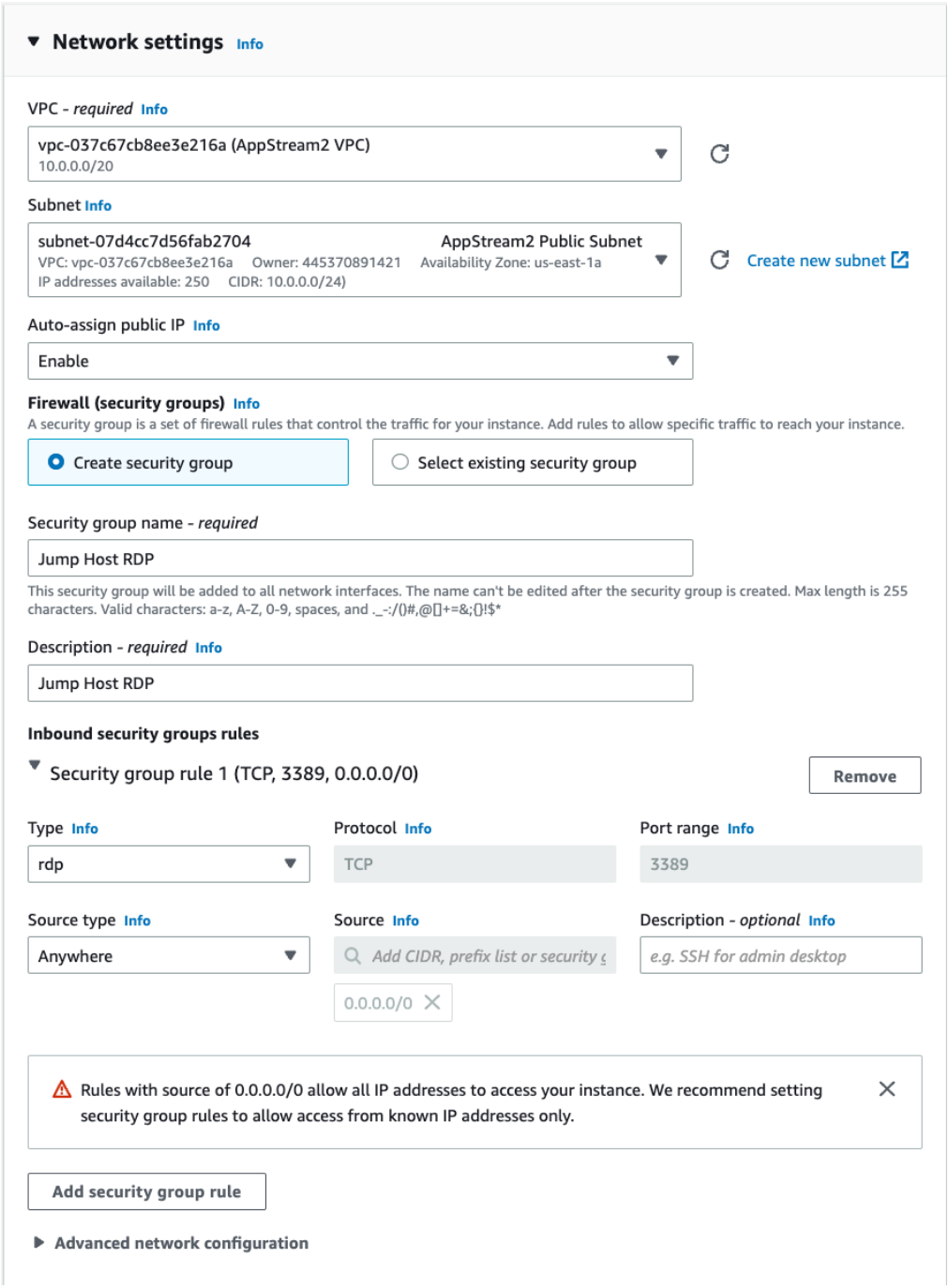
8. On the navigation pane, click Instances to return to the list of EC2 instances. In Step 6: In the Network Settings section, click **Edit**. The settings should have VPC:**AppStream2 VPC** and Subnet:**AppStream2 Public Subnet**.



9. In Step 7: In the Firewall (security groups) section, select Create security group and choose your own name or use Security group name: **Autodesk Network License Manager** with a Description: **Autodesk Network License Manager Security Group**.

10. In Step 8: Add one **Inbound security group rule** to allow Remote Desktop Protocol (RDP) to the Jump Host so the NLM can be configured and maintained.

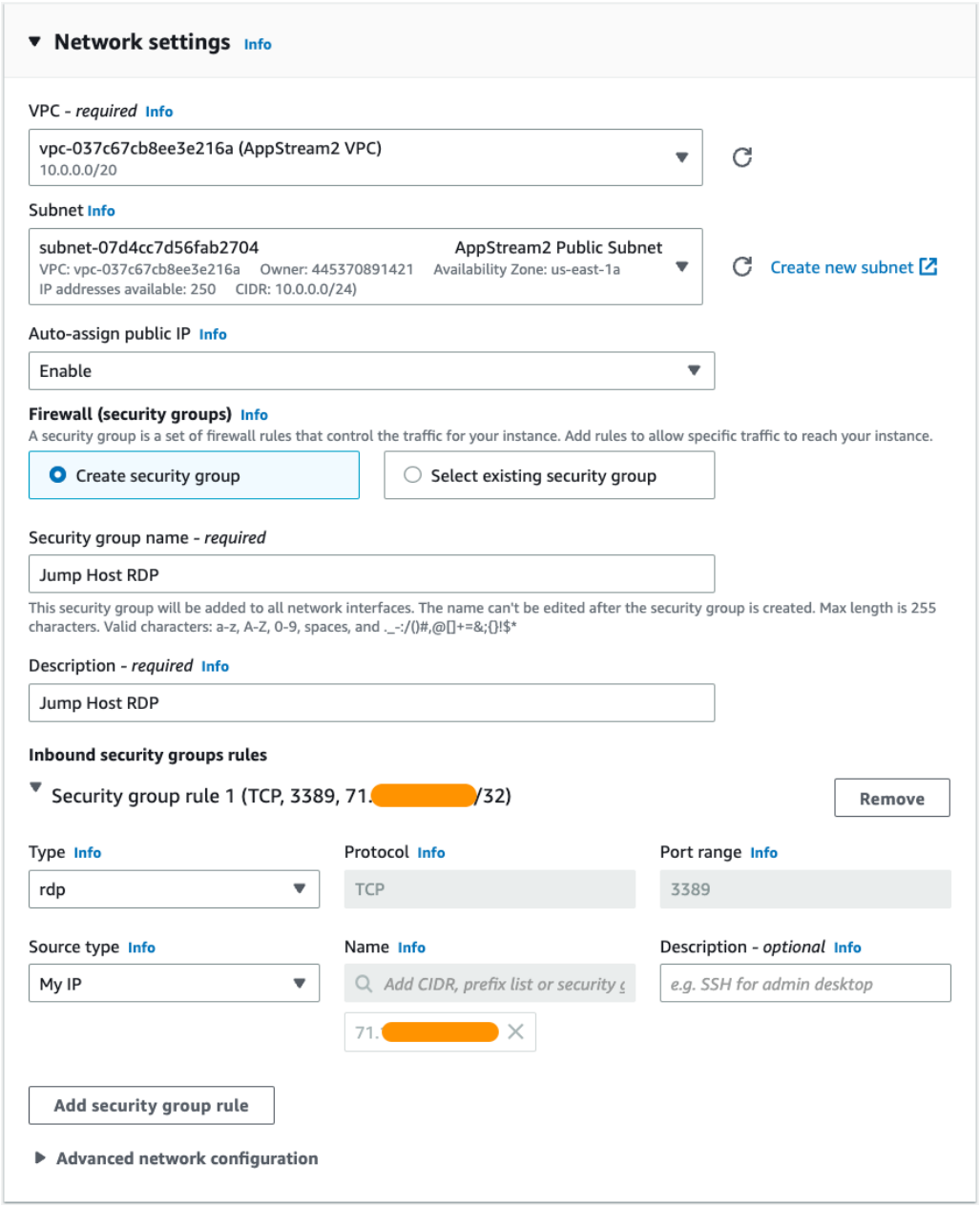
    Inbound security group rule 1
    Type: rdp
    Protocol: TCP
    Port range: 3389
    Source type: Anywhere
    Source: 0.0.0.0/0
    Description: jump host rdp



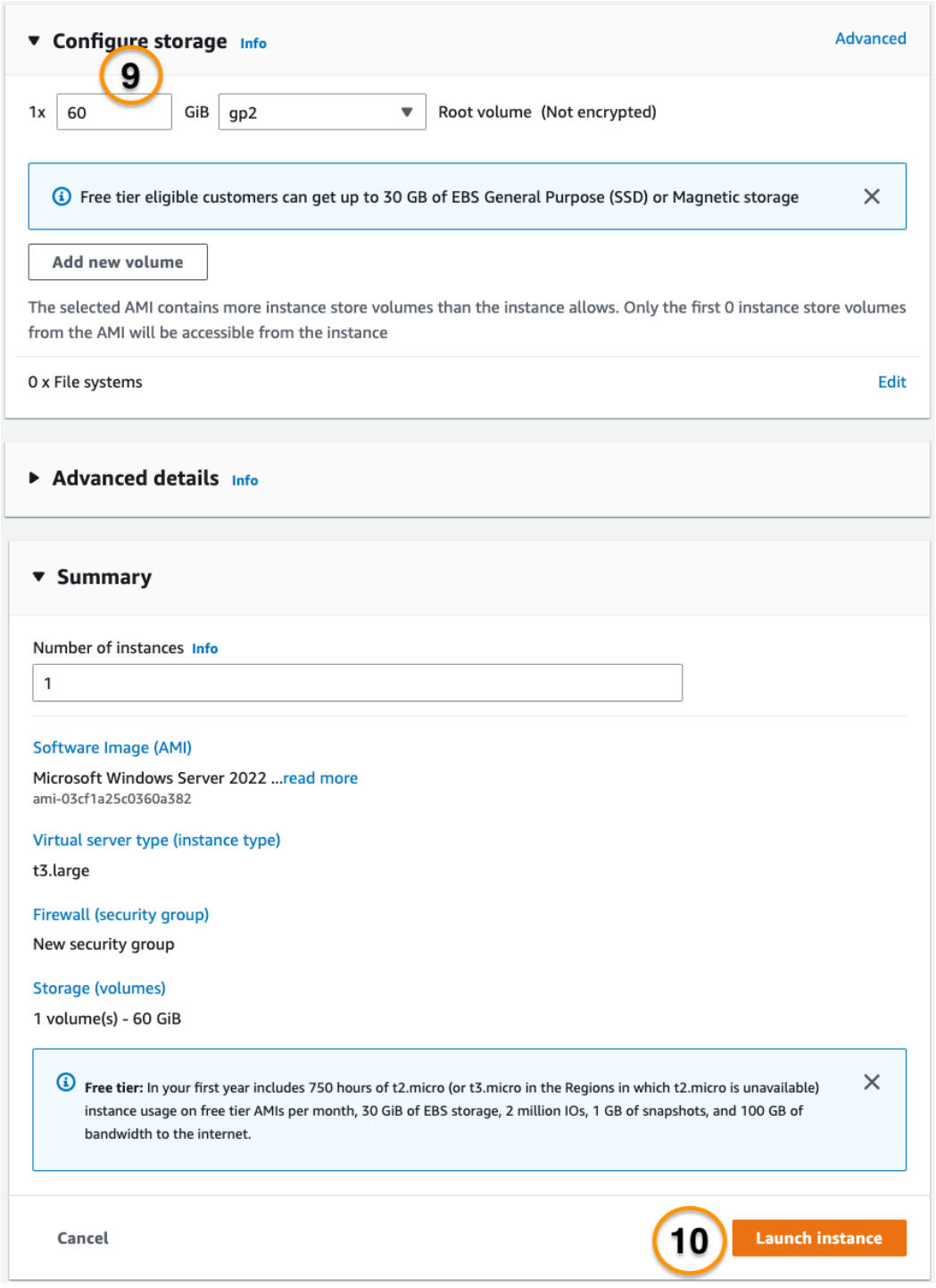
Optional
To help security the Jump Host, use **Source type My IP** to restrict only your remote IP to access RDP on the public Jump Host.

Inbound security group rule 1
Type: Custom TCP
Protocol: TCP
Port range: 3389

Source type: My IP
Source: <This will be auto-filled by your IP>
Description: jump host rdp with IP restriction



11. In Step 9: **Add Storage**, in Size (GiB), enter **60** with **gp2** selected for the Root volume.
12. In Step 10: Review the **Summary** and click **Launch instance**.



13. 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.

    i. In the navigation pane, select Instances, select the instance, choose Connect, and in Connect To Your Instance, choose Get Password.
    ii. In Key Pair Path, click Browse, and then locate the file that contains the key pair associated with the instance.

    iii. Click Decrypt Password. Save the decrypted password to your local computer for later use.

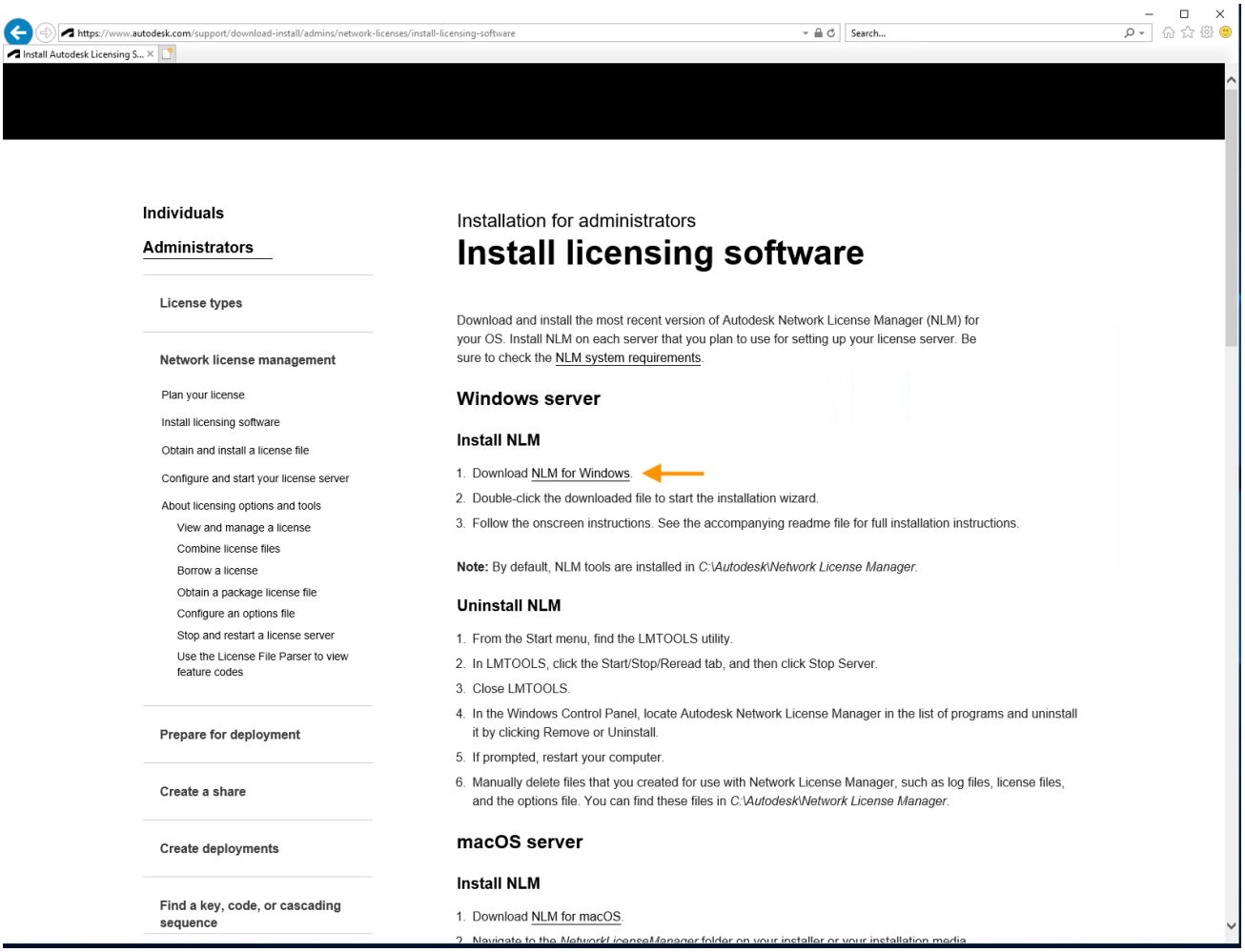
    iv. Download the RDP connection file to your local computer so that you can use it to start a remote connection

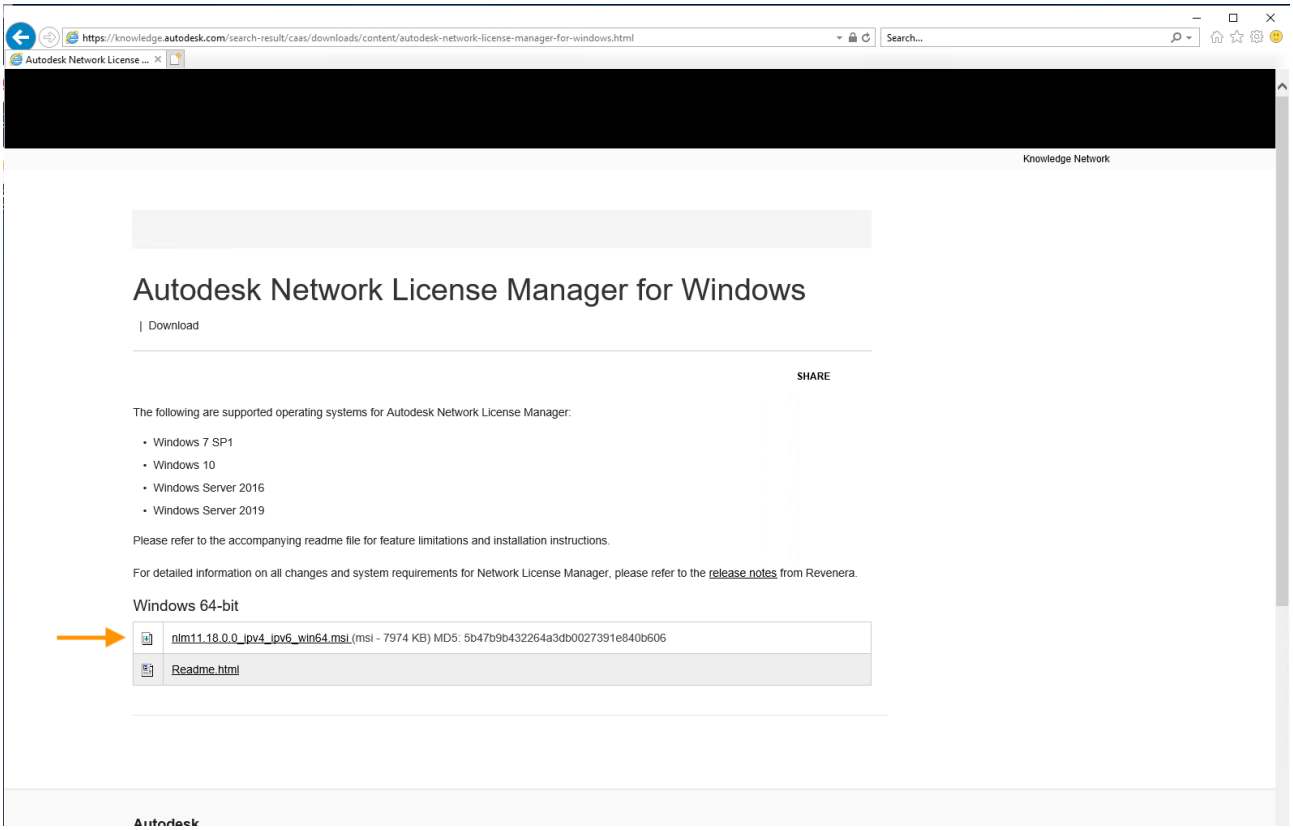
14. On your local computer, open an RDP client to establish a remote connection to the jump host.

15. On the jump host, open an RDP client to establish a remote connection to the license server.

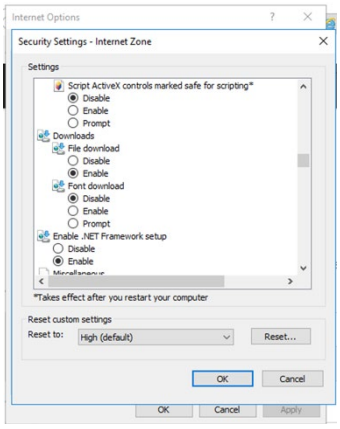
Install and configure the Autodesk Network License Manager

1. After you connect to the license server, navigate to [Autodesk Network License Administration] and download the Network License Manager for Windows 64-bit.

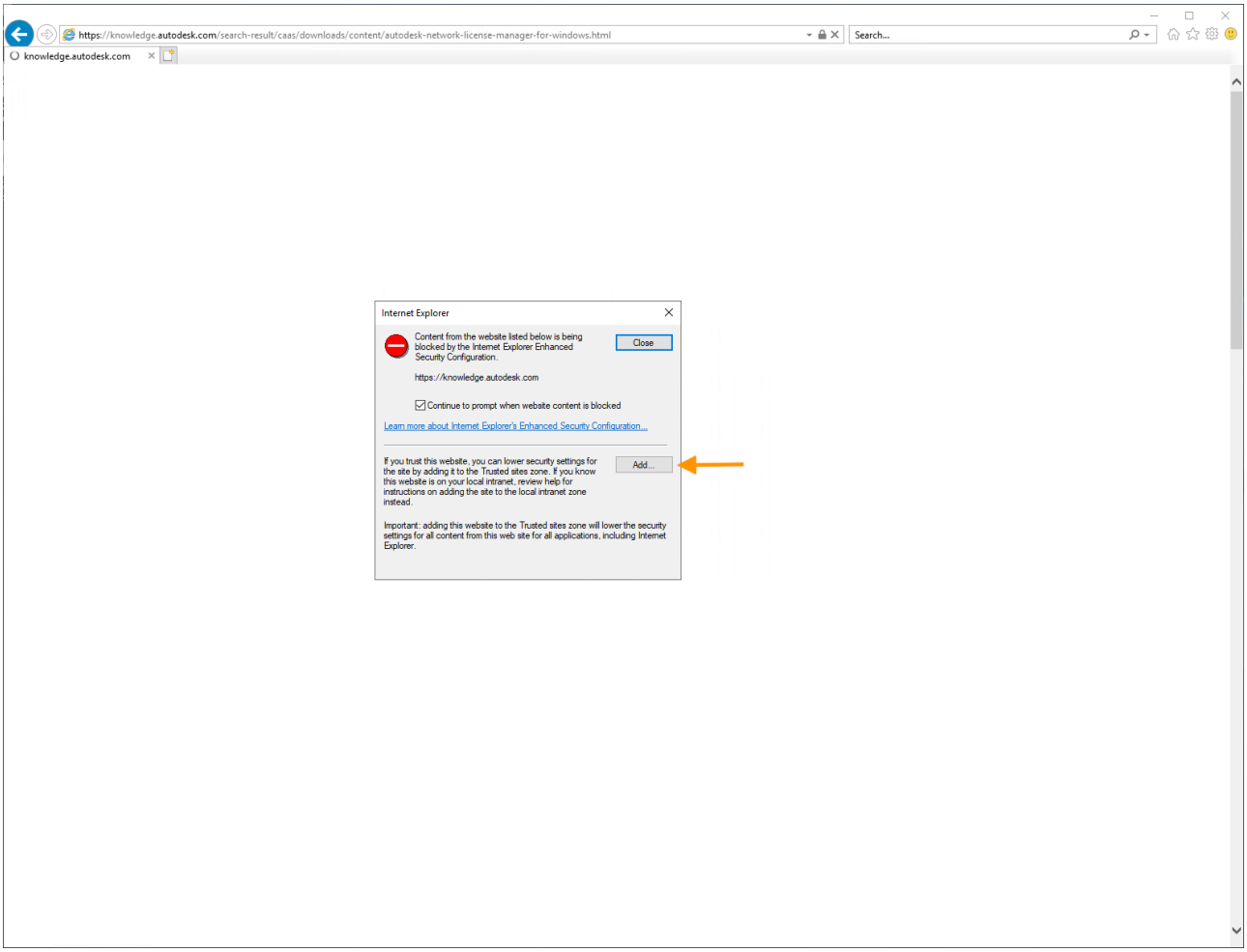


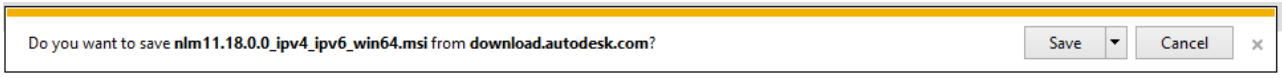


You may need to alter your security preferences to enable downloads. If so, from internet explorer, click the **Tools** icon, and choose **Internet Options**. From Internet Options, choose the **Security** tab, and choose **Custom Level.** Scroll to the options box and enable file downloads.

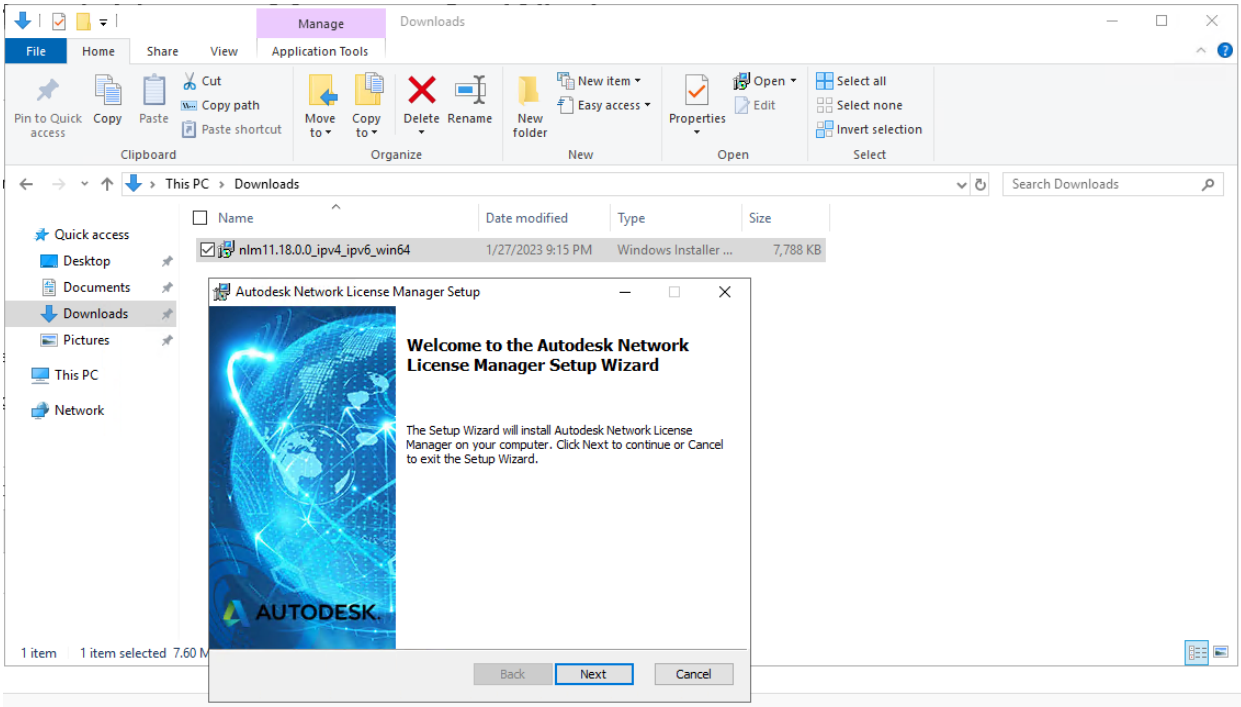


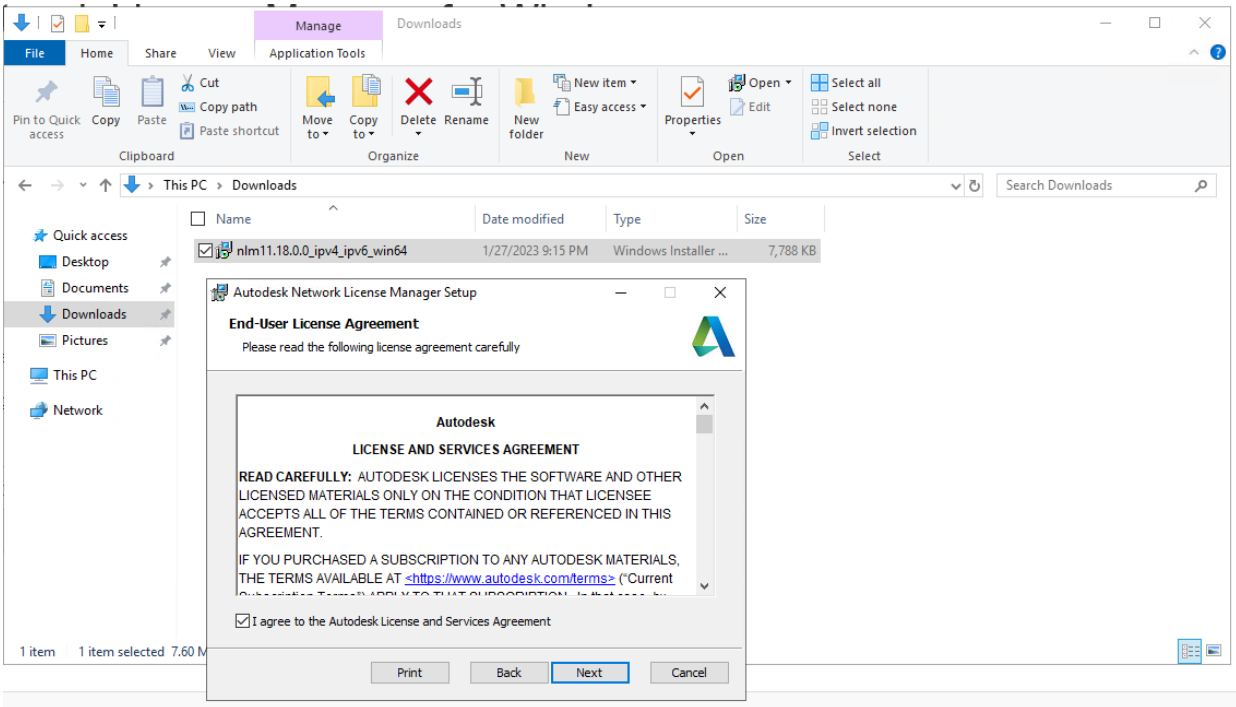
To prevent multiple pop-up windows on the new EC2 IE browser, add the site as a trusted site by clicking Add.

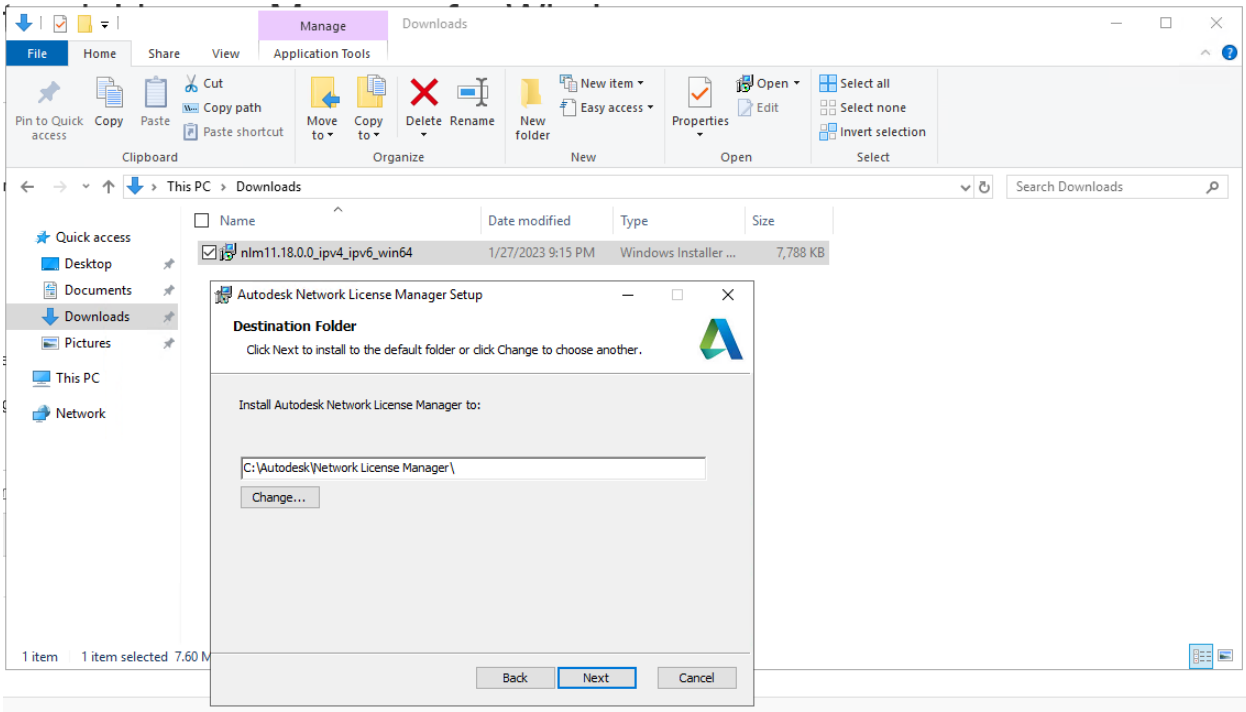


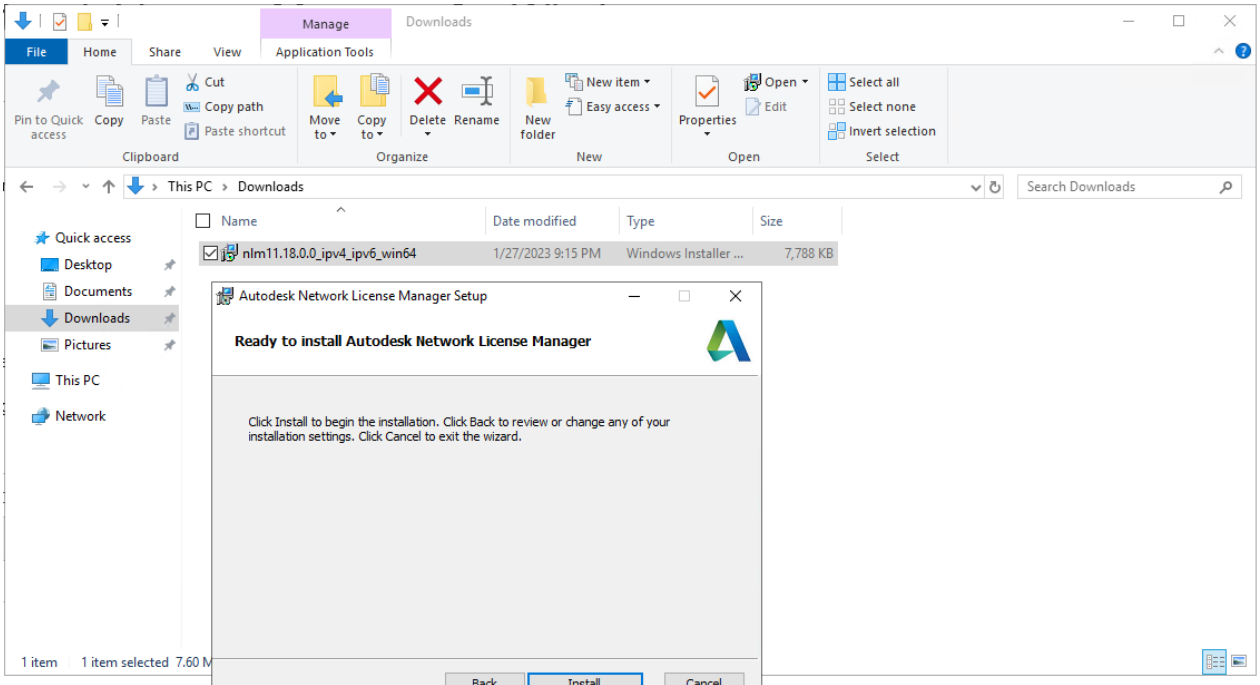


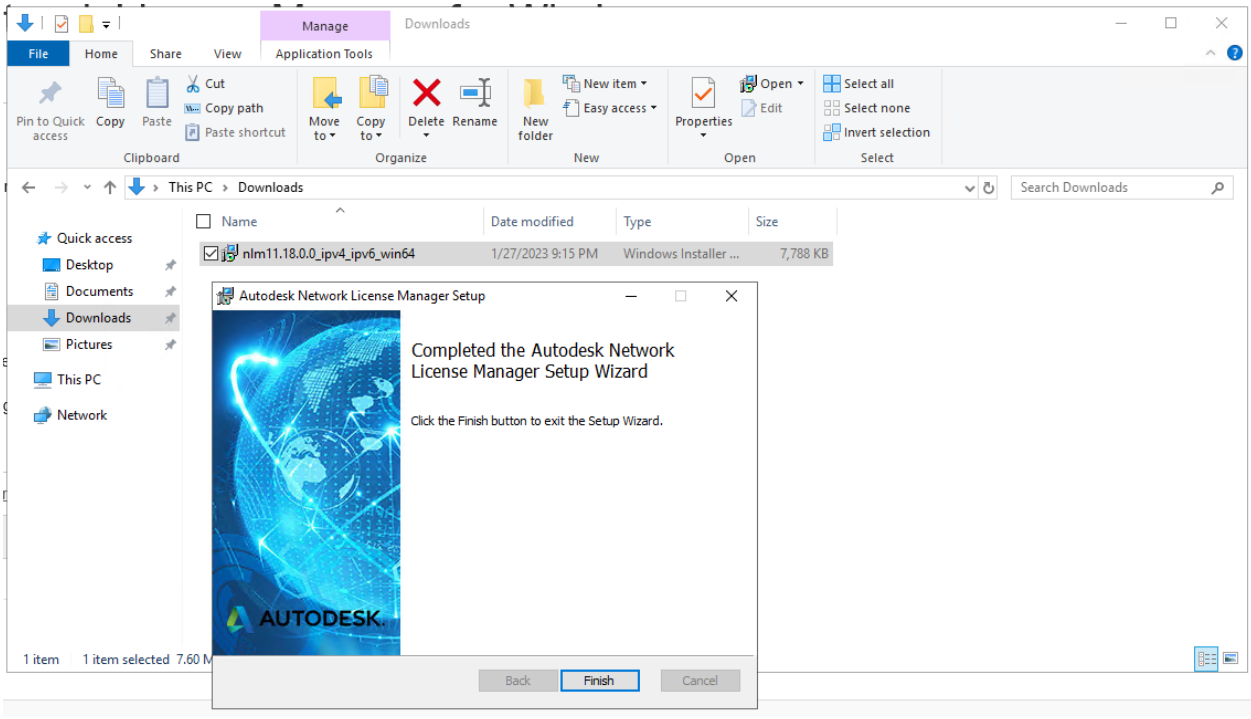
2. After downloading the Network License Manager Installer, open the file and complete the steps in the setup wizard. Use the default installation path.


Manage
Downloads
File
Home
Share
View
Application Tools
Pin to Quick access
Copy
Paste
Cut
Copy path
Paste shortcut
Clipboard
Move to
Copy to
Delete
Rename
Organize
New folder
New item
Easy access
New
Properties
Open
Edit
Select all
Select none
Invert selection
Select
This PC › Downloads
Search Downloads
Quick access
Desktop
Documents
Downloads
Pictures
This PC
Network
Name
Date modified
Type
Size
nlm11.18.0.0_ipv4_ipv6_win64
1/27/2023 9:15 PM
Windows Installer ...
7,788 KB
Autodesk Network License Manager Setup
Welcome to the Autodesk Network License Manager Setup Wizard
The Setup Wizard will install Autodesk Network License Manager on your computer. Click Next to continue or Cancel to exit the Setup Wizard.
AUTODESK.
Back
Next
Cancel
1 item
1 item selected 7.60 M


Manage
Downloads
File
Home
Share
View
Application Tools
Pin to Quick access
Copy
Paste
Cut
Copy path
Paste shortcut
Clipboard
Move to
Copy to
Delete
Rename
Organize
New folder
New item
Easy access
New
Properties
Open
Edit
Select all
Select none
Invert selection
Select
This PC › Downloads
Search Downloads
Quick access
Desktop
Documents
Downloads
Pictures
This PC
Network
Name
Date modified
Type
Size
nlm11.18.0.0_ipv4_ipv6_win64
1/27/2023 9:15 PM
Windows Installer ...
7,788 KB
Autodesk Network License Manager Setup
End-User License Agreement
Please read the following license agreement carefully
Autodesk
LICENSE AND SERVICES AGREEMENT
READ CAREFULLY: AUTODESK LICENSES THE SOFTWARE AND OTHER LICENSED MATERIALS ONLY ON THE CONDITION THAT LICENSEE ACCEPTS ALL OF THE TERMS CONTAINED OR REFERENCED IN THIS AGREEMENT.
IF YOU PURCHASED A SUBSCRIPTION TO ANY AUTODESK MATERIALS, THE TERMS AVAILABLE AT <https://www.autodesk.com/terms> ("Current
I agree to the Autodesk License and Services Agreement
Print
Back
Next
Cancel
1 item
1 item selected 7.60 M


Manage
Downloads
File
Home
Share
View
Application Tools
Pin to Quick access
Copy
Paste
Cut
Copy path
Paste shortcut
Clipboard
Move to
Copy to
Delete
Rename
Organize
New folder
New item
Easy access
New
Properties
Open
Edit
Open
Select all
Select none
Invert selection
Select
This PC › Downloads
Search Downloads
Quick access
Desktop
Documents
Downloads
Pictures
This PC
Network
Name
Date modified
Type
Size
nlm11.18.0.0_ipv4_ipv6_win64
1/27/2023 9:15 PM
Windows Installer ...
7,788 KB
Autodesk Network License Manager Setup
Destination Folder
Click Next to install to the default folder or click Change to choose another.
Install Autodesk Network License Manager to:
C:\Autodesk\Network License Manager\
Change...
Back
Next
Cancel
1 item
1 item selected 7.60 M



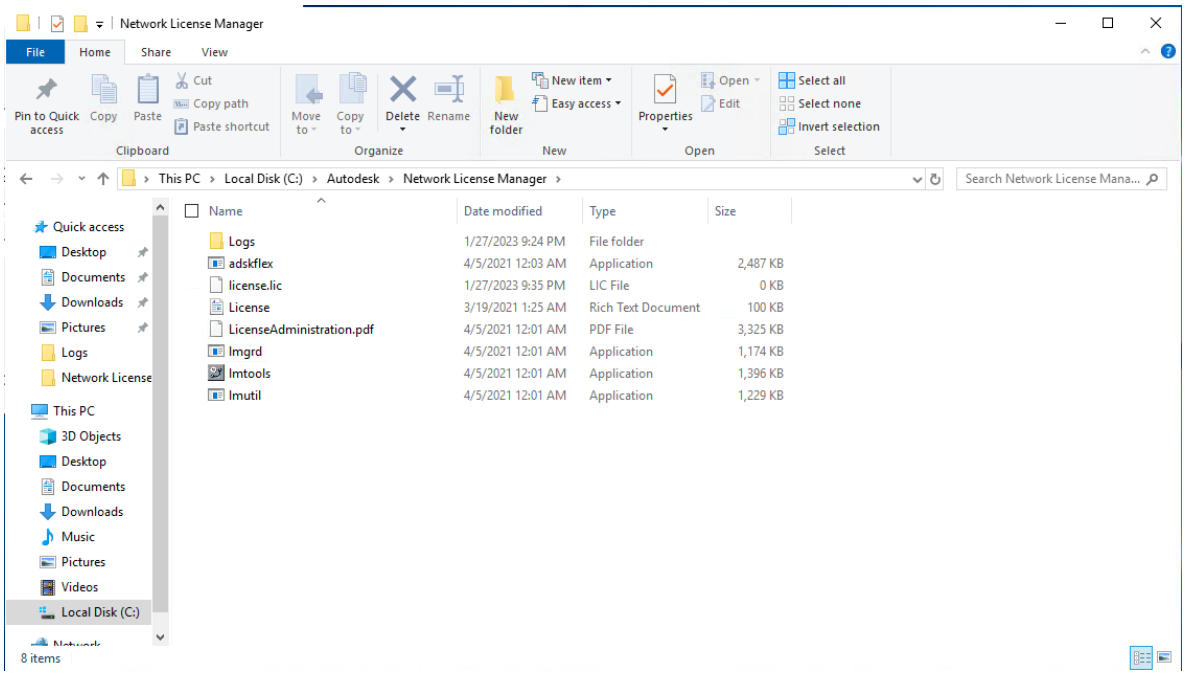


Following installation, you should see the LMTOOLS Utility icon appear on your desktop

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. 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.

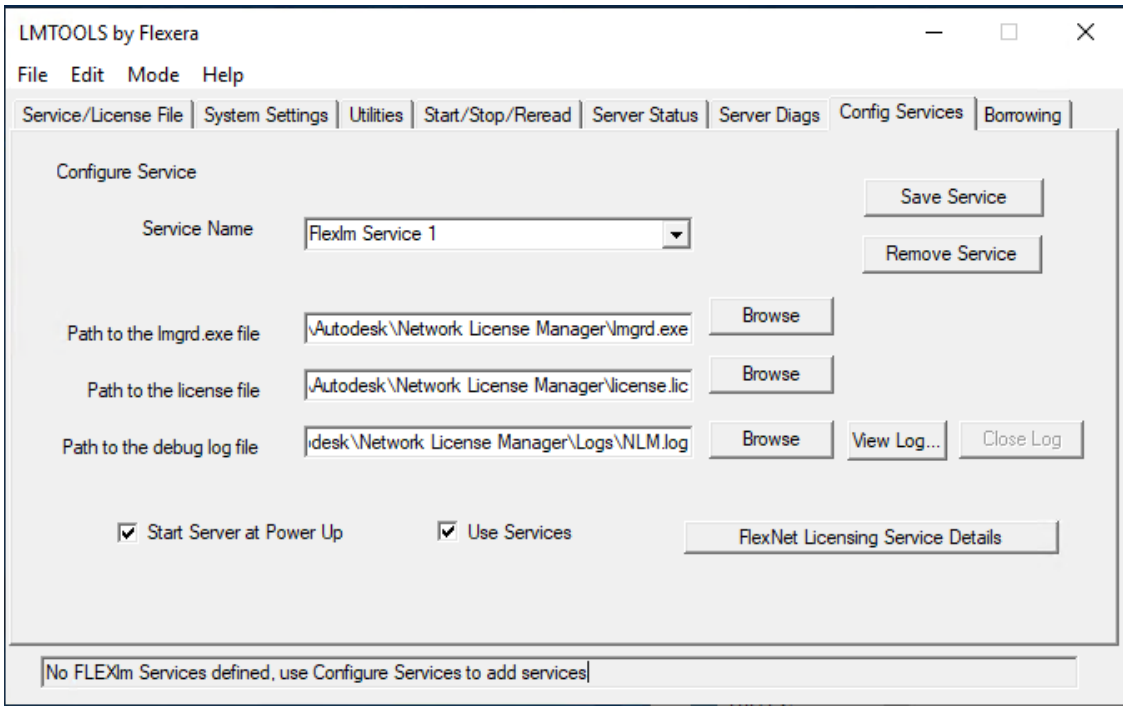
   ii. **Path to the license file**: Browse to select the license file you obtained from Autodesk.

   iii. **Path to the debug log file**: Browse to select the debug log file you created earlier.

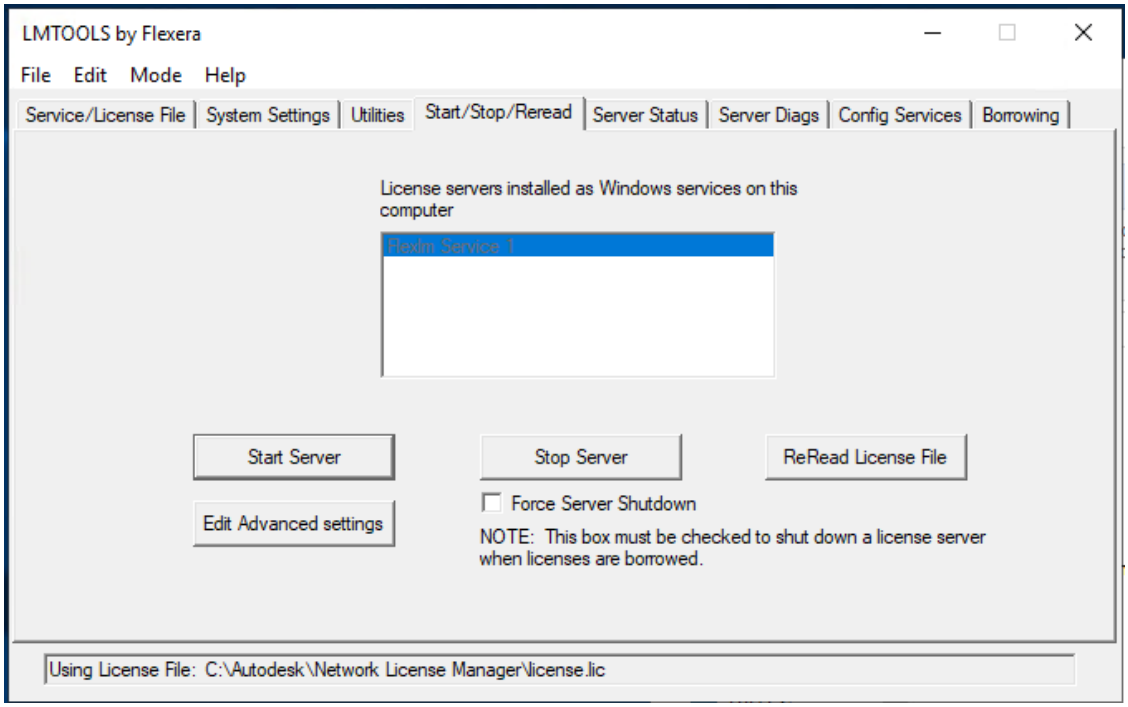
   Note: Be sure that users and services have write access to the debug log file or folder.

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.



i.

For more information on configuring a network license, see here.

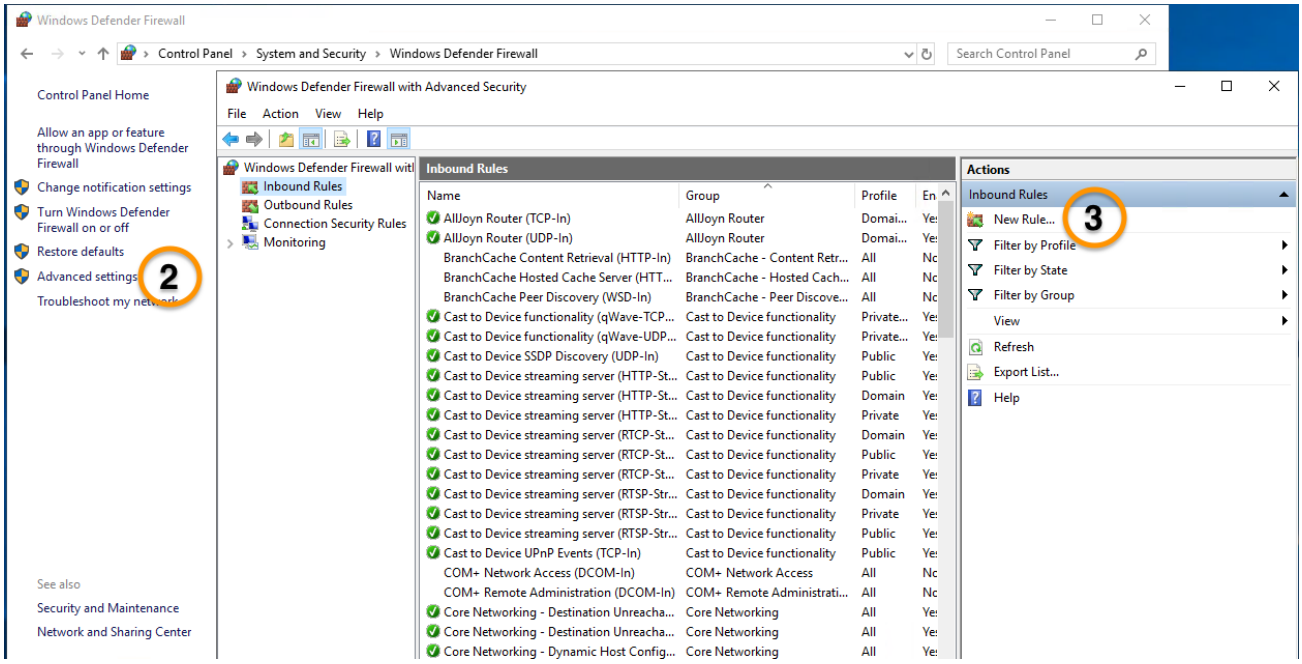
Configure Windows Firewall to open up the license server ports

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.

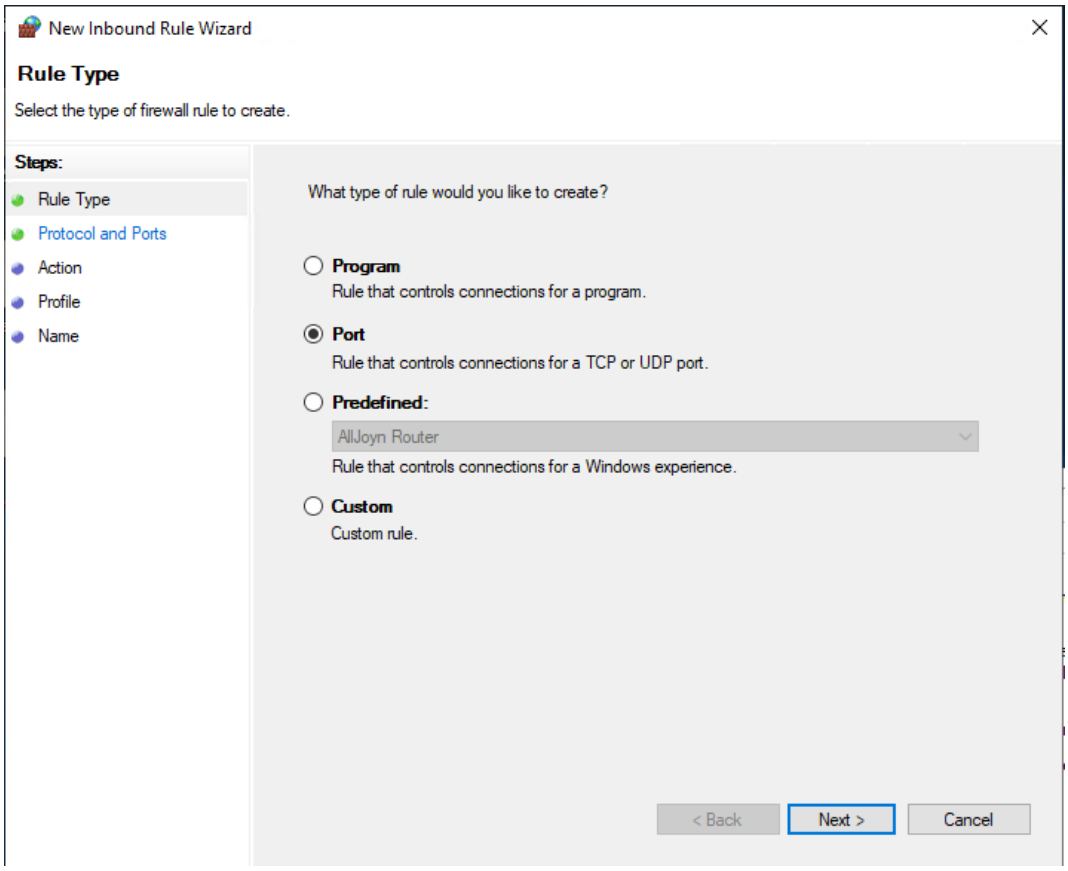
1. Select **Start -> Control Panel -> System and Security -> Windows Defender Firewall.**

2. In the left pane, select **Advanced settings**.

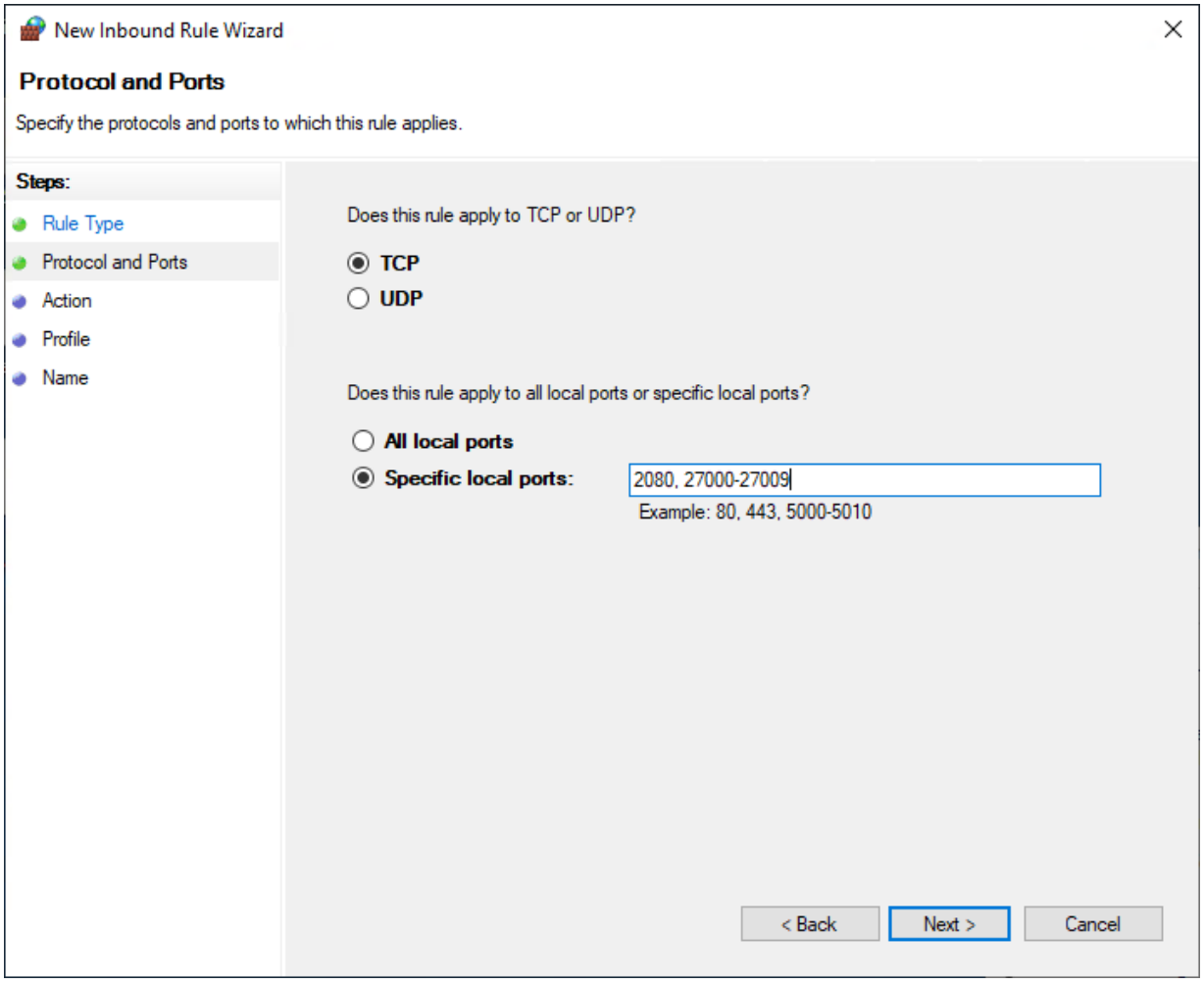
3. Select **Inbound Rules**, and then **New Rule**.



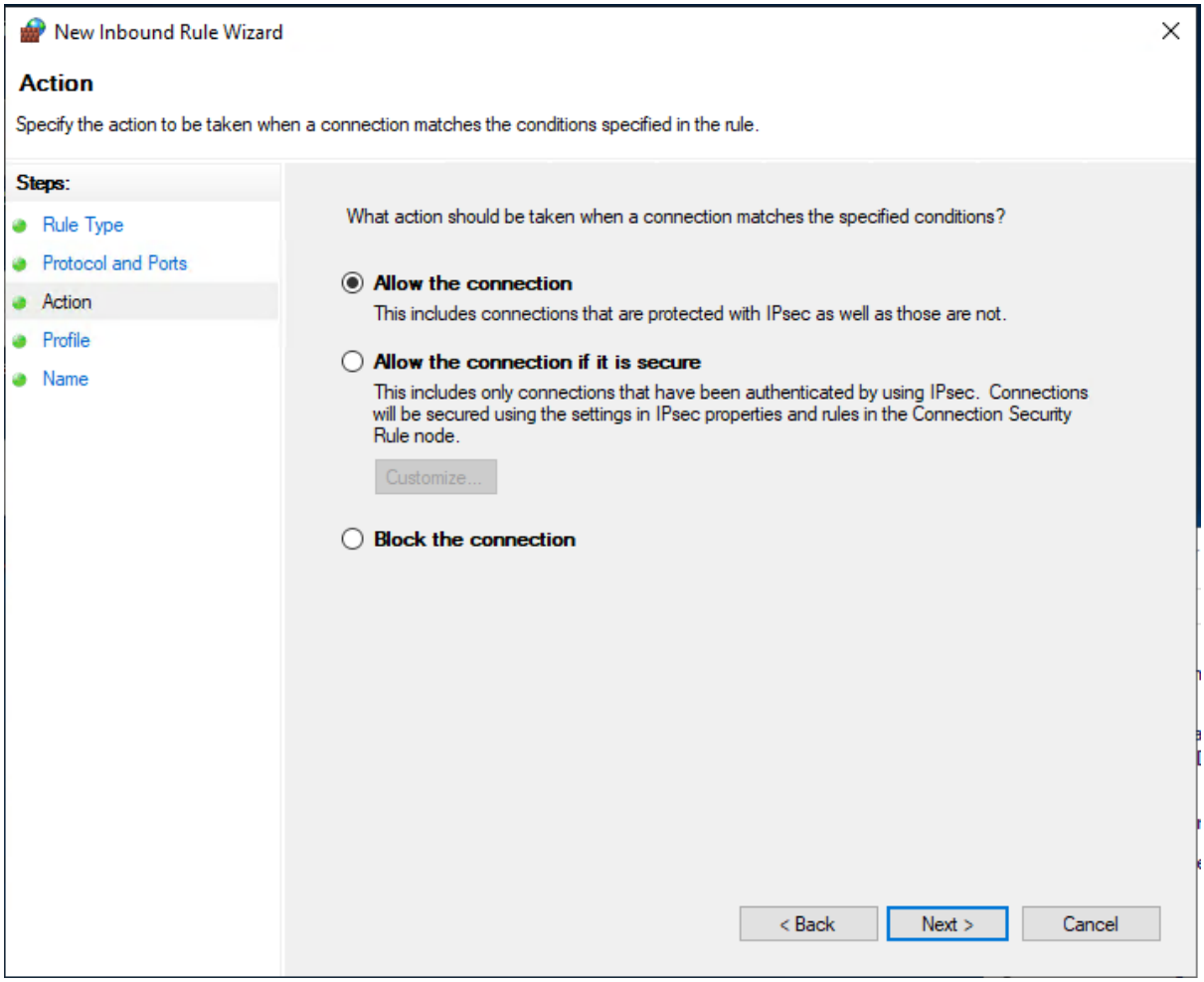
4. Select **Port**, and then click **Next**.



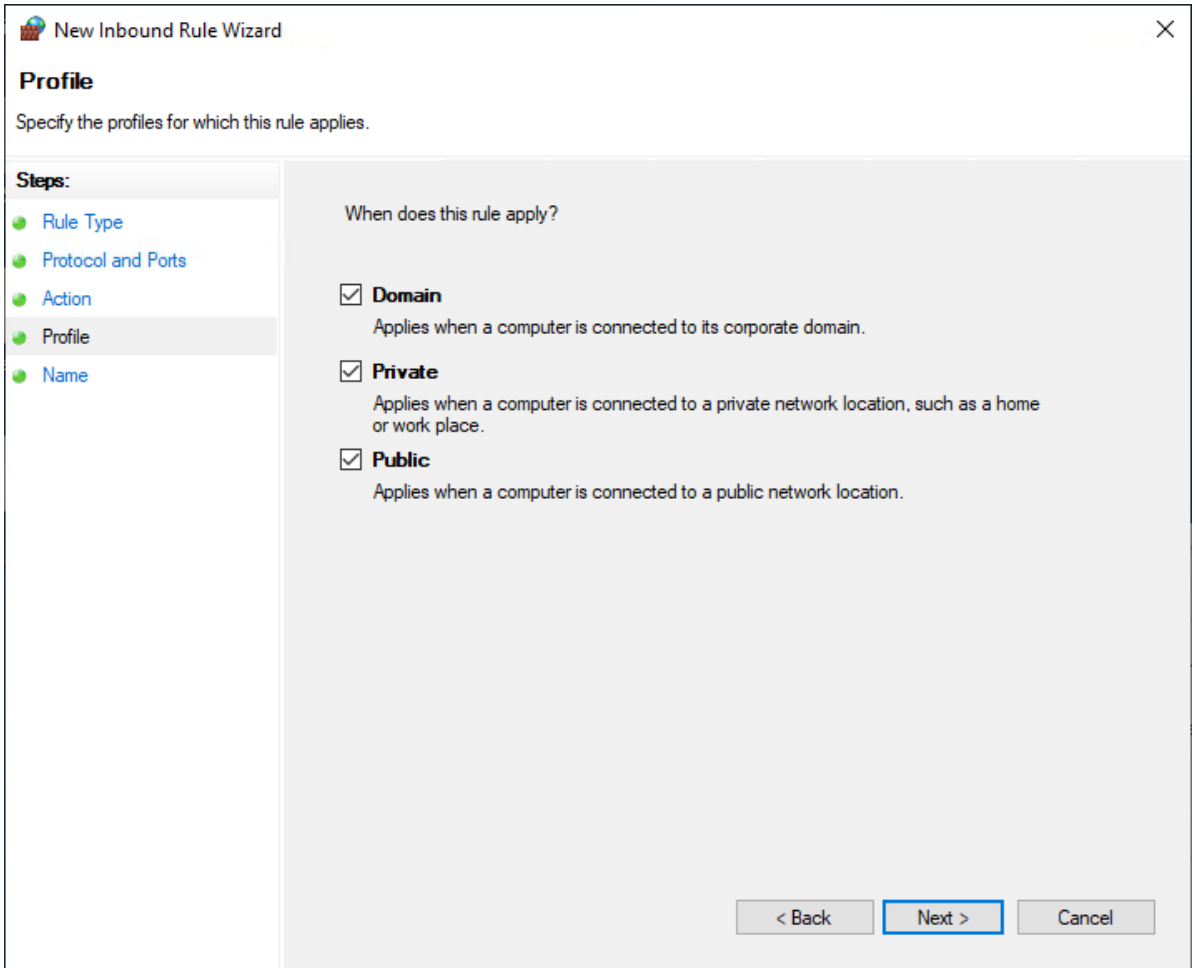
5. Make sure that **TCP** is selected, enter 2080, 27000-27009 in **Specific local port**, and then click **Next**.



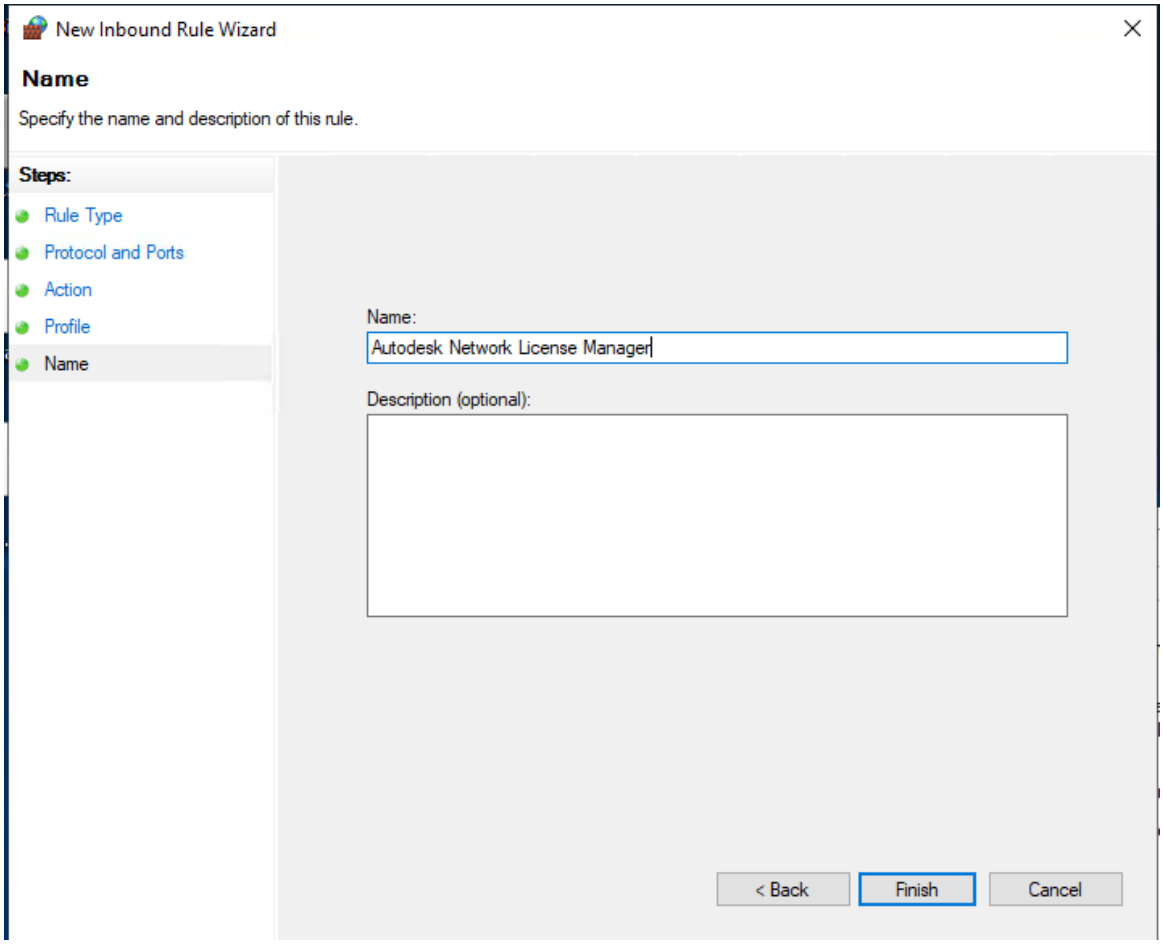
6. Select **Allow the connection**, and then click **Next**.



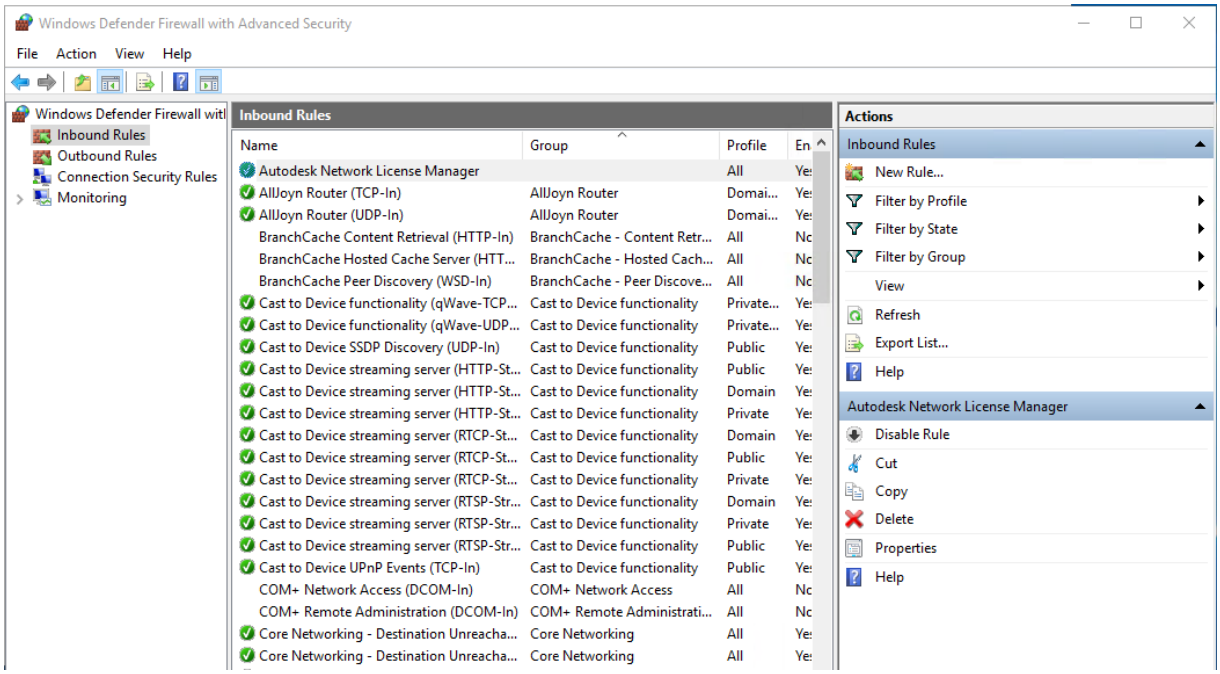
7. Select **Domain**, **Private**, and **Public,** and then click **Next.**



8. Enter a name of **Autodesk Network License Manager** for the rule, and then click **Finish.**



The rule will be displayed at the top of the list.



Step 4: Create an AppStream 2.0 image builder

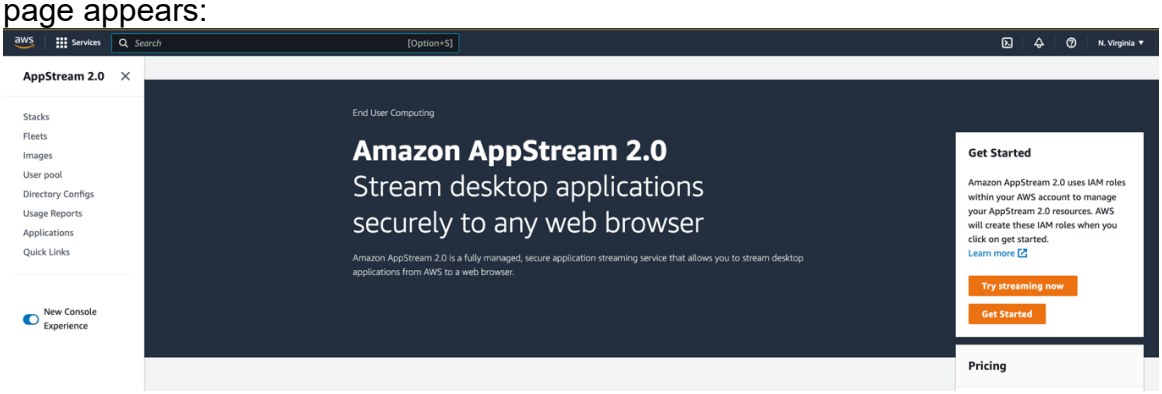
AppStream 2.0 uses EC2 instances to stream applications. You launch instances, called *image builders*, from base images that AppStream 2.0 provides. To create your own custom image, you connect to an image builder instance, install, and configure your applications for streaming, and then create your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

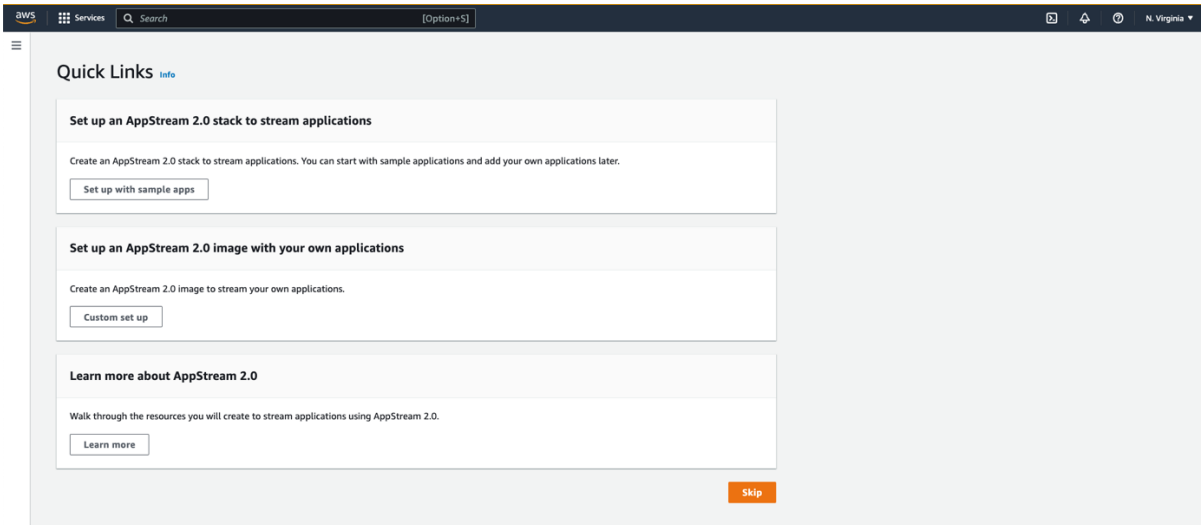
2. If you have not previously configured any AppStream 2.0 settings, the following page appears:



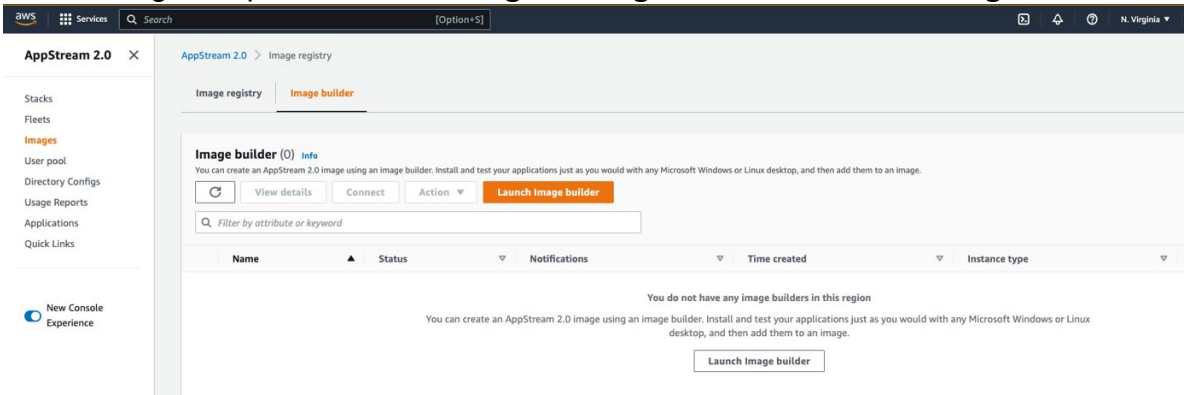
Note: If the AppStream 2.0 navigation page appears instead, skip to step 5.

3. Choose **Get started**.

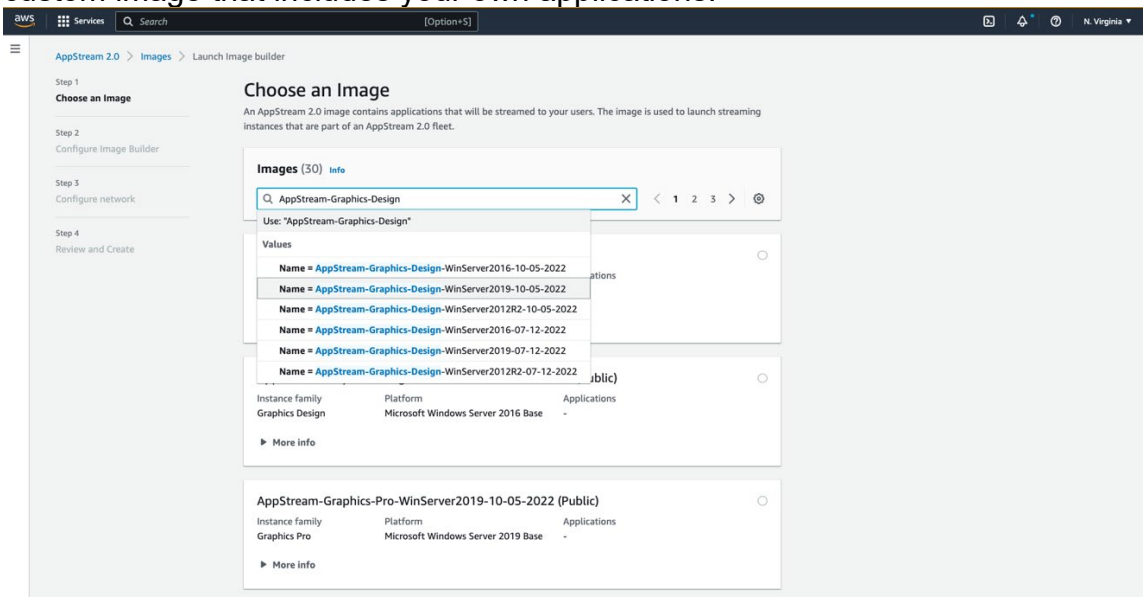
4. In the lower right corner of the page, choose **Skip** (this guide walks you through a different process for getting started with AppStream 2.0).



5. In the navigation pane, choose **Images**, **Image Builder**, **Launch Image Builder**.



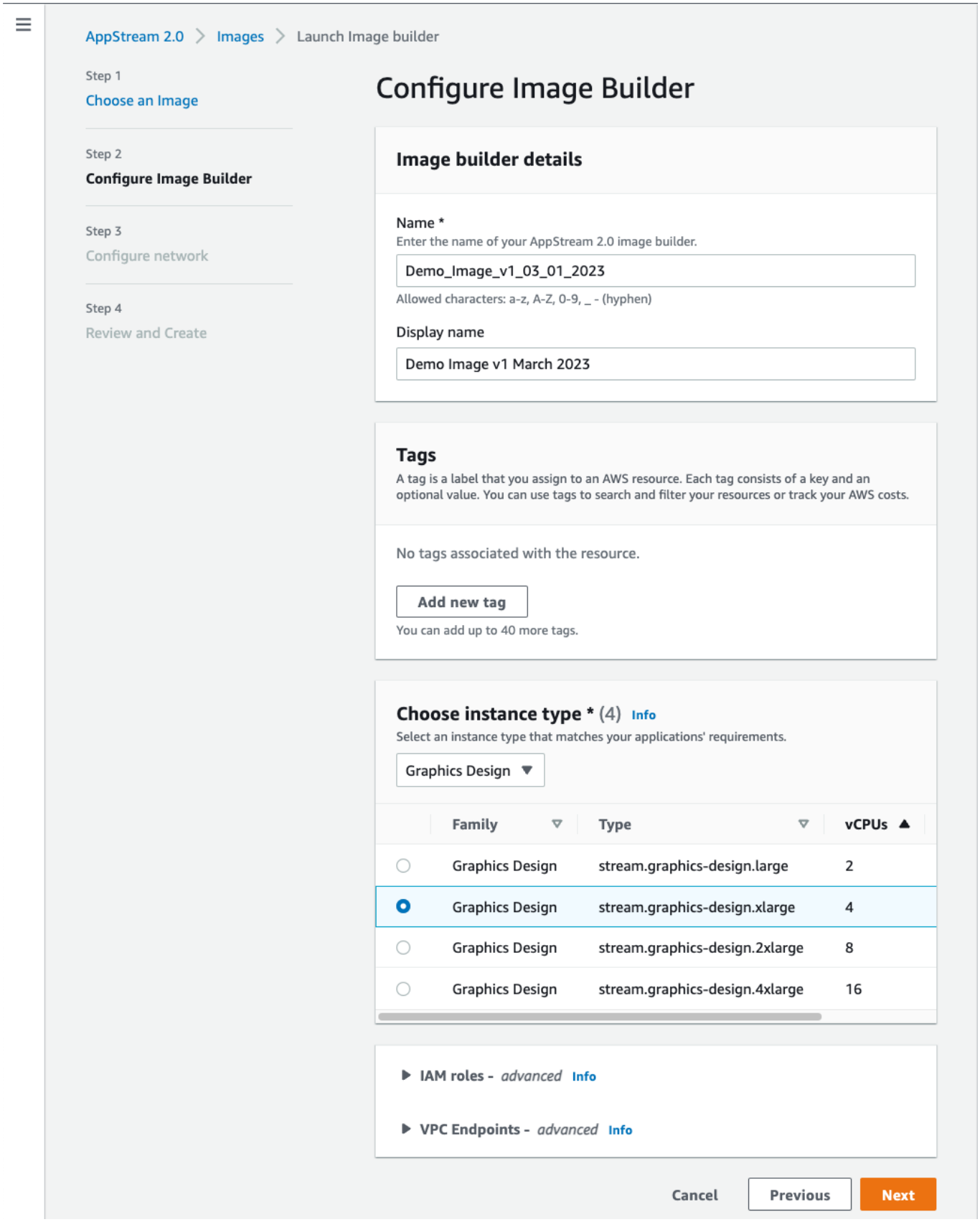
6. In the **Step 1: Choose Image** window, in the list of images, select the image builder with the name *AppStream-Graphics-Design-WinServerYYYY-mm-dd-yyyy*, or *AppStream-Graphics-Pro-WinServerYYYY-mm-dd-yyyy*, where *YYYY* represents the version and *mm-dd-yyyy* represents the most recent date. For best results, the image builder you choose should match the instance type of the virtual machines you intend to deploy (see 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.**

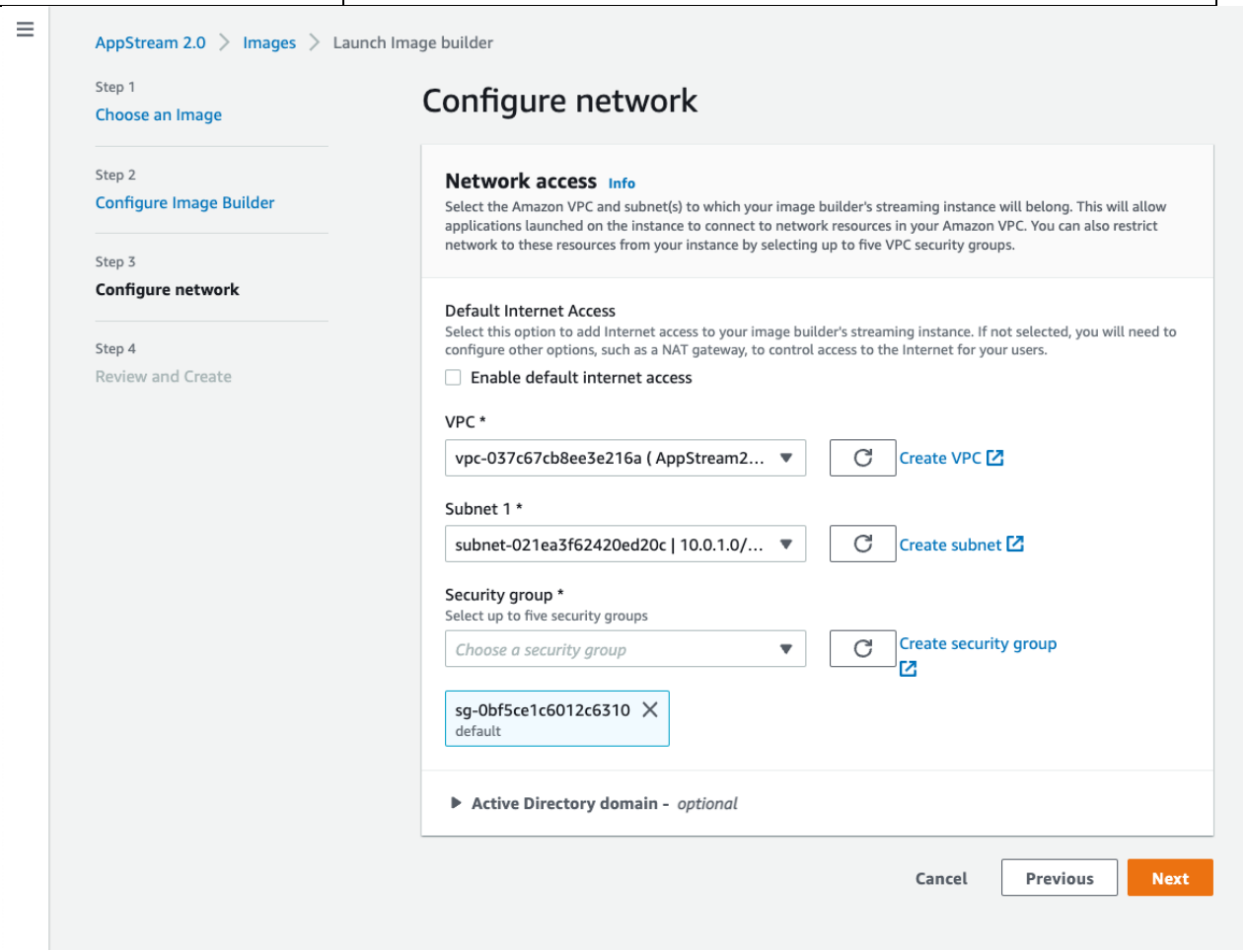
8. In **Step 2: Configure Image Builder**, enter the below information:

Option	Value
Name	Provide a unique name identifier for the image builder, such as "**Demo_Image_v1_03_01_2023**", using any of the following characters: a-Z, 0-9, -,_.
Display Name	Provide an optional name, such as "**Demo Image v1 March 2023**", to be displayed in the console for easier reference and readability.
Instance Family	Choose Graphics Design or Graphics Pro, depending on your previous choice.
Instance Type	Refer to pages 2 and 3 of this guide for guidance on picking the right instance type.


AppStream 2.0 > Images > Launch Image builder
Step 1
Choose an Image
Step 2
Configure Image Builder
Step 3
Configure network
Step 4
Review and Create
Configure Image Builder
Image builder details
Name *
Enter the name of your AppStream 2.0 image builder.
Demo_Image_v1_03_01_2023
Allowed characters: a-z, A-Z, 0-9, _ - (hyphen)
Display name
Demo Image v1 March 2023
Tags
A tag is a label that you assign to an AWS resource. Each tag consists of a key and an optional value. You can use tags to search and filter your resources or track your AWS costs.
No tags associated with the resource.
Add new tag
You can add up to 40 more tags.
Choose instance type * (4) Info
Select an instance type that matches your applications' requirements.
Graphics Design
Family
Type
vCPUs
Graphics Design
stream.graphics-design.large
2
Graphics Design
stream.graphics-design.xlarge
4
Graphics Design
stream.graphics-design.2xlarge
8
Graphics Design
stream.graphics-design.4xlarge
16
IAM roles - advanced Info
VPC Endpoints - advanced Info
Cancel
Previous
Next

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

Option	Value
Default Internet Access	Do not enable. 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

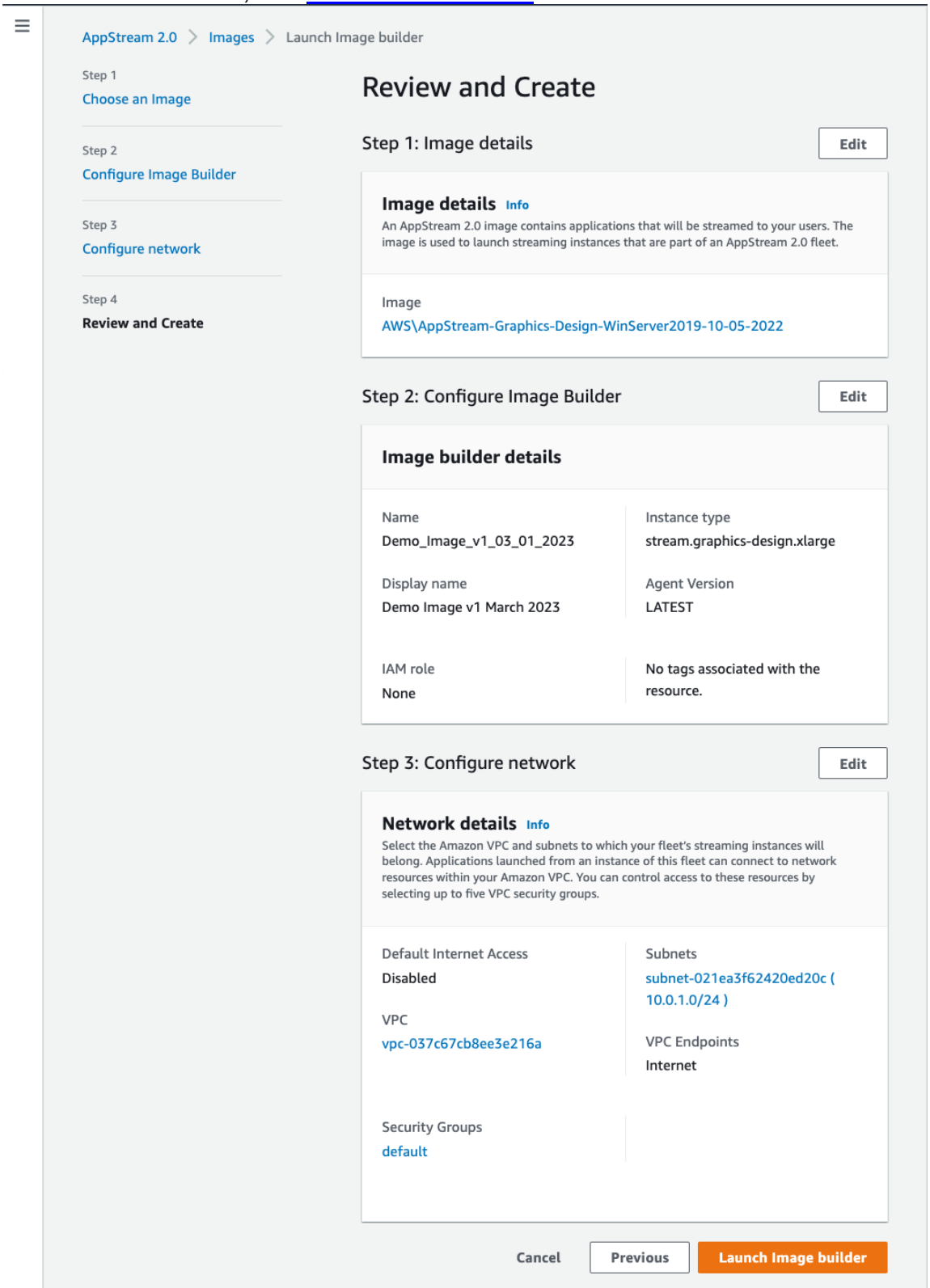


Click Next.

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

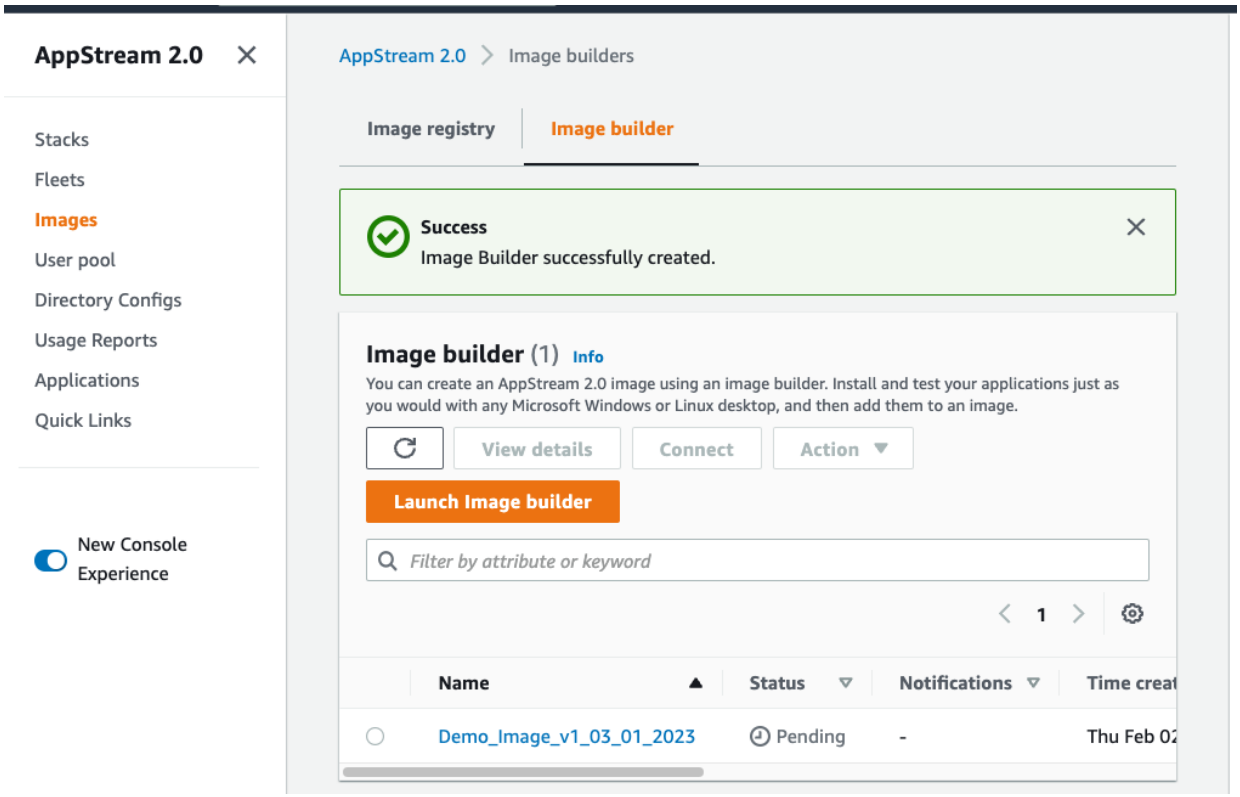
11. After you finish reviewing the configuration details, choose **Launch Image builder**. If an error message notifies you that you don’t have sufficient limits to create the image builder, submit a limit increase request through the AWS Support Center.

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].

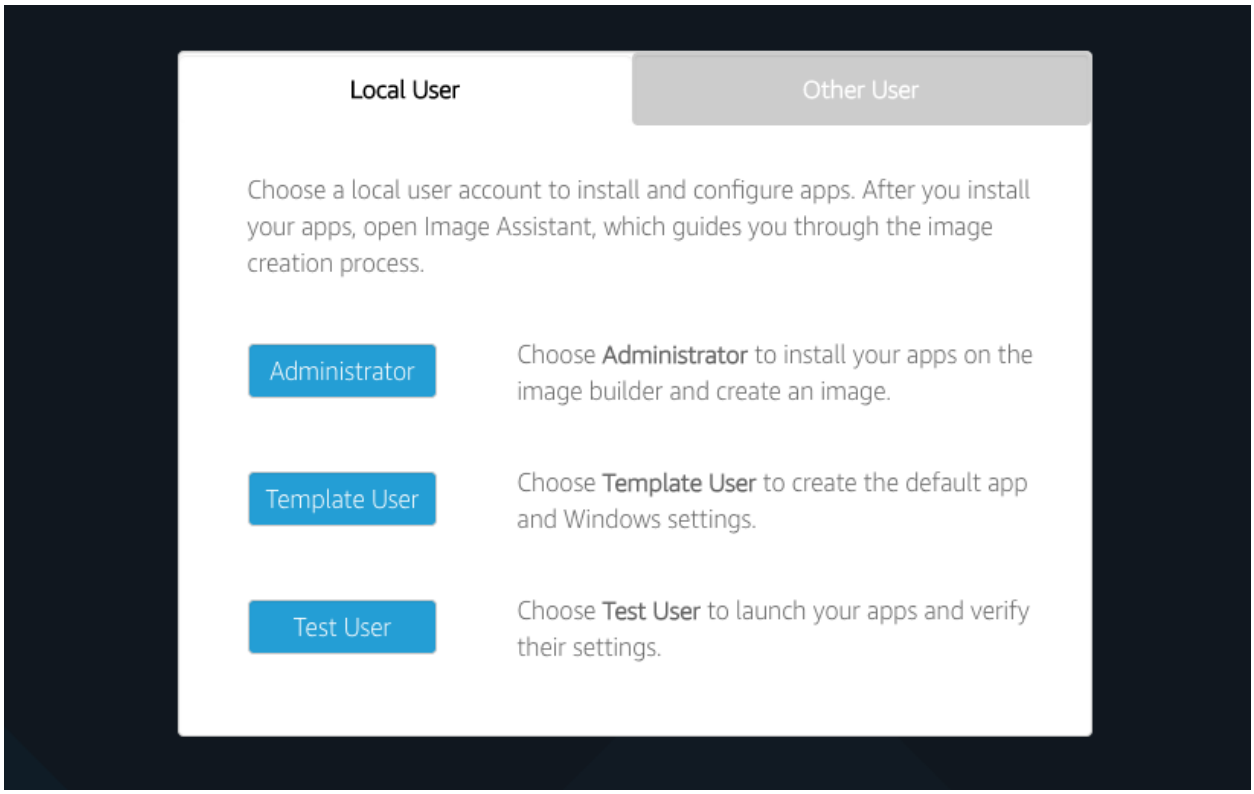
Step 5: Connect to the image builder and install AutoCAD

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 (*Demo_Image_v1_03_01_2023*). 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**.

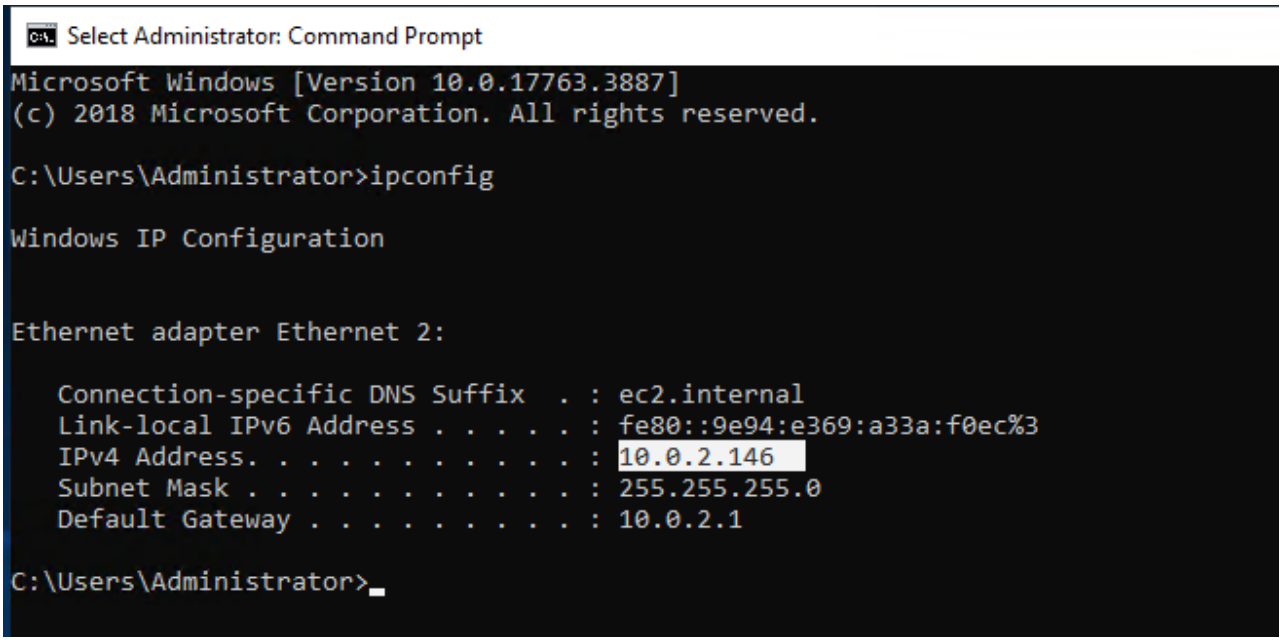


   Note: If a new browser tab does not open, configure your browser to allow popups from https://console.aws.amazon.com/.
5. After a few moments, you are connected to the image builder instance with administrator rights.

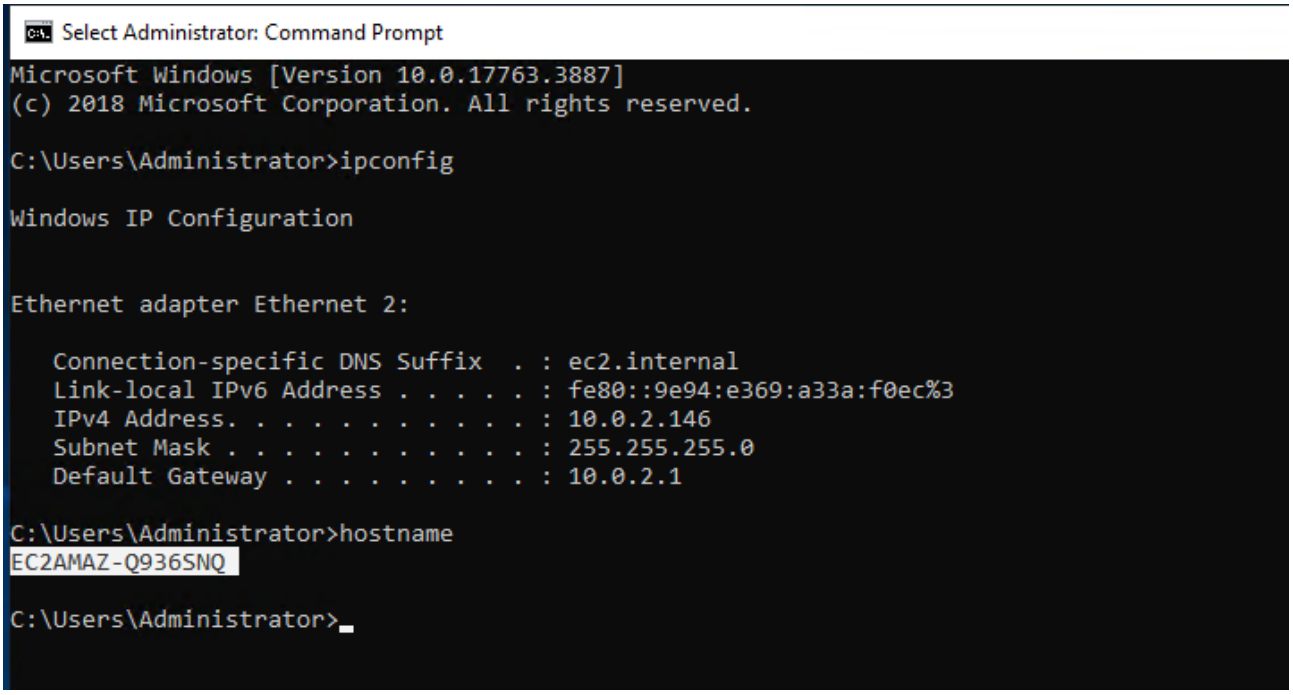
Add the license server hostname to the host list

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.

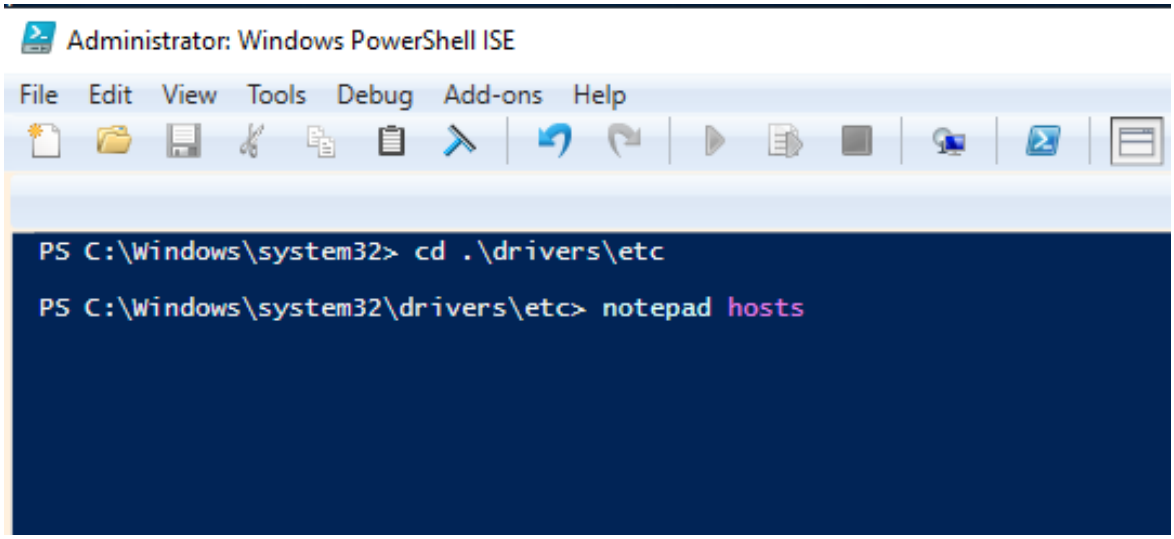
1. Log in into the license server EC2 instance by using the jump host.
2. After you are connected to the license server, open **Command Prompt**, type **ipconfig** and then press ENTER. Note the IP address of the license server.



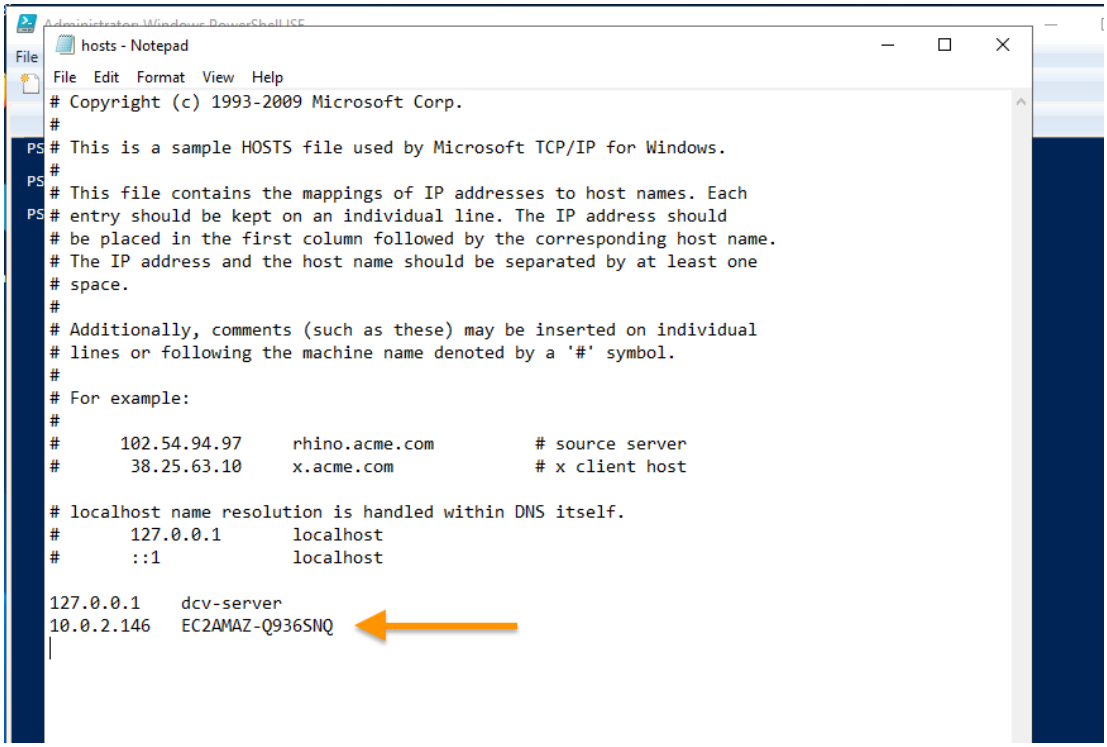
3. At the command prompt, type **hostname** and then press ENTER. Note the computer name of the license server.



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.

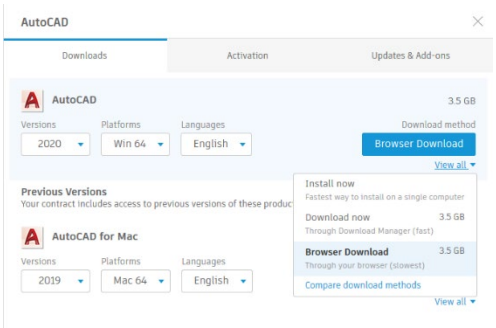


Note: if you don't run PowerShell as Administrator, the file can't be saved.

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. As part of the installation, the AutoCAD installer will ask to restart the image.

6. 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:

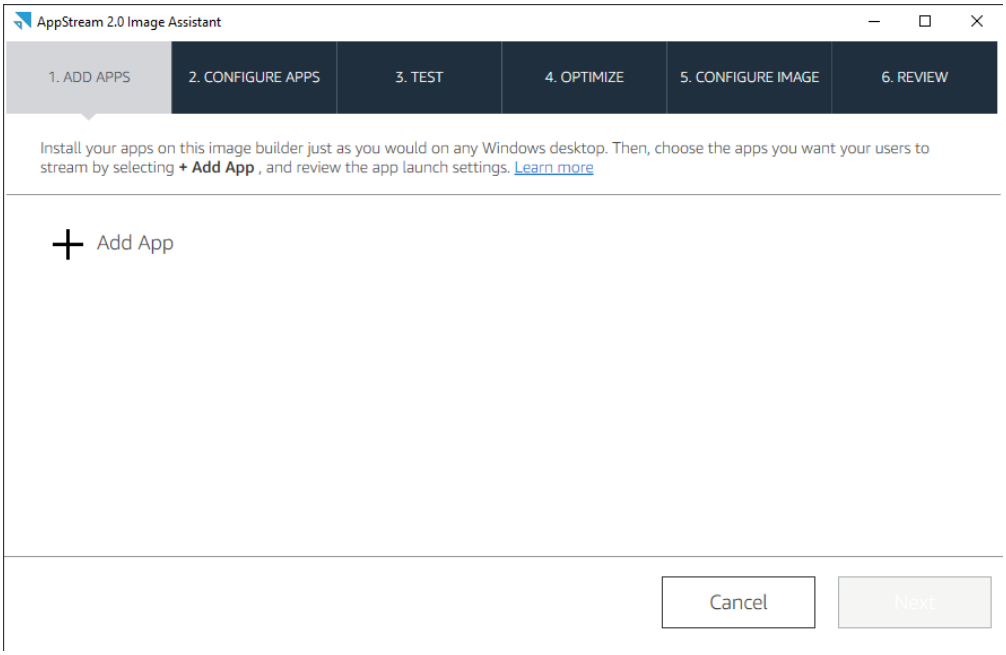
- Create an application catalog by using Image Assistant.
- Disable Internet Explorer Enhanced Security Configuration
- Test the application by using a local user account that has the same permissions that end users will have in their streaming sessions.
- Optimize the application's launch performance.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

Create your AppStream 2.0 application catalog

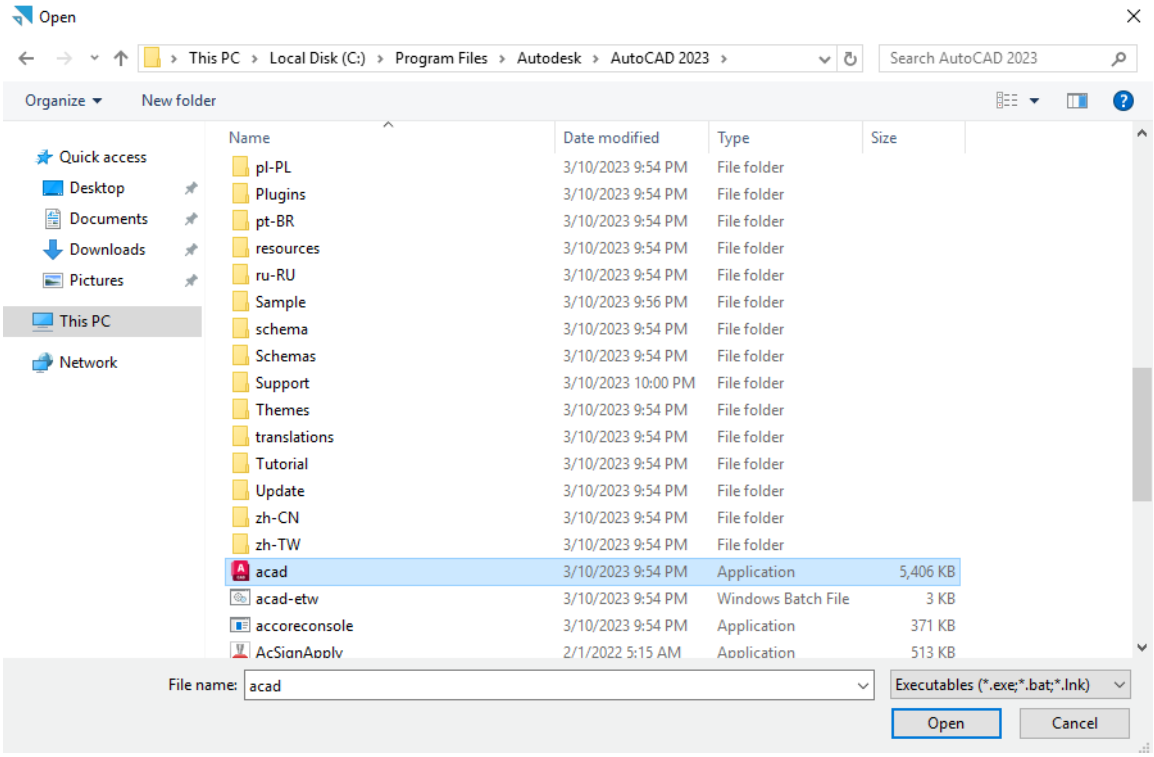
The process of creating an AppStream 2.0 application catalog includes specifying the name, display name, executable file to launch, and icon to display for each application that you plan to stream.

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**.

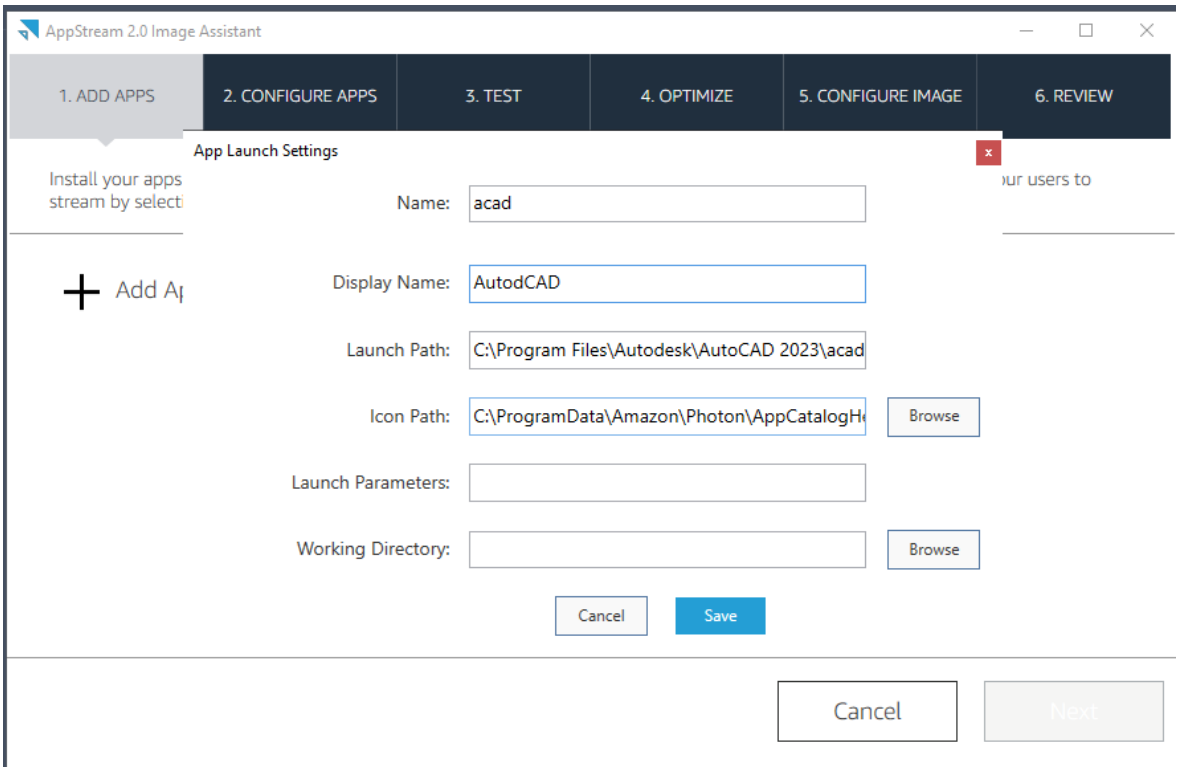


3. Navigate to the location of the AutoCAD application executable (usually C:\Program Files\Autodesk\AutoCAD 20XX), select the application executable acad.exe), and then choose **Open**.



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 *AutoCAD.*
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.

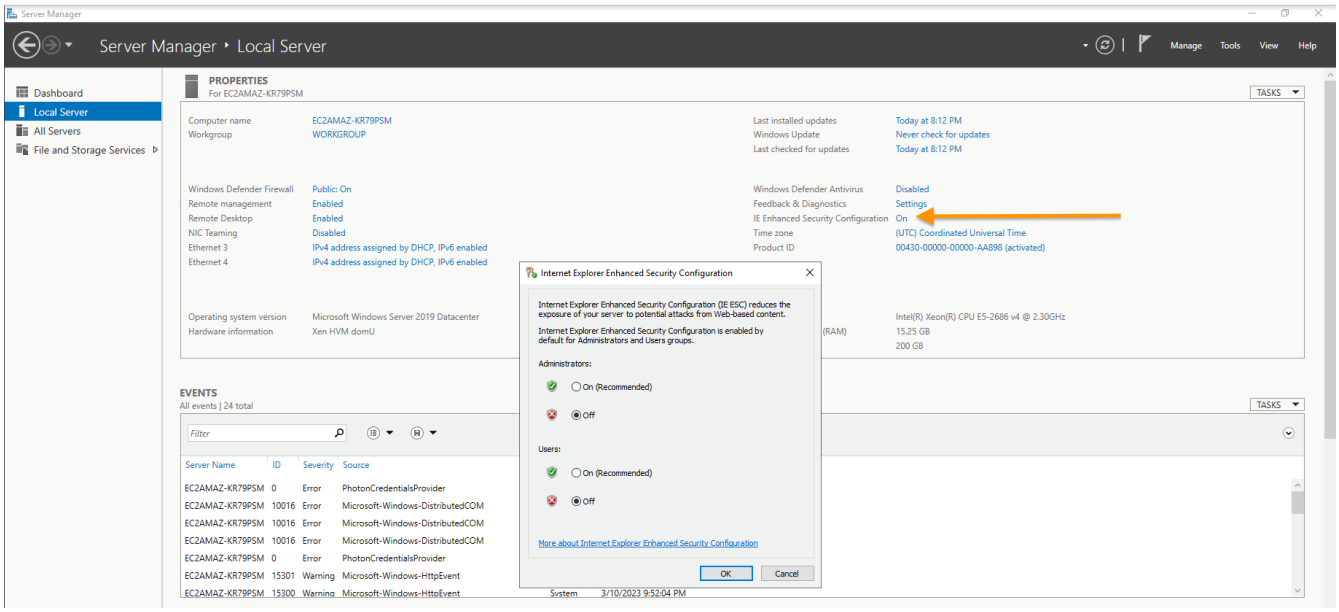


5. Now that you have added AutoCAD to your catalog, choose **Next**.

Disable Internet Explorer enhanced security configuration

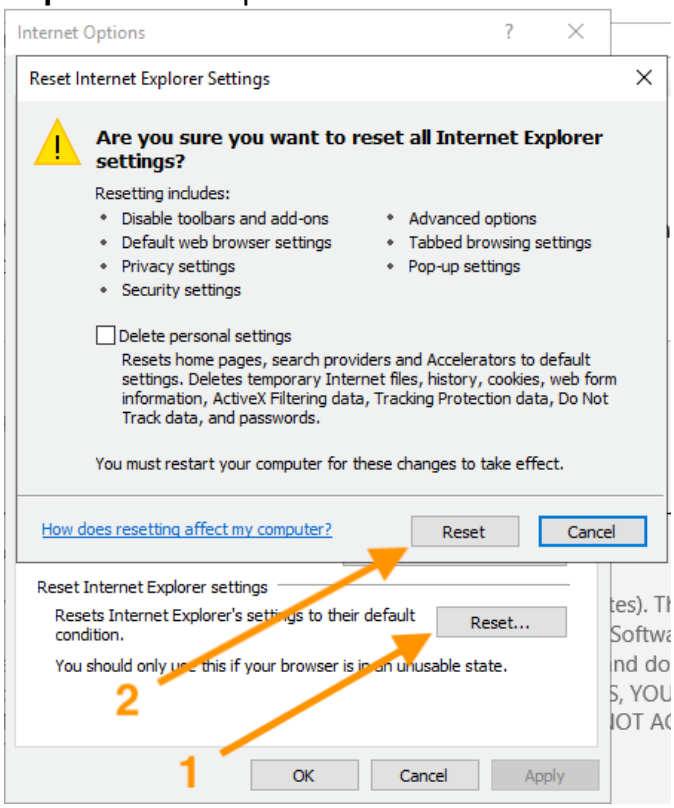
Applications use Internet Explorer to open http links embedded in the applications. When you launch one of these links, Internet Explorer displays a warning message for every webpage that it opens. This behavior is due to the Internet Explorer Enhanced Security Configuration, a security setting of IE 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.



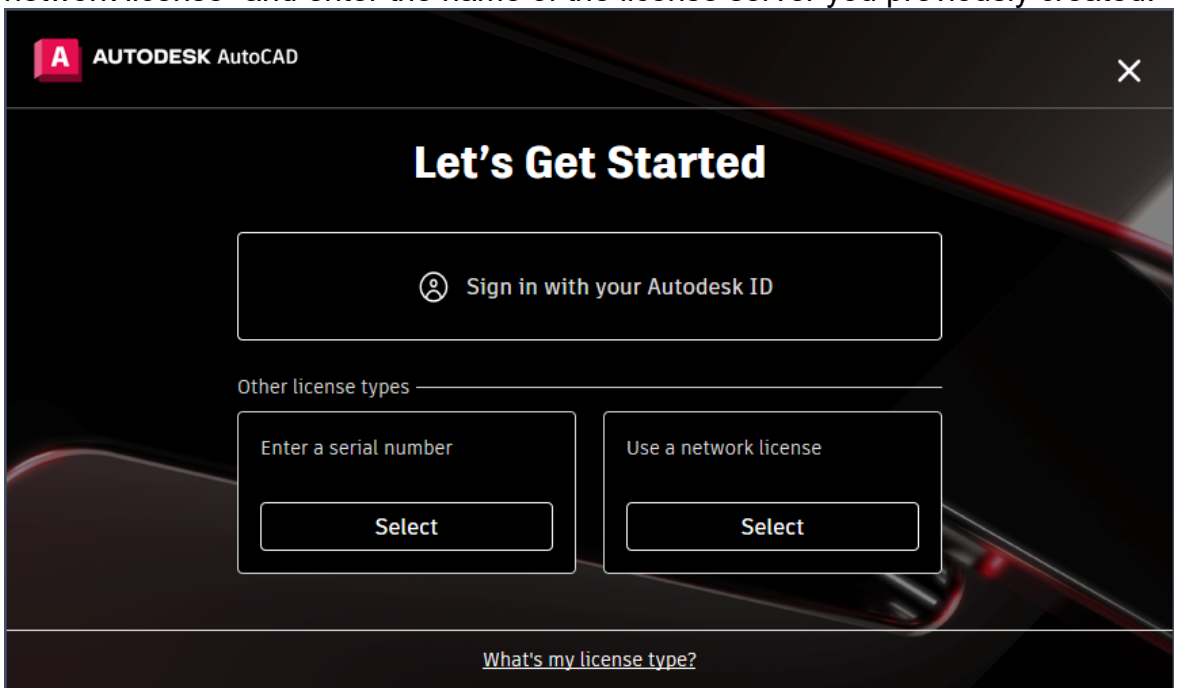
9. Switch to the **Administrator** account. Launch **Image Assistant.** Choose **Next** to proceed to the Configure step. From this tab, click **Save settings.** This will save the template user settings as default user settings.

Configure multi-user licensing (if applicable)

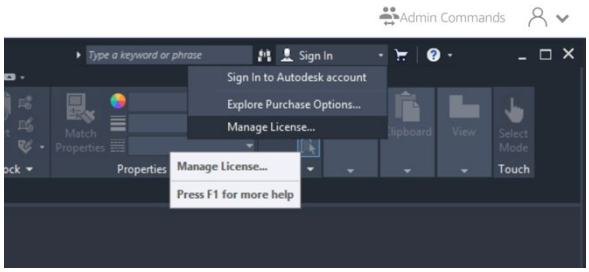
Customers with Enterprise Business Agreement Multi-User Licenses are entitled to run AutoCAD in a virtual environment. Disabling the Internet Explorer Enhanced Security will allow you to properly configure AutoCAD with a Multi-User License.

1. Switch back to the **Template** User Account

2. Launch AutoCAD. When the “Let’s Get Started” icon appears, choose “Use a network license” and enter the name of the license server you previously created.



Note: if you do not successfully register a network 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 network 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. 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.

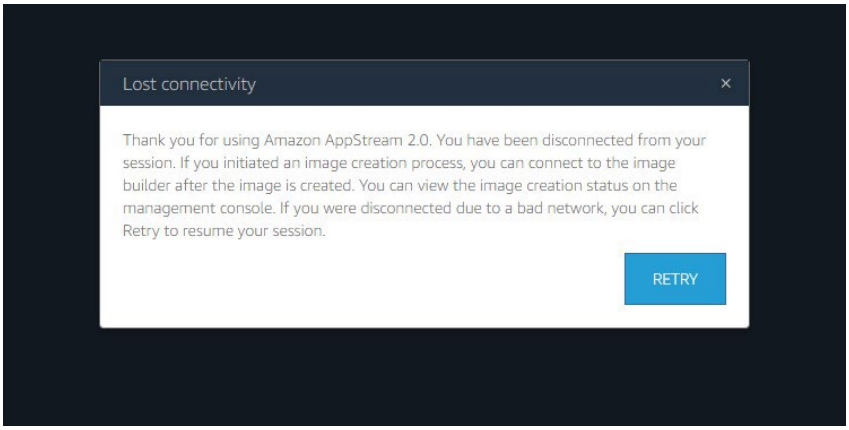
Option	Value
Name	The unique name identifier for the image, such as *DemoCo_Image_AutoCAD_v1_mmddyyyy*, using any of the following characters: a-Z,0–9,-,_,. This guide used "*Demo_Image_v1_03_01_2023*" Note: The name cannot begin with "Amazon," "AWS," or "AppStream."
Display Name	A user-friendly name to display in the console
Description	An optional description for the image: for example, *Image v1 created by (your initials or name) on mm/dd/20yy.*
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.
- Configure the fleet.
- Choose an image.
- Configure the network.

Provide fleet details

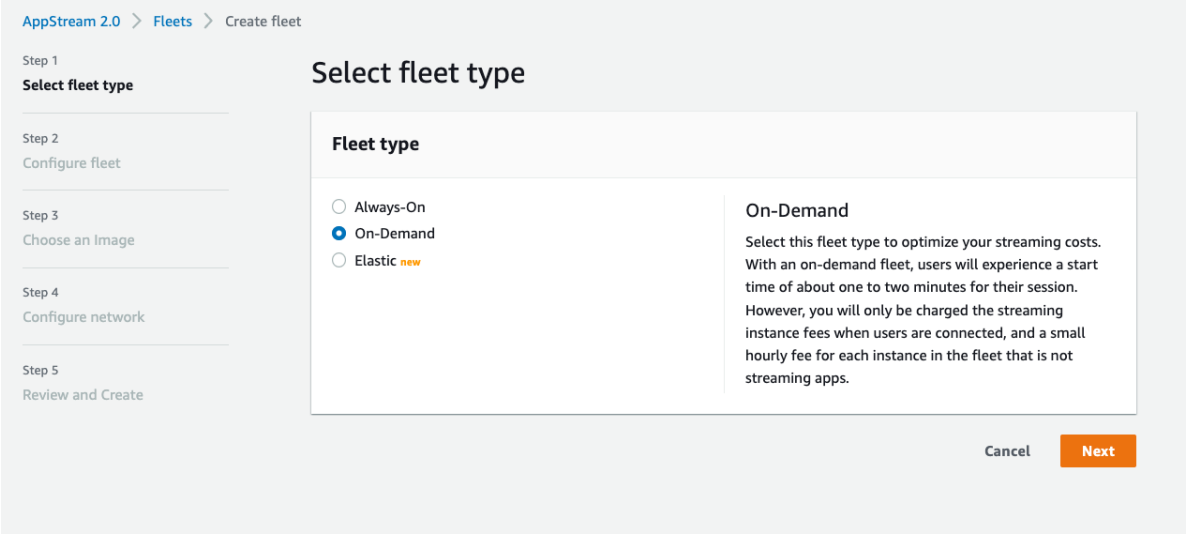
1. Open the AppStream 2.0 console at https://console.aws.amazon.com/appstream2.

2. In the navigation pane, choose **Fleets**, **Create Fleet**.

3. 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.

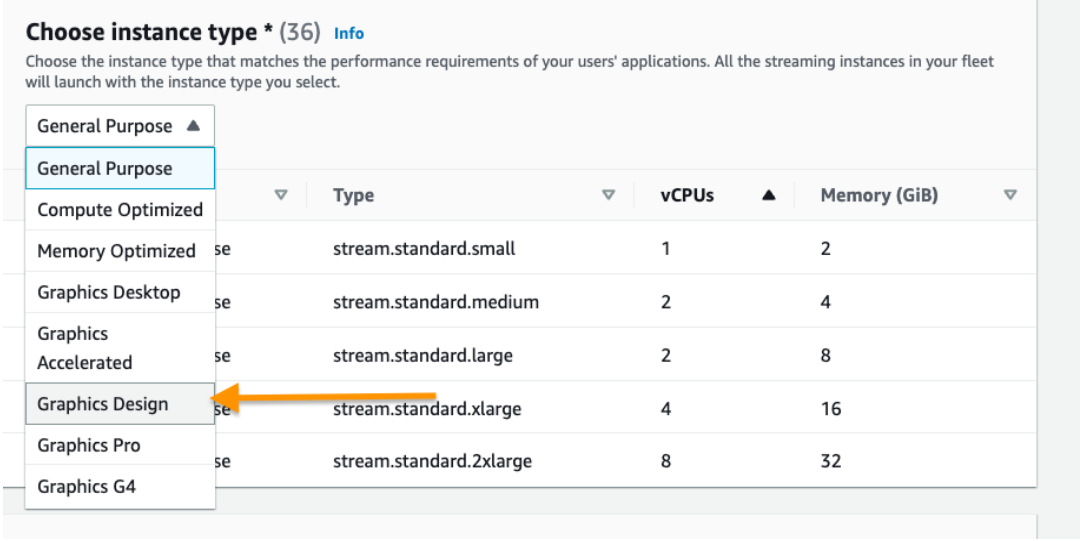


4. In Step 2: Configure Fleet - **Provide Fleet Details**, type the following text and choose **Next**.

Option	Value
Name	The unique name identifier for the fleet, such as *Demo_Fleet_v1_mmddyyyy*, using any of the following characters: a-Z,0–9,-,_,. Example: Demo_Fleet_v1_03_01_2023 Note: The name cannot begin with "Amazon," "AWS," or "AppStream."
Display Name	The name displayed in the console, such as *Demo_Fleet_v1_03_01_2023*
Description	An optional description for the fleet. For example, *Fleet v1 created by (your initials or name) on mm/dd/20yy.*

5. **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 in the drop down will need to be “Graphics Design”. **Graphics Design** instance family, and then choose **stream.graphics-design.xlarge.** For more information, see Amazon AppStream

2.0 Instance Families.



Note: If a different instance type is choosen other than Graphics Design, the image selection step will not display the image built because the types are not in the same family.

6. 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)

7. Configure your **Fleet capacity.**

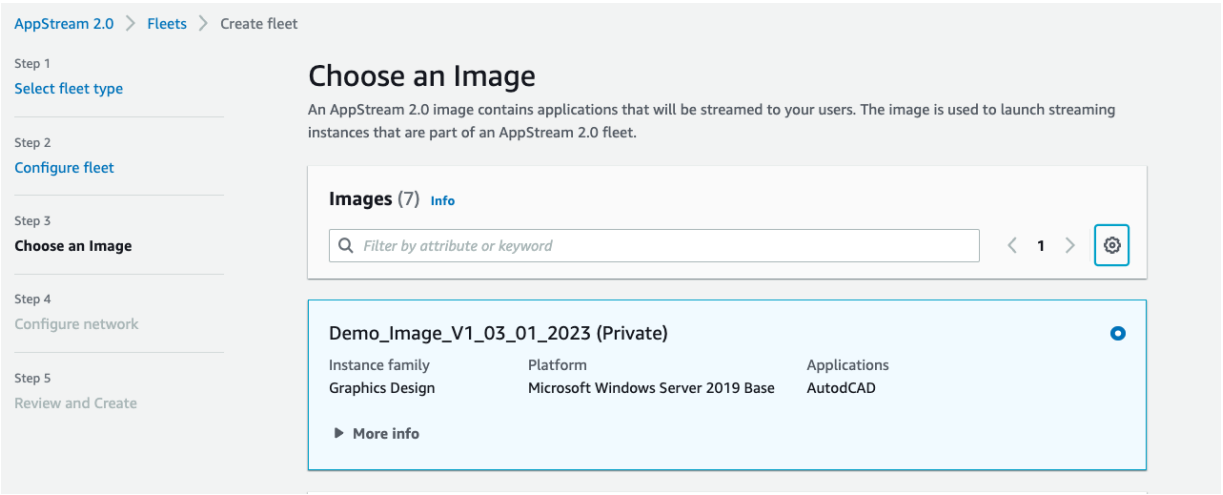
- Capacity is defined in terms of the number of instances within a fleet and, consequently, every unique user streaming session that is served by a separate instance.
- The minimum capacity for your fleet is the minimum number of users who are expected to be streaming at the same time (ex. 2).
- The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

8. Stream view details – Select Application.

9. Tags – Add any desired tags.

10. Choose **Next**.

11. For Step 3: Choose an Image – Select the image created previously in the guide.



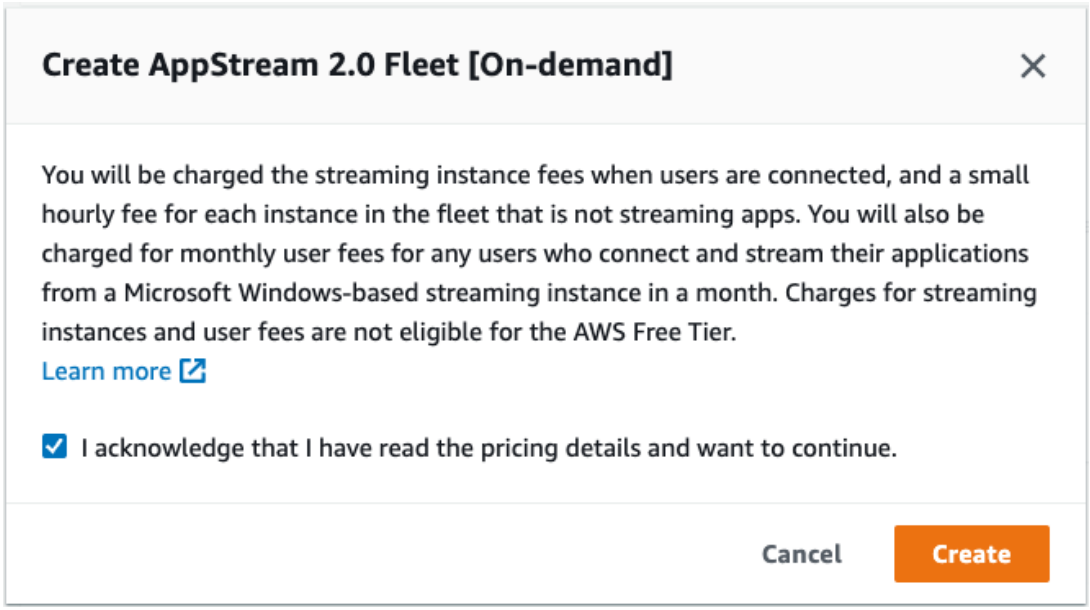
12. Choose Next.

Configure the network

1. In 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-xxxxxxxx (AppStream2 VPC)**.

3. For **Subnet 1**, choose **subnet-xxxxxxxx | (10.0.1.0/24)**. This is the AppStream2 Private Subnet1.
4. For **Subnet 2**, choose **subnet-xxxxxxxx | (10.0.2.0/24)**. This is the AppStream2 Private Subnet2.
5. For **Security group(s)**, choose the default option.
6. Choose **Next**.

7. In Step 5: 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 Fleet**.
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.
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.

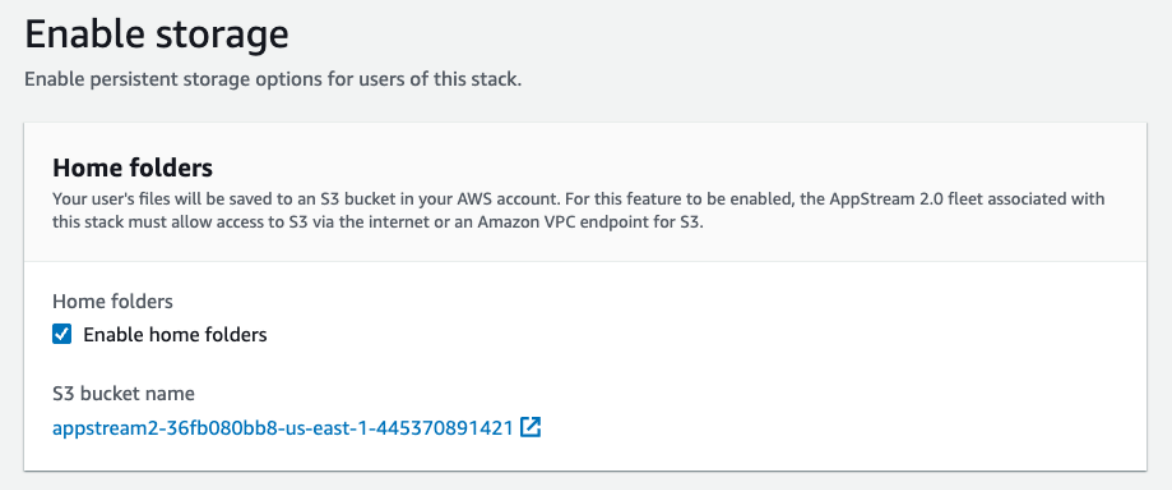
2. In the navigation pane, choose **Stacks**, **Create Stack**.

3. For **Step1: Stack Details**, type the following information and choose **Next**.

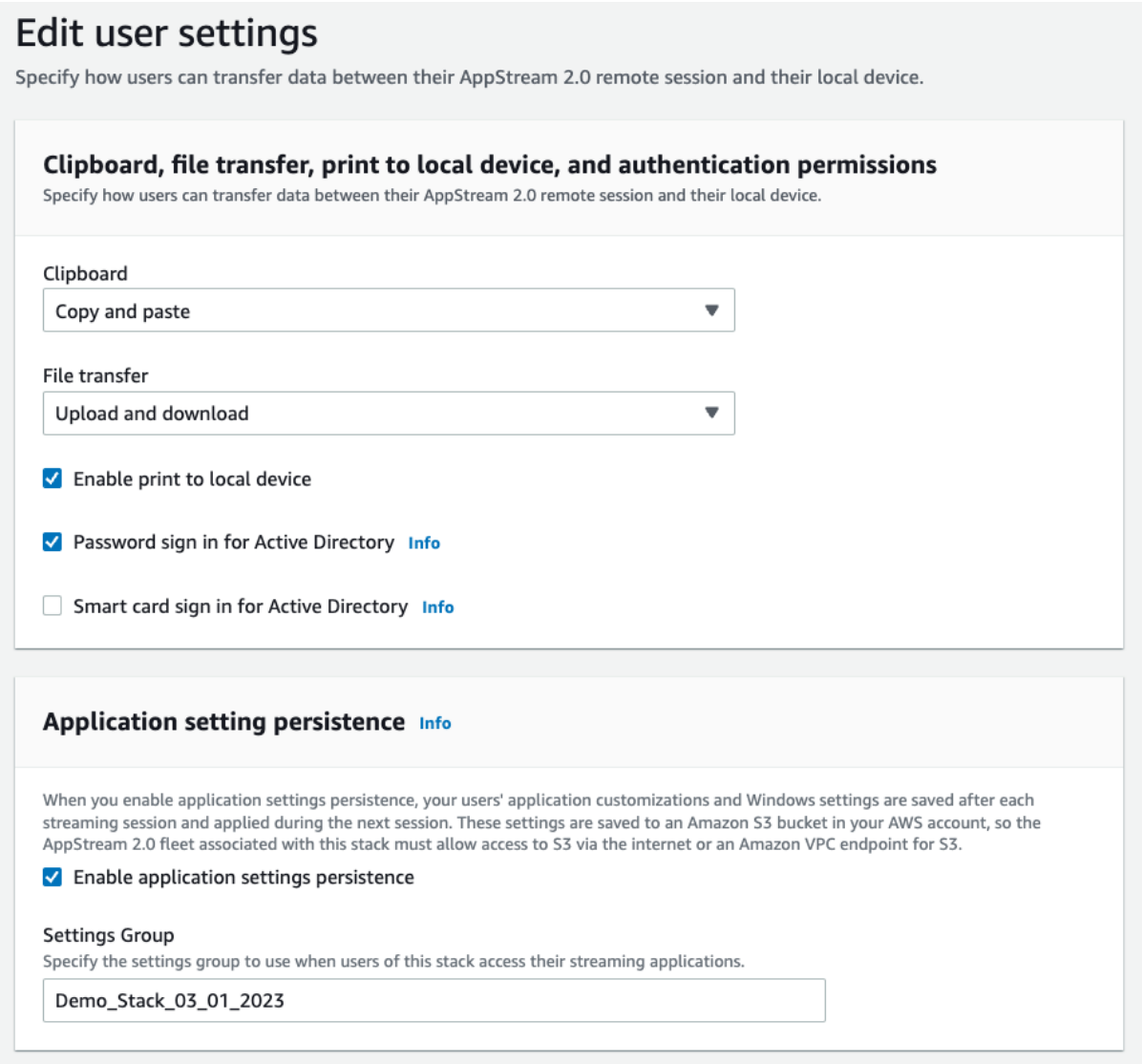
Option	**Value**
Name	The unique name identifier for the stack, such as *Demo_Stack_mmddyyyy*, using any of the following characters: a-Z,0–9,-,_. Example: Demo_Stack_03_01_2023 Note: The name cannot begin with "Amazon," "AWS," or "AppStream."
Display Name	The name displayed in the console, such as *Demo Stack March 2023*.
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: *https://aws.amazon.com*
Feedback URL (Optional)	An optional URL for your users to submit feedback Type: *https://aws.amazon.com*
Fleet	Select the fleet that you created.
Streaming Experience Settings	Select TCP as the protocol preference. See the list of requirement if UDP is a requirement. UDP preference requires additional steps to ensure end users stream using UDP: 1. Ensure your network supports UDP traffic on port 8433 2. Ensure your network is open to the AppStream 2.0 IP Ranges 3. Ensure your end users are using the latest Native Client 4. Ensure your base Image supports UDP (this is not required for Elastic Fleets)

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 Next

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 Stack**.

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.

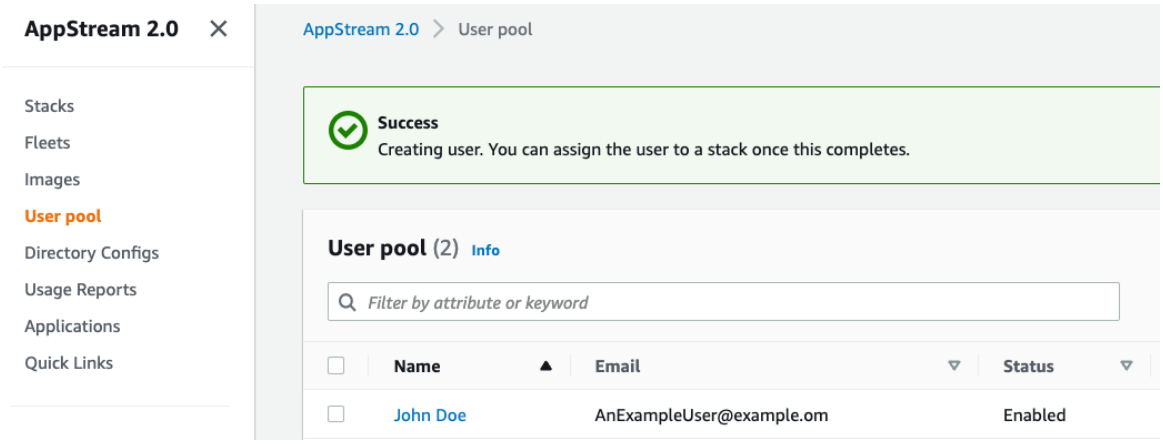


Figure 10: The User Pool dashboard showing the newly created user.

Assign a stack to the user

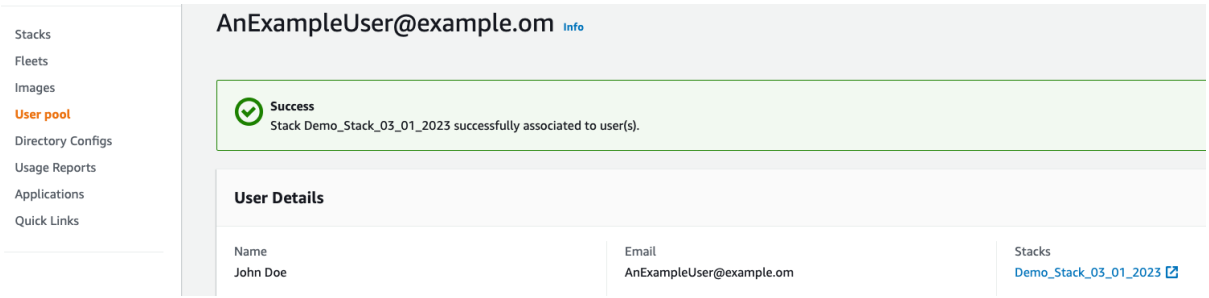
1. In the navigation pane, choose **User Pool**, and select the user that you created.

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**.

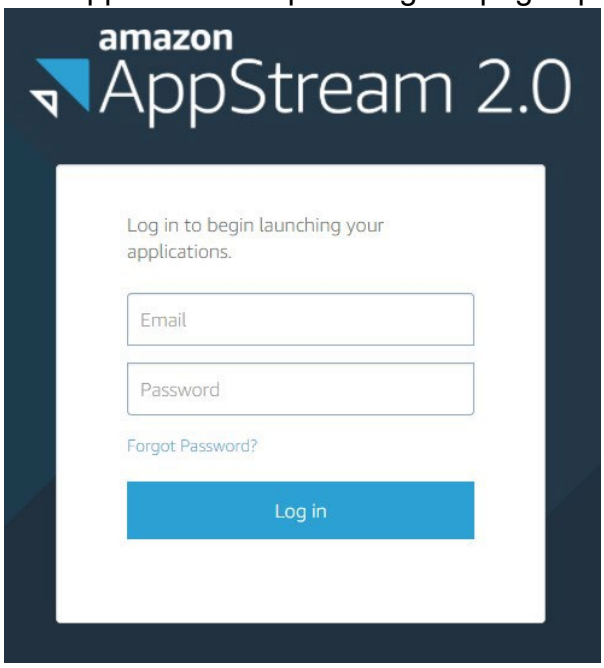
6. After a few moments, the **User Pool** list refreshes. The user that you created appears under **User Details** with as an assigned stack.



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

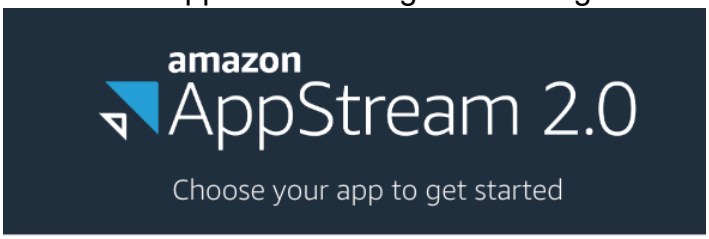
In the previous section, you added a user to the user pool by providing a name and an email address and then assigned a stack to the user. AppStream 2.0 sent an email to the email address after each action. To test the end user experience, sign in to AppStream 2.0 as the user that you created and start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

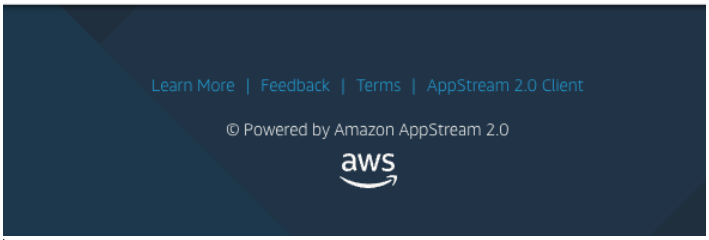
1. Open the first notification email that you received, and open the **Login page** link.
   The AppStream 2.0 portal sign-in page opens in your browser.

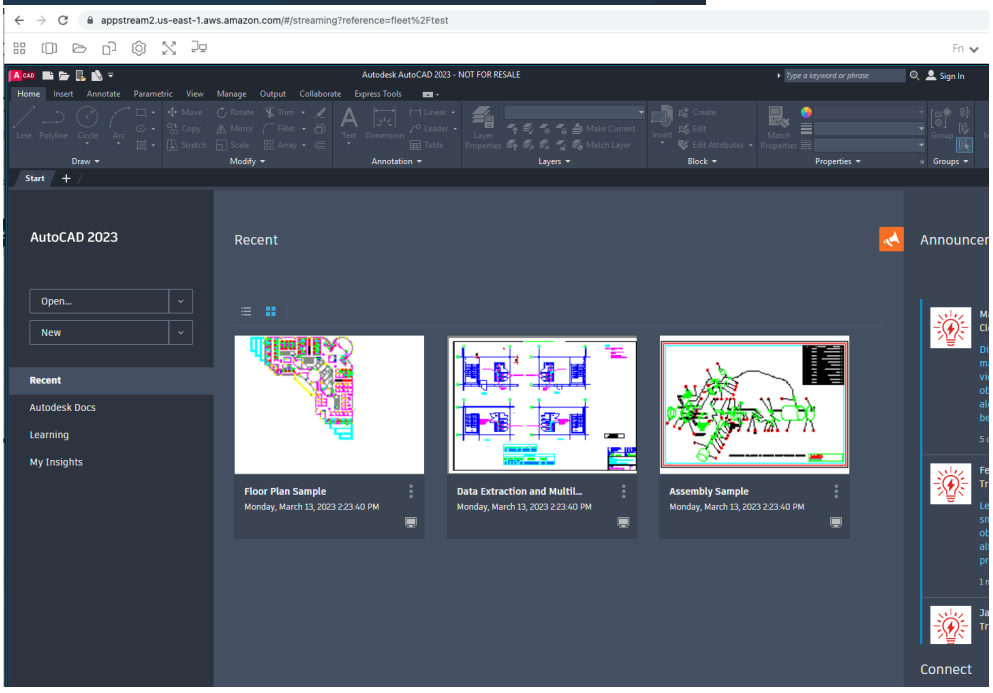


2. Type the email address used for the user that you created and the temporary password that was provided in the email, and then choose **Log in**.
3. When prompted, type a new password, confirm it, and then choose **Set Password**. The AppStream 2.0 application catalog page opens, displaying the applications 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. 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. 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.
3. 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 B*. For more information about AppStream 2.0 pricing, see Amazon AppStream 2.0 Pricing.

Contributors

Contributors to this document version:

- Brian Slater, Principal Solutions Architect, AWS Industries

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 webpage.
2. Choose **Create a new 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:

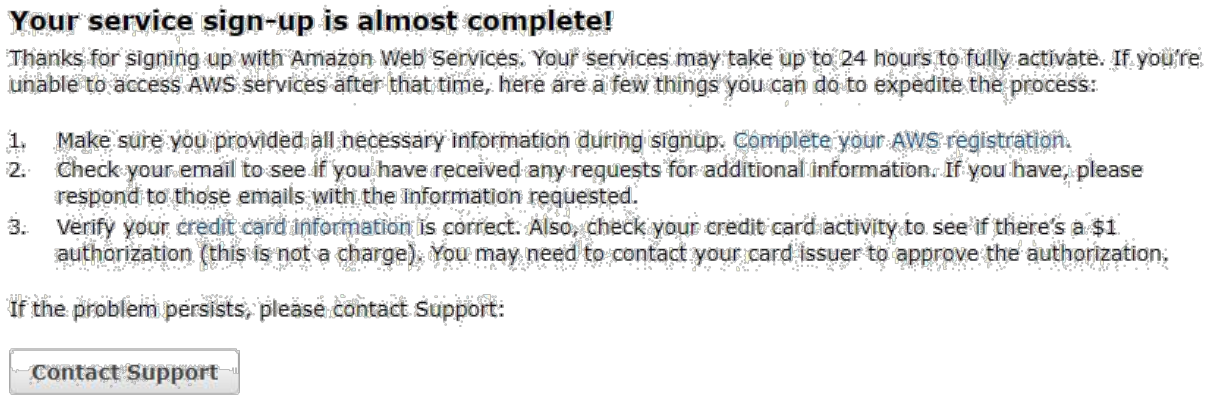


Figure 17: Message that appears if you sign in before your account activation is complete.

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.

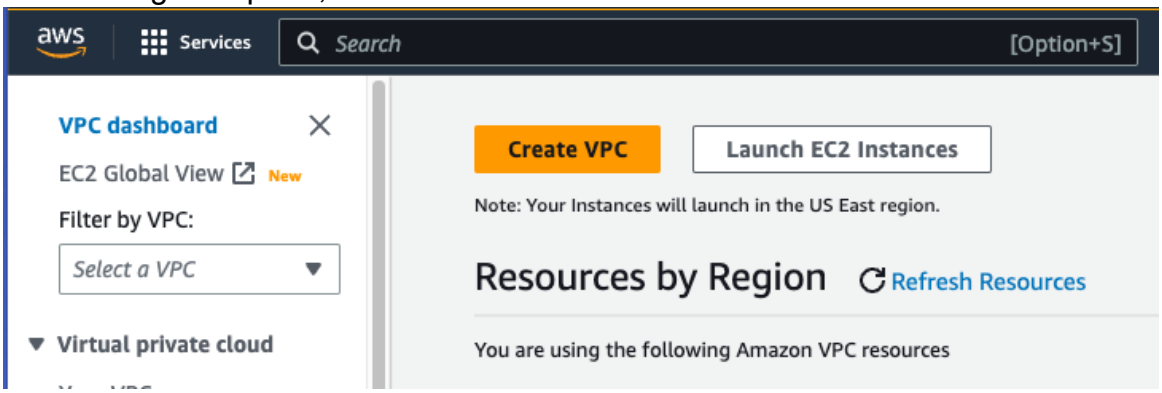
AppStream VPC requirements

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.

Create a VPC by using Create VPC

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

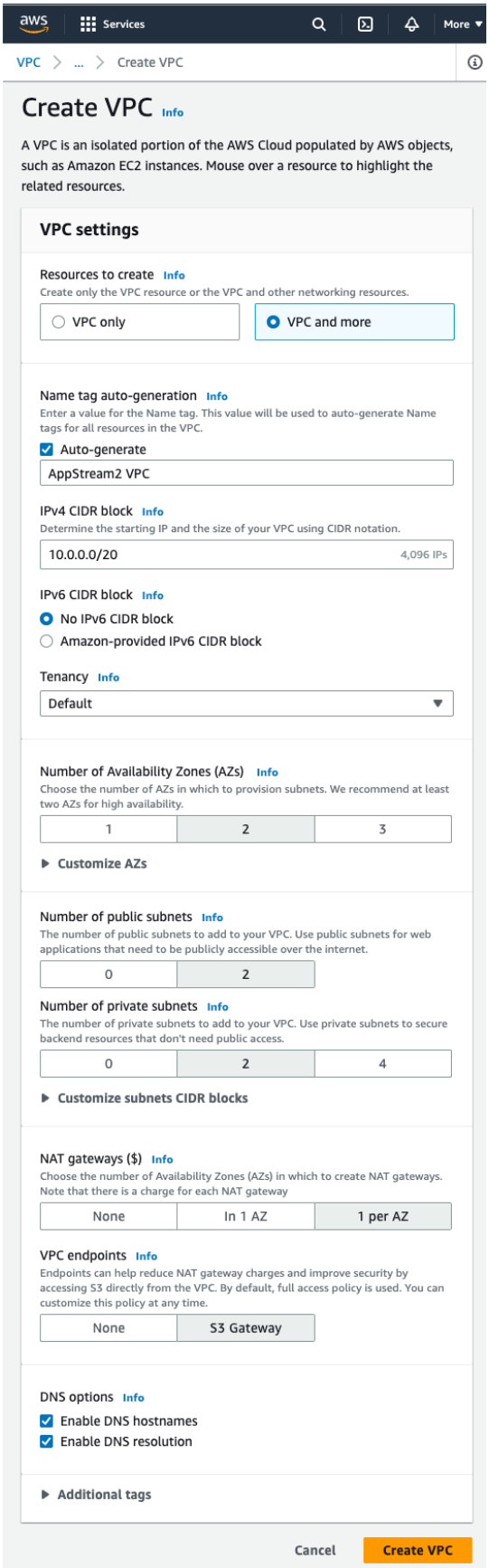
1. Open the Amazon VPC console at https://console.aws.amazon.com/vpc/.
2. In the navigation pane, choose VPC Dashboard and then choose **Create VPC.**



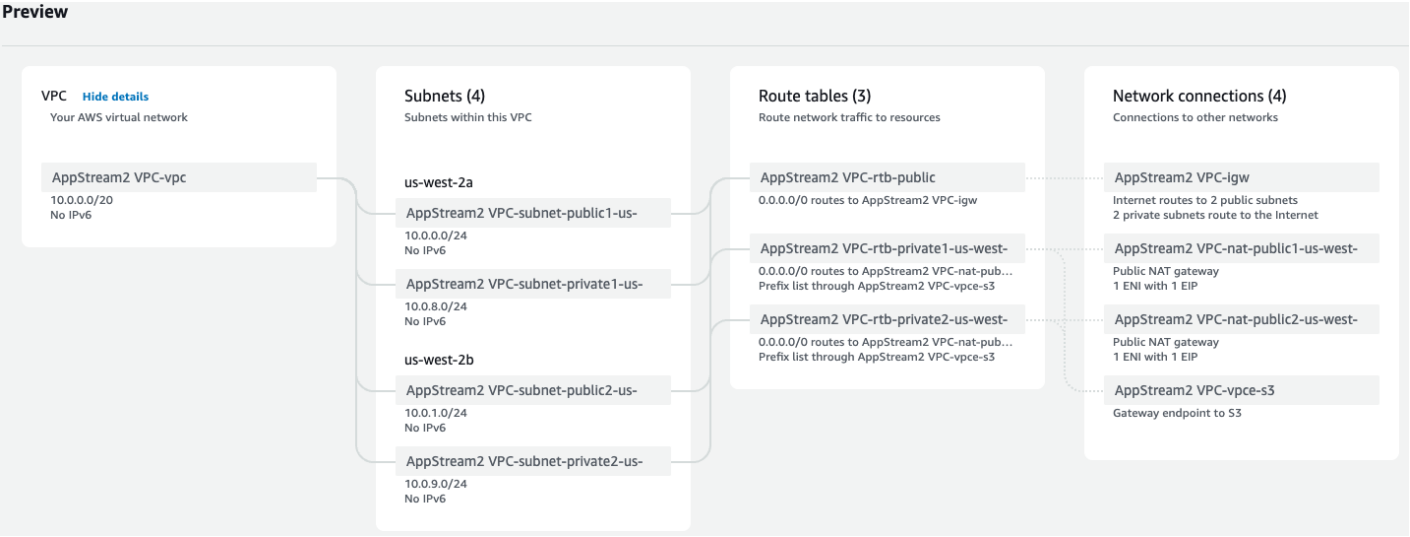
3. In the VPC Setting form, fill in the following values:

Option	Value
VPC Settings	**VPC and more**
Name tag auto-generation	**1. Check Auto-generate** **2. Name: AppStream2 VPC**
IPv4 CIDR block	*10.0.0.0/20*
IPv6 CIDR block	Accept the default value: *No IPv6 CIDR Block*

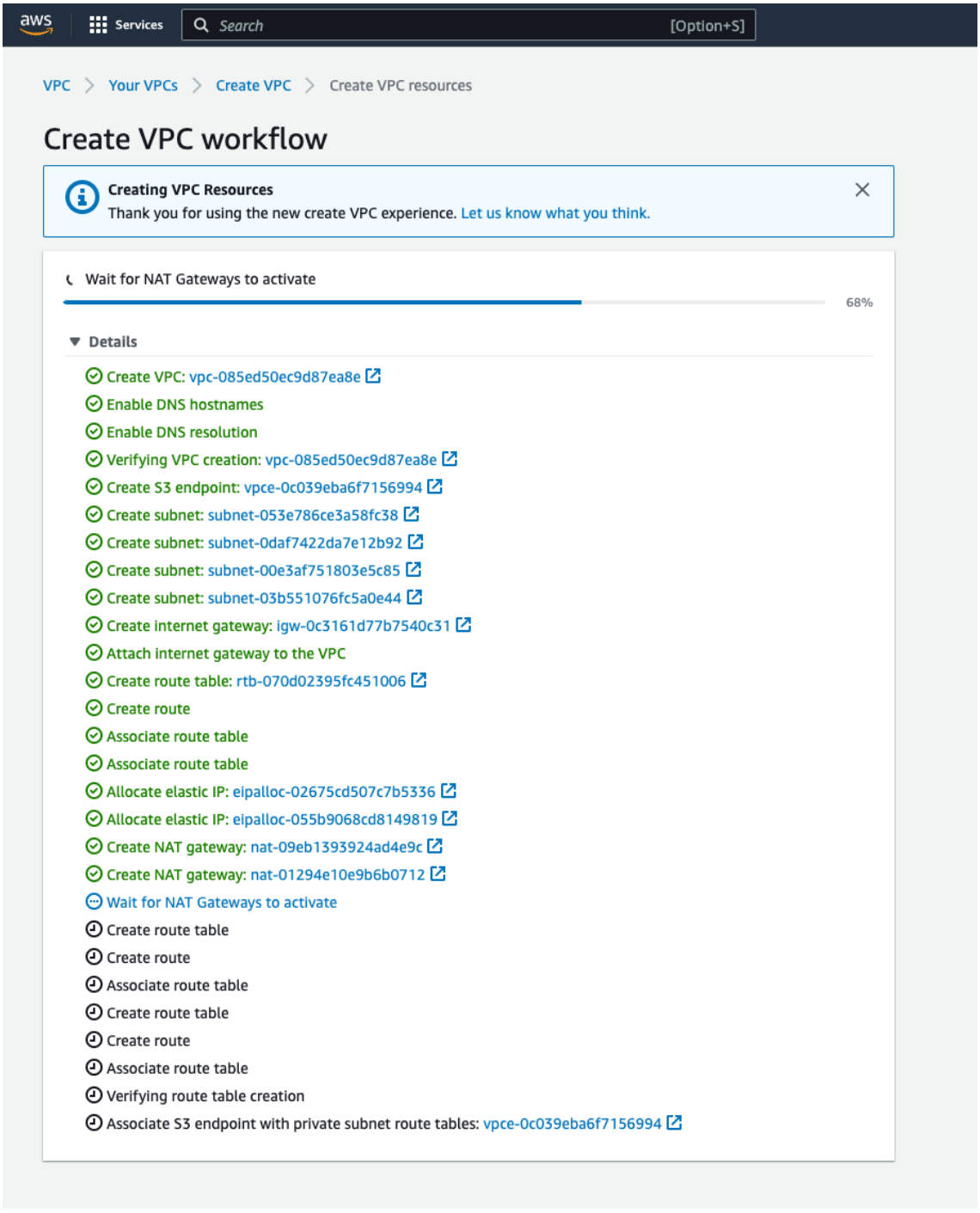
Tenancy	Accept the default value: Default
Number of Availability Zones (AZs)	Select 2
Number of public subnets	Select 2
Number of private subnets	Select 2
NAT gateways($)	Select 1 per AZ
VPC endpoints	Select S3 Gateway.
DNS options	
Enable DNS hostnames	*Check the box*
Enable DNS resolution	*Check the box*


aws
Services
More
VPC
...
Create VPC
Create VPC Info
A VPC is an isolated portion of the AWS Cloud populated by AWS objects, such as Amazon EC2 instances. Mouse over a resource to highlight the related resources.
VPC settings
Resources to create Info
Create only the VPC resource or the VPC and other networking resources.
VPC only
VPC and more
Name tag auto-generation Info
Enter a value for the Name tag. This value will be used to auto-generate Name tags for all resources in the VPC.
Auto-generate
AppStream2 VPC
IPv4 CIDR block Info
Determine the starting IP and the size of your VPC using CIDR notation.
10.0.0.0/20
4,096 IPs
IPv6 CIDR block Info
No IPv6 CIDR block
Amazon-provided IPv6 CIDR block
Tenancy Info
Default
Number of Availability Zones (AZs) Info
Choose the number of AZs in which to provision subnets. We recommend at least two AZs for high availability.
1
2
3
Customize AZs
Number of public subnets Info
The number of public subnets to add to your VPC. Use public subnets for web applications that need to be publicly accessible over the internet.
0
2
Number of private subnets Info
The number of private subnets to add to your VPC. Use private subnets to secure backend resources that don't need public access.
0
2
4
Customize subnets CIDR blocks
NAT gateways ($) Info
Choose the number of Availability Zones (AZs) in which to create NAT gateways. Note that there is a charge for each NAT gateway
None
In 1 AZ
1 per AZ
VPC endpoints Info
Endpoints can help reduce NAT gateway charges and improve security by accessing S3 directly from the VPC. By default, full access policy is used. You can customize this policy at any time.
None
S3 Gateway
DNS options Info
Enable DNS hostnames
Enable DNS resolution
Additional tags
Cancel
Create VPC

Preview


VPC
Hide details
Your AWS virtual network
AppStream2 VPC-vpc
10.0.0.0/20
No IPv6
Subnets (4)
Subnets within this VPC
us-west-2a
AppStream2 VPC-subnet-public1-us-
10.0.0.0/24
No IPv6
AppStream2 VPC-subnet-private1-us-
10.0.8.0/24
No IPv6
us-west-2b
AppStream2 VPC-subnet-public2-us-
10.0.1.0/24
No IPv6
AppStream2 VPC-subnet-private2-us-
10.0.9.0/24
No IPv6
Route tables (3)
Route network traffic to resources
AppStream2 VPC-rtb-public
0.0.0.0/0 routes to AppStream2 VPC-igw
AppStream2 VPC-rtb-private1-us-west-
0.0.0.0/0 routes to AppStream2 VPC-nat-pub...
Prefix list through AppStream2 VPC-vpce-s3
AppStream2 VPC-rtb-private2-us-west-
0.0.0.0/0 routes to AppStream2 VPC-nat-pub...
Prefix list through AppStream2 VPC-vpce-s3
Network connections (4)
Connections to other networks
AppStream2 VPC-igw
Internet routes to 2 public subnets
2 private subnets route to the Internet
AppStream2 VPC-nat-public1-us-west-
Public NAT gateway
1 ENI with 1 EIP
AppStream2 VPC-nat-public2-us-west-
Public NAT gateway
1 ENI with 1 EIP
AppStream2 VPC-vpce-s3
Gateway endpoint to S3

4. After a few minutes the VPC is created. The process can be observed or check back in a few minutes on the status in the VPC Dashboard.



5. The VPC creation process is now complete.

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