

AWS Whitepaper

Tableau Desktop on Amazon AppStream 2.0



Tableau Desktop on Amazon AppStream 2.0: AWS Whitepaper

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Tableau Desktop on Amazon AppStream 2.0

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This guide provides best practices for deploying Tableau Desktop to Amazon AppStream 2.0 as well as instructions to launch and configure the AppStream 2.0 resources needed for this use case.

What is Amazon AppStream 2.0?

Amazon AppStream 2.0 is a fully managed, non-persistent desktop and application virtualization service for securely accessing the data, applications, and resources users need, anywhere, anytime, from any supported device. With AppStream 2.0, you can scale your applications and desktops to any number of users across the globe without acquiring, provisioning, and operating hardware or infrastructure.

AppStream 2.0 is built on Amazon Web Services (AWS), so you benefit from a data center and network architecture designed for the most security-sensitive organizations. Each user has a fluid and responsive experience because your applications run on virtual machines optimized for specific use cases, and each streaming session automatically adjusts to network conditions.

How does AppStream 2.0 fit with Tableau?

Using AppStream 2.0, you provide access to Tableau's desktop-based products through a web browser instead of requiring users to install applications like Tableau Desktop, Tableau Prep Builder, and the Content Migration Tool on their local desktop.

Tableau Desktop

Tableau Server already has web-edit capabilities, but a gap exists between the features available in web-edit compared to Tableau Desktop. If you want to provide the full Tableau Desktop experience to your content creators but want to avoid installing software on workstations, AppStream 2.0 is designed to provide a solution.

Tableau Prep Builder

If you are running the Tableau Server 2020.4 pre-release and later versions, you can create and edit Tableau Prep flows through your web browser. If you are running an older version of Tableau

Server, you can stream the application with AppStream 2.0 to provide Prep Builder functionality to your users without local installation.

Content Migration Tool

The Content Migration Tool is a Windows-only desktop application, so macOS users need virtualization software like VMware or Parallels to run it. You can use AppStream 2.0 to simplify deployment of the tool.

Data residency

The previous use cases center on operating systems and features, but what if access to the data itself is the challenge? For example, what if your data must live in the AWS eu-west-1 Region, but your content creators work outside of that Region? Using AppStream 2.0, content creators can work with the data without the need to bring it down to Tableau Desktop on their machines.

If Tableau Desktop is running within AWS and delivered to users through AppStream 2.0, your data can remain centralized, and applications can interact with data stored in [Amazon Simple Storage Service](#) (Amazon S3), [Amazon Relational Database Service](#) (Amazon RDS), and other services with low latency.

What are the prerequisites for this guide?

- Confirm that you have an AWS account and that you have the required permissions to create AppStream 2.0 resources.
- Review the [AppStream 2.0 Getting Started Guide](#) and [AppStream 2.0 Administration Guide](#) to learn more about AppStream 2.0.
- Review [AppStream 2.0 pricing](#) and the [simple pricing tool](#) to estimate the cost of streaming Tableau applications using AppStream 2.0.
- Confirm your installation of Tableau Server and that you are able to publish your Tableau Desktop applications to the AppStream 2.0 fleet instances. Also, if following this guide, you must have a license key to use Login-based License Management (LBLM).
- Confirm that the Tableau Desktop Installer is version 2020.1 or higher. These versions are compatible with LBLM.

Procedures

Steps

- [Step 1: Create your image](#)
- [Step 2: Customize your image](#)
- [Step 3: Create your fleet](#)
- [Step 4: Create your stack](#)
- [Step 5: Manage users](#)

Step 1: Create your image

Create the custom image that will get assigned to your AppStream 2.0 fleet.

1. Open the AppStream 2.0 console at <https://console.aws.amazon.com/appstream2> (login required)
2. From the navigation pane, choose the **Images** section, then choose the **Image Builder** tab. The images you've already created are listed.
3. Choose the blue **Launch Image Builder** button beside the desired image to open the AppStream 2.0 Image Builder.

Launch an AppStream 2.0 Image Builder

Step 1: Choose Image

Step 2: Configure Image Builder



Step 3: Configure Network

Step 4: Review

Choose Image

An AppStream 2.0 image contains applications that will be streamed to your users. The image is used to launch streaming instances that are part of an AppStream 2.0 fleet. [AppStream 2.0 Image Version History](#)

Public | Microsoft Win... | General Purpose |

-  **AppStream-WinServer2019-07-16-2020**
Platform: Microsoft Windows Server 2019 Base
Description: AppStream image for launching image builder instances
Display Name: AppStream-WinServer2019-07-16-2020
Visibility: Public
Owner: AWS
Instance Family: General Purpose, Compute Optimized, Memory Optimized
Apps Included : None
AppStream 2.0 agent version: 10-08-2020 (LATEST)
Dynamic application providers: Disabled
-  **AppStream-WinServer2019-04-22-2020**
Platform: Microsoft Windows Server 2019 Base
Description: AppStream image for launching image builder instances
Display Name: AppStream-WinServer2019-04-22-2020
Visibility: Public
Owner: AWS
Instance Family: General Purpose, Compute Optimized, Memory Optimized
Apps Included : None
AppStream 2.0 agent version: 10-08-2020 (LATEST)
Dynamic application providers: Disabled

The AppStream 2.0 console

4. On the **Choose Image** page, choose the latest general-purpose Windows Server 2019 base image.
5. Choose **Next**.
6. On the **Configure Image Builder** page, enter basic details about your image, including name and display name.
7. Select **stream.standard.large** as the instance type.
8. Choose **Next**.

Launch an AppStream 2.0 Image Builder

Step 1: Choose Image

Step 2: Configure Image Builder

Step 3: Configure Network

Step 4: Review

Configure Image Builder

Enter a name for the Image Builder

Name*
Enter name for your AppStream 2.0 image builder. [Allowed characters: a-z,0-9,-,_,.]

Display Name

Tags

Key	Value
<small>Add a tag to this resource to get started</small>	

[Add Tag](#)

Instance Type

Select an instance type that matches your applications' requirements. Learn more about available instance types [here](#).

*Free tier eligible: You can use up to 40 hours per month of stream.standard.large instance type when using image builder for free. This benefit is available for 2 months following your AWS sign-up date or until March 31st, 2017, whichever is later.

General Purpose

	Family	Type	vCPUs	Memory (GiB)
<input type="radio"/>	General Purpose	stream.standard.medium	2	4
<input checked="" type="radio"/>	General Purpose	stream.standard.large	2	8

VPC Endpoints (Advanced)

Virtual Private Cloud (VPC) endpoints allow your users to stream from AppStream 2.0 through your VPC. You can create a VPC endpoint in the VPC of your choosing, then use the endpoint with AppStream 2.0 to maintain the streaming traffic within your VPC. When you select a VPC endpoint, users can only stream from this stack when they have network access to the VPC. The selected VPC endpoint can be in a different VPC than the fleet. By default, AppStream 2.0 uses a streaming endpoint that requires the user to have access to the internet. [Learn more](#).

Streaming Endpoint: [Create VPC Endpoint](#)

IAM role (Advanced)

Select an IAM role that will be available on the image builder. Learn more about IAM roles on image builders [here](#).

IAM role: [Create new IAM role](#)

Only IAM roles with trust policies which include appstream.amazonaws.com are shown.

* Required [Cancel](#) [Previous](#) [Next](#)

Choose the instance type

9. On the **Configure Network** page, choose **Default Internet Access** if you want the Image Builder to connect to the internet via a public IP address; for example, if you need to download the Tableau Desktop installer. Also specify the VPC, subnet, and security group(s), and configure [Active Directory settings](#) if required for your image.

10. Choose Next.

Launch an AppStream 2.0 Image Builder

Step 1: Choose Image

Step 2: Configure Image Builder

Step 3: Configure Network

Step 4: Review

Network access

Select the Amazon VPC and subnet(s) to which your fleet streaming instances will belong. This will allow applications launched on the instances to connect to network resources in your Amazon VPC. You can also restrict network to these resources from your instances by selecting up to five VPC security groups. [Learn more.](#)

Default Internet Access Select this option if you want to add Internet access from your image builder. Leave this unchecked if you plan to control Internet access for your image builder using an advanced set up, such as a NAT gateway in your Amazon VPC.

VPC * vpc-025a57ab06b8ae16e (PUBLIC-cust-consult-... [Create new VPC](#)

Subnet 1 * subnet-05584f4b8bd4c53a4 | (172.31.0.0/20) | us... [Create new subnet](#)

Security group(s)
 sg-09fb5a237934c2590 - awseb-e-zhmaeyj82i-stack-AWSE
 sg-0a93b501ab1694902 - PUBLIC-EC2
 sg-0ba2fb75d3de54f79 - PUBLIC-DB
 sg-0c833315b57730e65 - PUBLIC-ELB [Create new security group](#)

Select up to five VPC security groups. Use SHIFT+arrow, CTRL+click, or CMD+click (OSX) to select multiple items from list.

Active Directory Domain (Optional)

Join your image builder to an Active Directory domain. This step is **optional** and only needed if you are planning to use AppStream 2.0 with your Active Directory.

Directory Name Select a Directory Config... [Create new directory configuration](#)

Select the directory config that will be used to join your image builder to your Active Directory domain.

Directory OU Select Directory OU...

Select the Organizational Unit in your Active Directory domain to which your image builder will belong.

* Required

Cancel

Previous

Review

Configure network access

11. On the **Review** page, review your settings and choose **Launch**. The Image Builder typically takes about 15 or 20 minutes to create the image.

Step 2: Customize your image

Customize your image with details that are specific to your configuration.

1. In the AppStream 2.0 console, select the image that you just created in the **Image Builder** list, and choose **Connect**.
2. In the **Local User** tab, choose **Administrator** so you can install Tableau Desktop.

Note

These steps might vary depending on your Tableau licensing. This guide assumes you have LBLM as your licensing option. If not, see the **Licensing** section later in this guide.

3. After logging in, download the installer for Tableau Desktop, but don't start the installer wizard. Instead, use the following installation script so you can customize some user settings:

```
TableauDesktop-Installer.exe /quiet /norestart ACCEPTEULA=1  
REGISTER=1 SILENTLYREGISTERUSER="true" LBLM="required"  
ACTIVATIONSERVER=https://<<my-tableau-server>> ATRENABLED=1  
ATRREQUESTEDDURATIONSECONDS=14400 SYNCHRONOUSLICENSECHECK="true"  
REPORTINGSERVER="https://<<my-tableau-server>>"
```

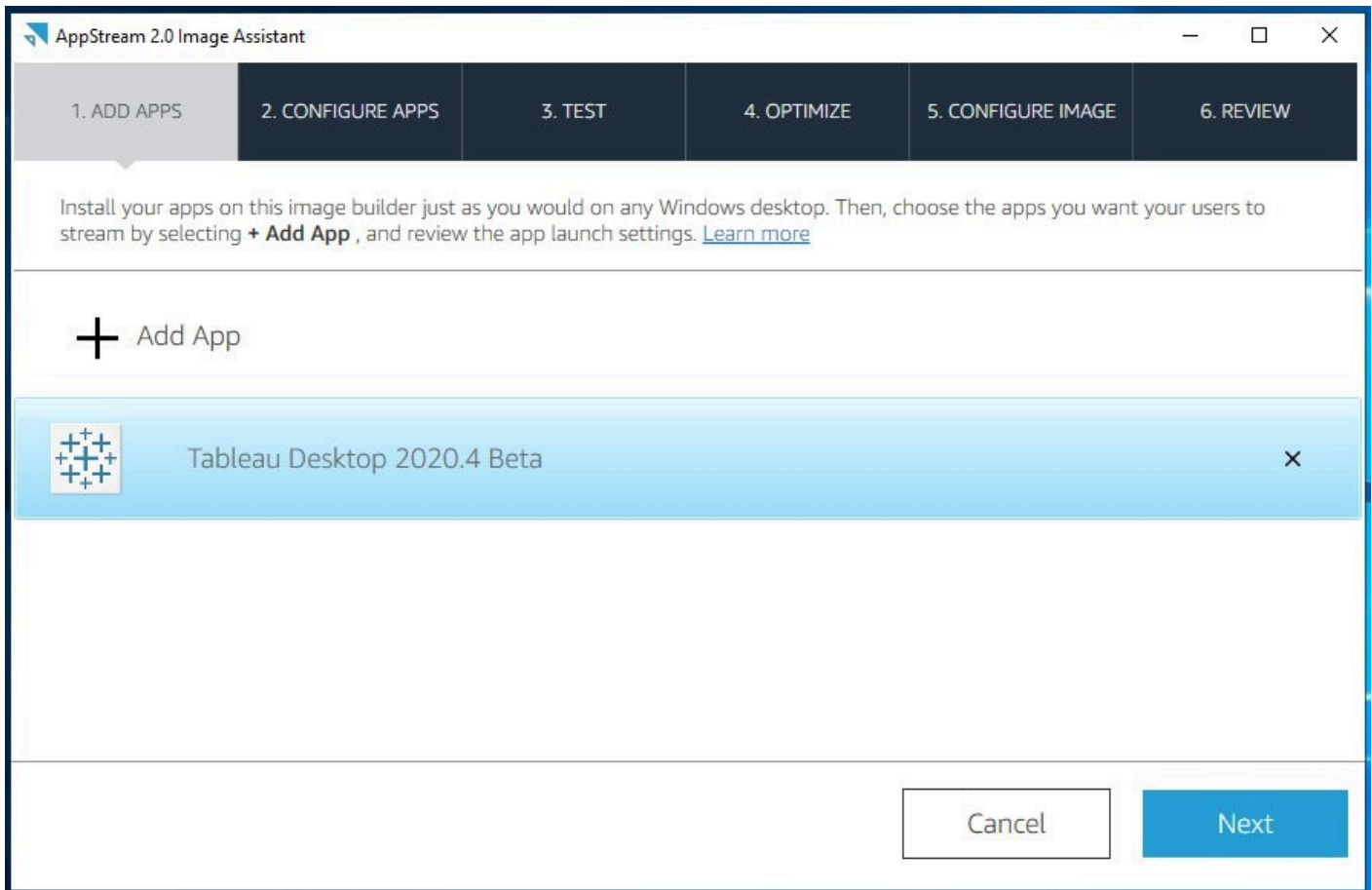
The script tells Tableau Desktop that users are activated using LBLM through their Tableau server. When users open Tableau Desktop for the first time, they are prompted to enter their Tableau Server credentials. This activates their desktop license for 14,400 seconds (four hours).

For information about licenses that expire during a session and best practices for AppStream 2.0 and the authorization-to-run (ATR) service duration, refer to [Login-based License Management](#) in the Tableau documentation.

Note

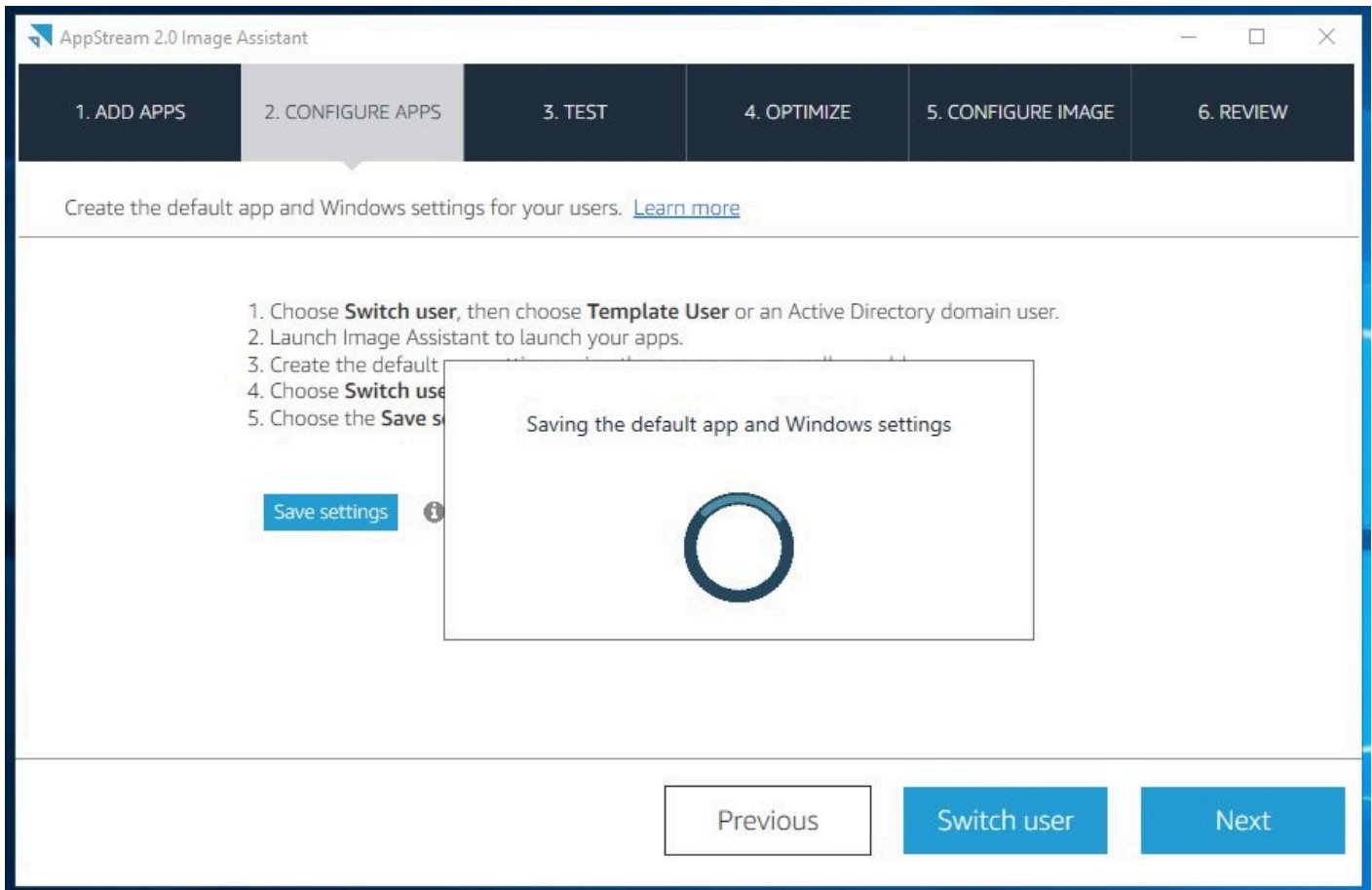
The subnet in which the AppStream 2.0 instances and image builders reside must be able to access the Tableau service instance. For more information about configuring VPCs, refer to [VPCs and subnets](#).

4. After Tableau Desktop is installed, open the Image Builder and launch the AppStream 2.0 Image Assistant, where you can make Tableau Desktop available in the AppStream 2.0 application catalog.
5. In the Image Assistant, choose **Add App**, and then navigate to the Tableau Desktop executable file; for example, C:\Program Files\Tableau\Tableau *{version}*\bin\tableau.exe.



Choose **Add App**

- (Optional) Choose the **Configure Apps** tab, and then choose **Switch user > Template user**. After logging in, launch Tableau Desktop and make one or more of the following customizations:
 - [Save data sources](#)
 - [Pin workbooks to the start page](#)
 - [Configure analytic extensions](#)
 - [Define custom color palettes and shapes](#)
 - [Define custom geocoding](#)
 - [Define new background maps](#)
- When you are finished, go back to the administrator user via the Image Assistant or the **Admin Commands** in the AppStream 2.0 toolbar, and choose **Save settings**.
- Choose **Next**.



Choose **Save settings**

9. To test the user experience with Tableau Desktop, open the **Test** tab, open **Test User**, and open Tableau Desktop. Verify the application is working as expected.
10. Switch back to the administrator user and choose the **Optimize** tab.
11. Choose the **Launch** button.
12. After Tableau Desktop loads, choose **Continue**.
13. Choose the **Configure Image** tab, and provide a name for your custom image. The name must be unique in your Image Registry.
14. Choose **Next**.

The screenshot shows the 'AppStream 2.0 Image Assistant' window, specifically the '5. CONFIGURE IMAGE' step. The interface includes a progress bar at the top with six steps: 1. ADD APPS, 2. CONFIGURE APPS, 3. TEST, 4. OPTIMIZE, 5. CONFIGURE IMAGE (highlighted), and 6. REVIEW. Below the progress bar, there is a prompt: 'Type the details about your image. [Learn more](#)'. The main configuration area contains several input fields: 'Name' (TableauDesktop20204Beta), 'Display name' (Tableau Desktop 2020.4 Beta), and 'Description' (my customized image for Tableau Desktop). A 'Tags' section features a table with 'Key' and 'Value' columns, containing one entry: 'Some AWS Tag' with 'Tag Value'. An 'Add Tag' button is located below the table. At the bottom left, there is a checkbox for 'Always use latest agent version:' which is checked. At the bottom right, there are 'Previous' and 'Next' navigation buttons.

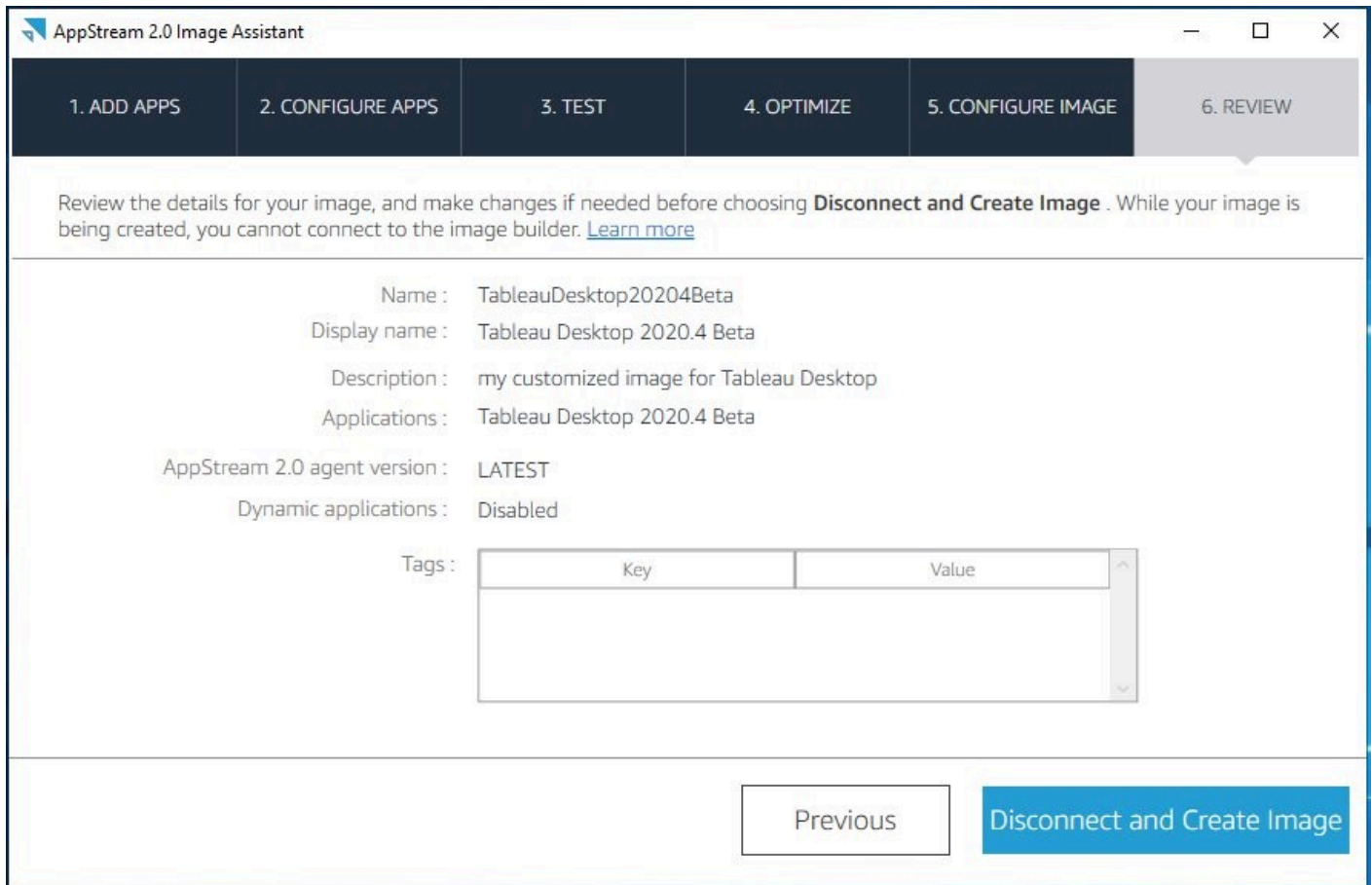
Key	Value
Some AWS Tag	Tag Value

Provide a name for your custom image

15 Choose the **Review** tab to review your image's configuration.

16 After you verify settings, choose **Disconnect and Create Image**.

After disconnecting from the Image Builder, wait 20 to 30 minutes for your new image to become available in the Image Registry.

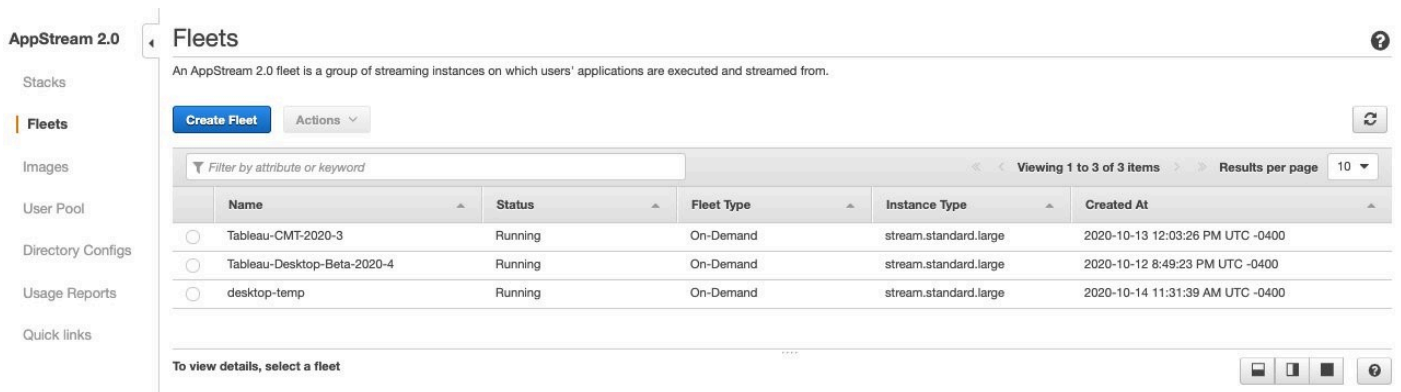


Review the details for your image

Step 3: Create your fleet

An AppStream 2.0 fleet is a set of instances that run on your custom image.

1. In AppStream 2.0, open the **Fleets** page, and choose **Create Fleet**



Choose **Create Fleet**

2. On the **Provide Fleet Details** page, provide a unique name and optionally a display name.
3. On the **Choose an Image** page, select the custom image you created from the image list.
4. Choose **Next**.

Create AppStream 2.0 Fleet

Step 1: Provide Fleet Details

Step 2: Choose an Image

Step 3: Configure Fleet

Step 4: Configure Network

Step 5: Review

Choose image

An AppStream 2.0 image contains applications that will be streamed to your users. The image is used to launch streaming instances that are part of an AppStream 2.0 fleet. [AppStream 2.0 Image Version History](#)

All Images All operating sy... Instance family Filter by keyword


- 

Tableau-Desktop-beta-2020-4
 Platform: Microsoft Windows Server 2019 Base
 Description: AppStream Image for Tableau Desktop 2020.4 Beta
 Display Name: Tableau Desktop 2020.4 Beta
 Visibility: Private
 Owner: Me (968006055560)
 Instance Family: General Purpose, Compute Optimized, Memory Optimized
 Apps Included : Tableau Desktop 2020.4 Beta
 AppStream 2.0 agent version: 10-08-2020 (LATEST)
 Dynamic application providers: Disabled



- 

Tableau-CMT-2020-3
 Platform: Microsoft Windows Server 2019 Base
 Description: Tableau Content Migration Tool - version 2020.3
 Display Name: Tableau CMT 2020.3
 Visibility: Private
 Owner: Me (968006055560)
 Instance Family: General Purpose, Compute Optimized, Memory Optimized
 Apps Included : Tableau CMT 2020.3
 AppStream 2.0 agent version: 10-08-2020 (LATEST)
 Dynamic application providers: Disabled

- 

Amazon-AppStream2-Sample-Image-02-04-2019
 Platform: Microsoft Windows Server 2012 R2
 Description: Image containing sample applications for Amazon AppStream2.
 Display Name: Amazon-AppStream2-Sample-Image-02-04-2019
 Visibility: Public
 Owner: AWS
 Instance Family: General Purpose, Compute Optimized, Memory Optimized
 Apps Included : Firefox,Eclipse,Notepad++,OpenOffice Writer,OpenOffice Calc,OpenOffice Impress,OpenOffice Draw,OpenOffice Math
 AppStream 2.0 agent version: 10-08-2020 (LATEST)
 Dynamic application providers: Disabled

Cancel

Previous

Next

Select the custom image you created from the image list

5. On the **Configure Fleet** page, choose the **stream.standard.large** instance type (the same as you did with the Image Builder).

Create AppStream 2.0 Fleet

Step 1: Provide Fleet Details

Step 2: Choose an Image

Step 3: Configure Fleet

Step 4: Configure Network

Step 5: Review

Configure fleet

An AppStream 2.0 fleet is a group of streaming instances on which users' applications are executed and streamed from.

Choose instance type

Choose the instance type that matches the performance requirements of your users' applications. All the streaming instances in your fleet will launch with the instance type you select. [Learn more about available instance types here.](#)

General Purpose

	Family	Type	vCPUs	Memory (GiB)
<input type="radio"/>	General Purpose	stream.standard.medium	2	4
<input checked="" type="radio"/>	General Purpose	stream.standard.large	2	8

Fleet Type details

Select your fleet type. You can learn more about fleet types [here](#)

Fleet type*

Select this fleet type to optimize your streaming costs. With an on-demand fleet, users will experience a start time of about one to two minutes for their session. However, you will only be charged the streaming instance fees when users are connected, and a small hourly fee for each instance in the fleet that is not streaming apps. [Learn more](#)

User session details

Specify the maximum amount of time that a streaming session can remain active.

Maximum session duration in minutes

Disconnect timeout in minutes

Idle disconnect timeout in minutes

Fleet capacity

Set the capacity configuration for your fleet

Minimum capacity*
Your minimum fleet size. Set this to match the minimum number of users who can stream their apps concurrently from this fleet. This value should be greater than or equal to 1.

Maximum capacity*
Your maximum fleet size. Set this to match the maximum number of users who can stream their apps concurrently from this fleet. This value should be greater than or equal to 1.

Stream view

Select the stream view you wish your users to have. When you select Application, your users will have an application-specific focus. When you select Desktop, your users will see the standard desktop experience that is available on the operating system.

Stream view

Scaling details (Advanced)

Scaling policies will automatically adjust the number of streaming instances that are available as part of your fleet. You can read more about scaling policies [here](#).

Scale out policy Add instance(s) if Capacity Utilization >= %

Scale in policy Remove instance(s) if Capacity Utilization <= %

IAM role (Advanced)

Select an IAM role that will be available on all fleet streaming instances. [Learn more about IAM roles on fleet streaming instances here.](#)


IAM role [Create new IAM role](#)

Only IAM roles with trust policies which include appstream.amazonaws.com are shown.

* Required

Cancel Previous **Next**

On the **Configure Fleet** page, choose the **stream.standard.large** instance type

 **Note**

You might decide to use a compute or memory-optimized instance type, depending on user datasets. Make the following additional updates:

- a. In the **Fleet Type details** section, in the **Fleet type** field, choose either **On-Demand** or **Always-On**.

The **Always-On** option means instances are available and ready whenever users try to access Tableau Desktop. However, this option also means that you pay for instances to be available *at all* times, even when users are not streaming from the fleet. The **On-Demand** option is better if you are not sure how often users will need Tableau Desktop, as it spins up new instances as needed. This means users must wait a couple of minutes when they first access Tableau Desktop for it to spin up the fleet instance. This option also means a lower cost to maintain the fleet.

- b. In the **User Session details** section, specify the different timeouts. Set the maximum session duration and disconnect timeout to 240 minutes to match the four-hour ATR duration used during the Tableau Desktop installation.
 - c. Provide details for fleet capacity, including the minimum and maximum number of instances available in your fleet, and whether to stream the entire desktop or just the Tableau Desktop application for users. For information to help you determine configuration choices, refer to [Fleet Auto Scaling for Amazon AppStream 2.0](#) in the AWS documentation.
6. On the **Configure Network** page, make the following additional updates to configure the network settings of your fleet:

Create AppStream 2.0 Fleet

Step 1: Provide Fleet Details

Step 2: Choose an Image

Step 3: Configure Fleet

Step 4: Configure Network

Step 5: Review

Configure network

Specify the fleet's network and directory config settings.

Network access

Select the Amazon VPC and subnet(s) to which your fleet streaming instances will belong. This will allow applications launched on the instances to connect to network resources in your Amazon VPC. You can also restrict network to these resources from your instances by selecting up to five VPC security groups. [Learn more.](#)

Default Internet Access Select this option if you want to add Internet access from your fleet streaming instances. Leave this unchecked if you plan to control Internet access for your users using an advanced set up, such as a NAT gateway in your Amazon VPC.

VPC * vpc-025a57ab06b8ae16e (PUBLIC-cust-consult-... [Create new VPC](#)

Subnet 1 * subnet-05584f4b8bd4c53a4 | (172.31.0.0/20) | us... [Create new subnet](#)

Subnet 2 subnet-0c5a4161ce8c9b251 | (172.31.16.0/20) | u... [Create new subnet](#)

Security group(s) sg-0c833315b57730e65 - PUBLIC-ELB
sg-0c954554849dd02f9 - rds-launch-wizard-1
sg-0d8c566e8b37d3bd7 - rds-launch-wizard
sg-0f9a18da984a64ccc8 - PUBLIC-SSH [Create new security group](#)

Select up to five VPC security groups. Use SHIFT+arrow, CTRL-click, or CMD+click (OSX) to select multiple items from list.

Active Directory Domain (Optional)

Join streaming instances in your fleet to an Active Directory domain. This step is **optional** and only needed if you are planning to use AppStream 2.0 with your Active Directory.

Directory Name Select a Directory Config... [Create new directory configuration](#)

Select the directory config that will be used to join your fleet to your Active Directory domain.

Directory OU Select Directory OU...

Select the Organizational Unit in your Active Directory domain to which your fleet will belong.

* Required

Cancel

Previous

Next

The Configure Network page

- Specify whether you want the fleet instances to connect to the internet via a public IP address.
- Define the VPC, subnets, and security groups for the instances within the fleet.
- Configure the fleet to join an Active Directory domain, if needed. Choose **Next**.
- On the **Review** page, confirm your settings, and choose **Create** to create your fleet.

Step 4: Create your stack

Use AppStream 2.0 stacks to define user access policies and storage configurations for your fleet.

- From the navigation pane, go to the **Stacks** page and choose **Create Stack**.

An AppStream 2.0 stack consists of streaming resources and policies for controlling access to these resources. The streaming resources are made up of instances that are part of an AppStream 2.0 fleet.

[Create Stack](#) [Actions](#)

Filter by attribute or keyword

Viewing 1 to 3 of 3 items Results per page 10

Name	Status	Created At
<input type="radio"/> Tableau-CMT-Stack	Active	2020-10-12 2:47:50 PM UTC -0400
<input type="radio"/> Tableau-Desktop-Beta-2020-4	Active	2020-10-12 8:58:57 PM UTC -0400
<input type="radio"/> test-stack	Active	2020-10-14 11:32:21 AM UTC -0400

To view details, select a stack

Choose **Create Stack**

2. On the **Stack Details** page, provide a name for the stack, and select the fleet you just created from the **Fleet** list.
3. Choose **Next**.
4. On the **Enable Storage** page, choose to enable or disable home folders.

If enabled, home folders provide Amazon S3-backed file storage that persists from session to session. When users save files to their home folder, those files are available the next time they start a session, and they can publish their content to the Tableau Server when they're ready. You can also enable access through Google Drive and OneDrive storage connectors, so your users can easily pull their files from the cloud.

5. Choose **Next** to continue.

Create AppStream 2.0 Stack

Step 1: Stack Details

Step 2: Enable Storage

Step 3: User Settings

Step 4: Review

Enable Storage

Enable persistent storage options for users of this stack.

Home Folders

Your users' files will be saved to an S3 bucket in your AWS account. For this feature to be enabled, the AppStream 2.0 fleet associated with this stack must allow access to S3 via the internet or an Amazon VPC endpoint for S3. For information about how to perform this task, see [here](#).

Enable Home Folders

S3 Bucket Name `appstream2-36fb080bb8-us-west-2-968006055560`

Google Drive for G Suite

Your users can link their Google Drive account to AppStream 2.0 and save files to their Google Drive during application streaming sessions. For this feature to be enabled, the AppStream 2.0 fleet associated with this stack must have access to the internet and Amazon AppStream 2.0 must be a trusted app to your G Suite domain. For information about how to perform this task, see [here](#).

Enable Google Drive

OneDrive for Business

Your users can link their OneDrive for Business account to AppStream 2.0 and save files to their OneDrive during application streaming sessions. For this feature to be enabled, the AppStream 2.0 fleet associated with this stack must have access to the internet. You must grant permissions to allow your users to link their OneDrive account with Amazon AppStream 2.0. For information about how to perform this task, see [here](#).

Enable OneDrive

Cancel

Previous

Next

*The **Enable Storage** page*

6. On the **User Settings** page, choose if users can copy and paste from their clipboard and upload and download files from this instance. Also select the check box to enable application settings persistence if you want AWS to save customizations and settings for the next time users start a session.

Create AppStream 2.0 Stack

- Step 1: Stack Details
- Step 2: Enable Storage
- Step 3: User Settings**
- Step 4: Review

User Settings

Clipboard, file transfer, and print to local device permissions

Specify how users can transfer data between their AppStream 2.0 remote session and their local device. [Learn more.](#)

Clipboard	<input type="text" value="Copy and paste"/>
File transfer	<input type="text" value="Upload and download"/>
Print to local device	<input type="text" value="Disabled"/>

Application settings persistence

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.](#)

Enable application settings persistence

Specify the settings group to use when users of this stack access their streaming applications. You can use the same settings group across multiple stacks. Doing so ensures that when users across different stacks access their streaming applications, the applications have the same settings. [Learn more.](#)

Settings group

The User Settings page

7. On the **Review** page, review the stack settings.
8. Choose **Create** to create the stack.

Step 5: Manage users

Now that you've created an active stack and running fleet, use one of the following AppStream 2.0 options to grant user access.

Single sign-on with SAML 2.0

AppStream 2.0 supports identity federation to AppStream 2.0 stacks through Security Assertion Markup Language (SAML) 2.0. You can use an identity provider such as [AWS Single Sign-On](#) (AWS SSO), Okta, or Active Directory Federation Services to pass user credentials to service providers AWS and AppStream 2.0.

For instructions on how to set up SAML 2.0 with AppStream 2.0, refer to [Setting up SAML](#).

Active Directory (Optional)

Using an Active Directory domain, you can use your organization's existing group structure to provide user access and security. For instructions on setting up Active Directory with AppStream 2.0, refer to [Tutorial: Setting Up Active Directory](#).

User pool

The AppStream 2.0 user pool provides a simplified way to manage user access to applications through a persistent portal for each AWS Region. This feature is a built-in alternative to user management through Active Directory and SAML 2.0 federation. As a best practice, use user pools when Active Directory is not required, for testing purposes, or for deployments with 50 or fewer users.

The screenshot displays the AWS IAM console 'User Pool' page. The left sidebar shows navigation options: Stacks, Fleets, Images, User Pool (selected), Directory Configs, Usage Reports, and Quick links. The main content area is titled 'User Pool' and includes a 'Create User' button and an 'Actions' dropdown. Below this is a search filter and a table of users. The table has columns for Name, Email, Status, and Created At. Two users are listed: Claire Folks and Takashi Binns. Below the table, the 'User Details' section for Takashi Binns is expanded, showing his Name, Email, Status, and the Stacks he is associated with: Tableau-Desktop-Beta-2020-4, Tableau-CMT-Stack, and test-stack.

Name	Email	Status	Created At
Claire Folks	cfolks@tableau.com	Enabled	2020-10-13 3:56:16 PM UTC -0400
Takashi Binns	tbinns@tableau.com	Enabled	2020-10-12 11:55:27 AM UTC -0400

User Details

- Name:** Takashi Binns
- Email:** tbinns@tableau.com
- Status:** Enabled
- Stacks:** Tableau-Desktop-Beta-2020-4, Tableau-CMT-Stack, test-stack

The *User Pool* page

For more information, refer to [Using Active Directory with AppStream 2.0](#) and [Single Sign-on Access \(SAML 2.0\)](#).

Licensing

When using a non-persistent solution such as AppStream 2.0 to host Tableau Desktop, you must activate the license key. Activation options depend on how you purchased Tableau licenses.

LBLM and ATR (recommended)

LBLM is used when users don't need their own license key to activate the software. Instead, the Tableau Server is licensed for a pool of creator users, and each user signs in to the Tableau Server individually to activate the license. This option gives you a central place to manage Tableau Desktop users on Tableau Server and an activations dashboard that shows the history of which users activated Tableau Desktop and how often they use it. For information about the activations dashboard, refer to [View login-based usage](#).

To use this option, your Tableau Server's license key must allow for LBLM. You can enable the LBLM feature using the following Tableau Services Manager (TSM) command:

```
tsm configuration set -k
  licensing.login_based_license_management.enabled -v true
tsm pending-changes apply
```

The screenshot shows the Tableau Services Manager (TSM) Configuration page for Licensing. The page includes a navigation menu with 'STATUS', 'MAINTENANCE', and 'CONFIGURATION'. The 'CONFIGURATION' tab is active, and the 'Licensing' section is selected. The page displays a table of licenses with the following columns: Product Key, Type, Creator/Explorer/Viewer, Data Management, Server Management, LBLM, Guest Access, Expires, and Maintenance Ends. The LBLM column is highlighted with a red box, indicating that the license key must allow for LBLM. The table shows two licenses, both with a 'Term' type and a capacity of 1000/750/500. The LBLM column shows a checkmark for the second license. The total role capacity is shown as Creator| 1010, Explorer| 750, Viewer| 500.

	Product Key	Type	Creator/Explorer/Viewer	Data Management	Server Management	LBLM	Guest Access	Expires	Maintenance Ends
<input type="radio"/>	[REDACTED]	Term	1000/750/500	✓	✓			February 15, 2021	February 15, 2021
<input type="radio"/>	[REDACTED]	Term	10/0/0	✓	✓	✓		February 15, 2021	February 15, 2021

Your Tableau Server's license key must allow for LBLM

For environments that meet the LBLM requirements, a typical user flow with an ATR duration of four hours starts by starting the session and logging in to Tableau Server, which is activated for four hours. Next, one of the following scenarios occur:

- If users disconnect from their session and then reopen the session more than four hours later, when they log in to Tableau Server, the session is active for another four hours.
- Assuming the fleet's disconnect timeout value matches the ATR duration, if users disconnect from the session but open it again within that four-hour window, the instance remains active, and they can access Tableau Server without logging in again.
- Assuming the maximum session duration matches the ATR duration of four hours, if users reach the end of the four hours, they are prompted to save their work before the session closes. Then they can open a new session and log back in to Tableau Server, if desired.

You must configure ATR settings when using LBLM. Tableau Desktop comes with copy protection to prevent users from installing or activating Tableau Desktop on a virtual machine and simply cloning it for other users. This means that when an instance is terminated, even if you spin up a new one, it has a different hardware profile that doesn't match the settings from the last session. For this reason, you must enable ATR and set the duration to match the fleet's maximum session duration.

Master key approach

If your company has a master key, you can create a script that activates Tableau Desktop before opening user sessions. For more information, refer to [Run Scripts Before Streaming Sessions Begin](#) in the AppStream 2.0 documentation.

Alternative approach

If LBLM is not available, and you don't have a master key, an architecture is available for using individual user-based desktop/creator product keys, although this process requires more manual work than the other approaches. AWS must be able to access a mapping of users to product keys, for example a database table. Rows in the table are users and their Tableau Desktop license keys. The following two session scripts are also required:

- **Startup script** — When users sign in, the script fetches their license key from the database table and uses it to activate Tableau Desktop.
- **Termination script** — When user sessions terminate, the script runs the deactivate command to free up the license key. This step is required because all Tableau licenses have a limited number of activations (to prevent users from activating the same license key on many machines). By deactivating before the instance terminates, the license key can be reused the next time the user logs in. For more information, refer to [Deactivate the product key](#) in the Tableau documentation.

Note that this approach is not recommended because it assumes the termination script always runs before the instance is terminated. If something causes your instances to terminate unexpectedly and the script is unable to complete, the license activations counter does not decrement. This means that you will eventually see license activation errors for those users, and the only resolution is through the Tableau support team (there is no programmatic way). Although this scenario is unlikely, the potential challenges make this a less desirable approach.

Security

For information about how to secure your AppStream 2.0 resources, refer to [Security in Amazon AppStream 2.0](#).

Conclusion

After following this guide, you should understand how to deploy Tableau Desktop on AppStream 2.0, and what to consider during deployment.

Contributors

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AWS Glossary

For the latest AWS terminology, see the [AWS glossary](#) in the *AWS Glossary Reference*.