ARISTA

CloudVision as-a-Service (CVaaS) Quick Start Guide

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1 CloudVision as-a-Service

CloudVision as-a-Service is an SaaS-based delivery for the Arista CloudVision management plane platform offering modern telemetry and analytics, network-wide automation, and orchestration. As a complement to the on-premises offering, the CloudVision as-a-Service platform offers cloud-based onboarding and feature delivery, using secure state-streaming to an Arista managed cloud-native architecture.

This document is intended to be a quick start guide for customers who seek to onboard to the CloudVision as-a-Service platform.

1.1 Onboarding at a Glance

Use the following steps and checklist to simplify the onboarding process.

1. Configure the CloudVision as-a-Service specific information in the respective IdP authentication provider portal (Authentication provider specific setup information can be found at: https://aristanetworks.force.com/AristaCommunity/s/article/CloudVision-Authentication-Provider-OAuth-SAML-Configuration).
2. Access CloudVision as-a-Service using the welcome email link.
3. Click on **Log in with Email** and fill in the form using your organization name and your email address.
4. Log in to the CloudVision cluster using the Invitation URL.
5. Configure an Authentication Provider.
6. Onboard Users.
7. Onboard EOS Devices.

1.2 Checklist

	Checklist Item	Description
User Onboarding Prerequisites	Configure the CloudVision Service specific information in the authentication system.	CloudVision as-a-Service currently supports SP-initiated and IDP initiated login. Cloudvision as-a-Service does not support Microsoft ADFS. Customers can use Azure Active Directory (Azure AD) Connect to configure federation with on-premises Active Directory Federation Services (ADFS) and Azure AD.
	Welcome Email	Arista will send you a welcome email. Generate the invitation URL by accessing the cluster and clicking on **Log in with Email** button. **(Valid for only 1 hour and can be regenerated on-demand after the expiration using the “Log in with Email” process.)**
	Authentication Details	Authentication provider specific setup information (both OAuth & SAML) can be found at: https://aristanetworks.force.com/AristaCommunity/s/article/CloudVision-Authentication-Provider-OAuth-SAML-Configuration
Device Onboarding Prerequisites	All supported EOS versions based on: https://www.arista.com/en/support/product-documentation/eos-life-cycle-policy	
	TerminAttr 1.19.6+	
	Connectivity Requirements: Port 443 access to apiserver.arista.io & www.arista.io	Refer to the Connectivity Details section for more information.
	Valid NTP server configuration	To configure NTP use the following command: `switch(config)#ntp server <vrf> <vrf-name> <ntp server>` https://www.arista.com/en/um-eos/eos-system-clock-and-time-protocols

	Checklist Item	**Description**
ZTP as-a-Service Prerequisites	For User-Generated Token with USBKey or Bootstrap Script: • EOS-4.25.5 or • EOS-4.26.1	No platform dependency for the USB Key and Bootstrap Script method. Supported in all Hardware Platforms.
	For Embedded Token Support • EOS-4.26.1	Supported with specific platforms. Please refer to the Platform-Specific Feature Set Guide

1.3 User Onboarding Prerequisites

1.3.1 Invitation URL

Use the welcome email link sent by Arista for initial access to CloudVision as-a-Service. Click on the **Log in with Email** button and fill in the form using your organization name (Case Sensitive) and your email address. After completion of this process you will receive another email containing an Invitation URL to login to CloudVision as-a-Service.

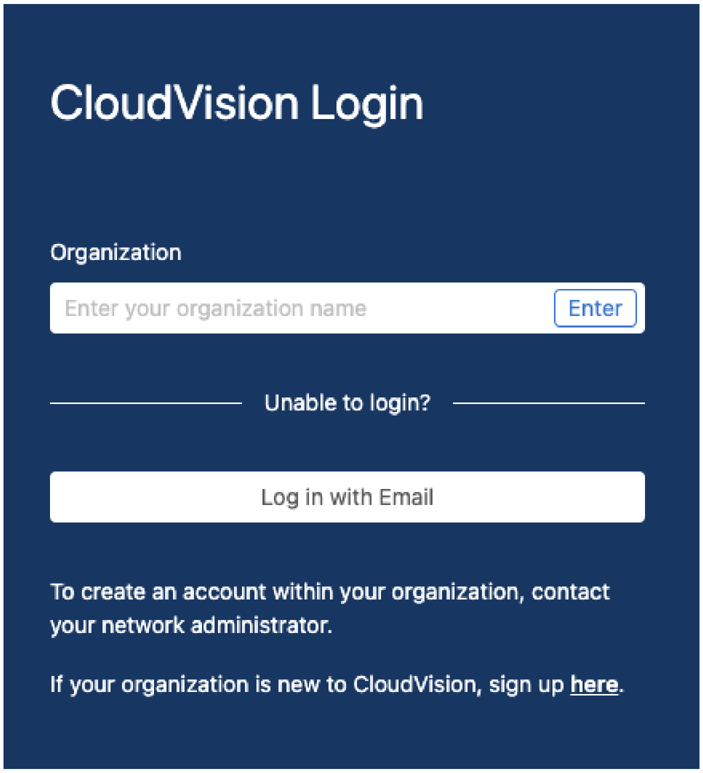
Please complete the authentication IdP provider selection and user onboarding for the administrator account before the Invitation URL expires. Please refer to the authentication provider specific documentation for further details: https://aristanetworks.force.com/AristaCommunity/s/article/CloudVision-Authentication-Provider-OAuth-SAML-Configuration

Optionally, you can skip the SSO provider setup and start adding users; however, your only method to log in to CVaaS will be to login with email, until you setup a SSO provider.

Note: If the invitation URL expires, you can request a new invitation using the **Log in with Email**. If you are having trouble with this process, please double check the case-sensitive organization name and request the Invitation URL. If you are still having issues please reach out to cvaas-onboarding@arista.com or if urgent please contact please contact Arista TAC.

For users who already have a user registered within CloudVision as-a-Service for your organization, you can use the **Log in with Email** self-service feature to obtain an invitation link.

Figure -1: Log in with Email



CloudVision Login

Organization

Enter your organization name

Enter

Unable to login?

Log in with Email

To create an account within your organization, contact your network administrator.

If your organization is new to CloudVision, sign up here.

1.3.2 Authentication Details

Your authentication administrator will need to configure CloudVision as-a-Service using the following authentication information in their respective IdP provider portal.

Setting up OIDC/OAuth provider

Configure the OIDC/OAuth provider of choice. You will need to configure the IdP provider using the following information:

- **Redirect URL:** *https://<hostname>/api/v1/oauth*
- **Login URL:** *https://<hostname>*

Please refer to the following table:

Table 1:

Region	OAuth Base URL	OAuth Redirect URL
United States 1a	https://www.arista.io	/api/v1/oauth
United States 1c	https://www.cv-prod-us-central1-c.arista.io	/api/v1/oauth
Japan	https://www.cv-prod-apnortheast-1.arista.io	/api/v1/oauth
Germany	https://www.cv-prod-euwest-2.arista.io	/api/v1/oauth
Australia	https://www.cv-prod-ausoutheast-1.arista.io	/api/v1/oauth
Canada	https://www.cv-prod-na-northeast1-b.arista.io	/api/v1/oauth

Setting up SAML provider

Obtain the entityID and location from CloudVision's metadata file at the below-listed URL.

Example Metadata URL: `https://<hostname>/api/v1/saml_sp_metadata`

Please refer to the following table for relevant base SAML URLs:

Table 2:

Region	SAML EntityID/Logout URL
United States 1a	https://www.arista.io
United States 1c	https://www.cv-prod-us-central1-c.arista.io
Japan	https://www.cv-prod-apnortheast-1.arista.io
Germany	https://www.cv-prod-euwest-2.arista.io
Australia	https://www.cv-prod-ausoutheast-1.arista.io
Canada	https://www.cv-prod-na-northeast1-b.arista.io

SAML SP Metadata URL: /api/v1/saml_sp_metadata

SAML Sign-on and Reply URL (Location): /api/v1/saml_callback

Please refer to the SAML Provider documentation on how to obtain this information. For more detailed configuration information, please refer to:

https://aristanetworks.force.com/AristaCommunity/s/article/CloudVision-Authentication-Provider-OAuth-SAML-Configuration

1.4 User Onboarding Workflow

The standard onboarding workflow is:

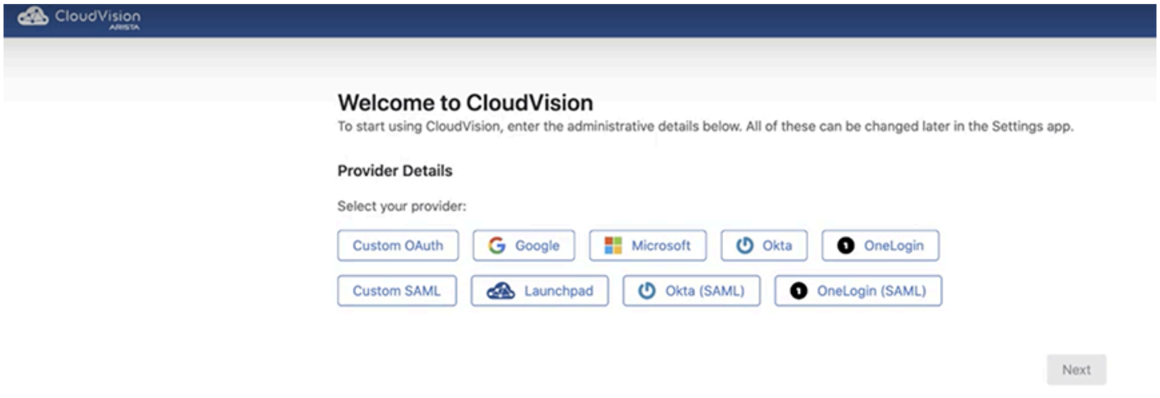
1. Onboarding Authentication Providers
2. Onboarding User Accounts
3. Login to CloudVision

1.5 Onboarding Authentication Providers

Once the CloudVision as-a-Service instance is set up, access the CloudVision Service using the welcome email and use the **Log in with Email** button to generate and Invitation URL specific to your cluster.

Select a preferred authentication provider from the list.

Figure -2: Welcome to CouldVision - Provider Details



Welcome to CloudVision

To start using CloudVision, enter the administrative details below. All of these can be changed later in the Settings app.

Provider Details

Select your provider:

Follow the configuration guidance for your IdP from the following location; **https://aristanetworks.force.com/AristaCommunity/s/article/CloudVision-Authentication-Provider-OAuth-SAML-Configuration**

1.5.1 Onboarding using an Arista Provided SAML Provider

Customers can request an Arista-hosted SAML provider option if they do not have access to an SSO provider. An SSO Provider is required for CloudVision Service login.

You can request an Arista-hosted SAML provider option named **Launchpad** by requesting this service via an Arista support request. If you already have Cognitive Wifi and access to **Launchpad**, you can also use the SAML SSO with CloudVision as-a-Service,. You will still need to open a TAC case with attention to the **Wifi Ops team** with your Organization (tenant) name and the region where your service is deployed. The Cognitive Wifi operations team will set up the SAML provider information with this information. Please reach out to your Arista representative to set up Launchpad access for your organization.

Once you have the Launchpad authentication configured, you can configure Launchpad as a Provider in CloudVision. Select **Launchpad SAML** as your SSO provider, select **shared provider**, and click **Add**.

If you manually configure this provider, please use the following settings.

Note: Launchpad use needs to be coordinated before setting up with the Arista TAC.

- Provider: **Launchpad**
- Identity Provider Issuer: https://login.mojonetworks.com/idp/shibboleth
- Identity Provider Metadata URL:https://login.wifi.arista.com/casui/idp-metadata.xml
- Email Attribute Name: **User.email**
- Authorization Request Binding: **HTTP-Redirect SAML protocol binding**

1.5.2 Adding or Changing Authentication Providers After the Initial Setup

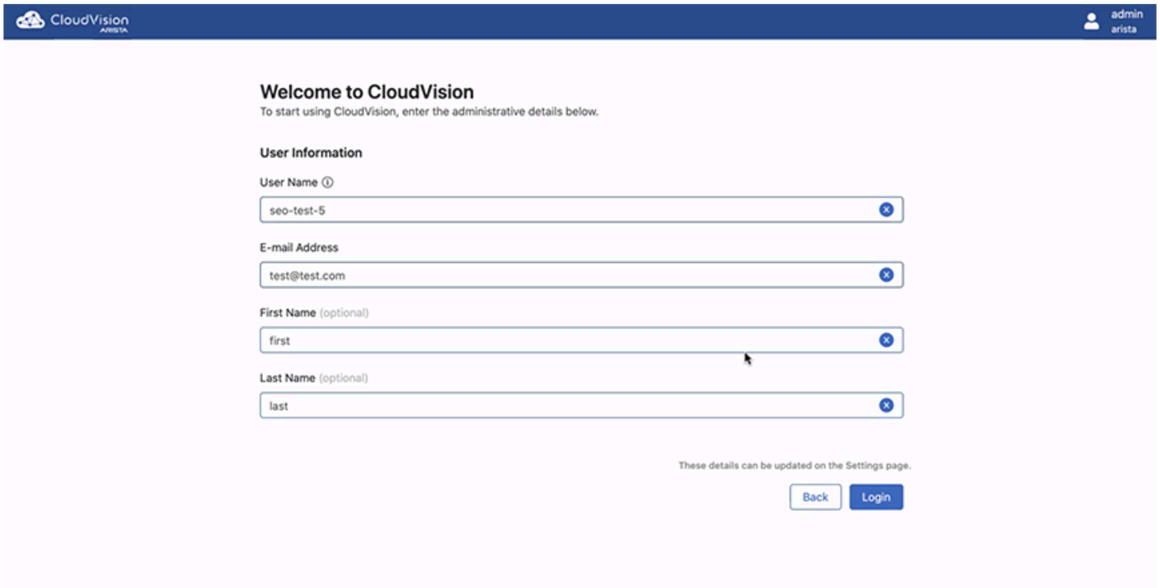
To make changes to authentication providers or add new authentication providers after the initial onboarding process click on the Settings and Tools icon ⚙ and navigate to **Access Control > Providers**.

Note: CloudVision as-a-Service does not support adding the same Authentication provider twice on the same cluster. However, you can add multiple providers (without any duplicates) if required.

1.6 Onboarding User Accounts

Once the authentication provider is set up, add the admin user account in the User Information screen. Make sure the email address matches with the email address maintained in the SSO.

Figure -3: User Information Screen



Welcome to CloudVision

To start using CloudVision, enter the administrative details below.

User Information

User Name: seo-test-5

E-mail Address: test@test.com

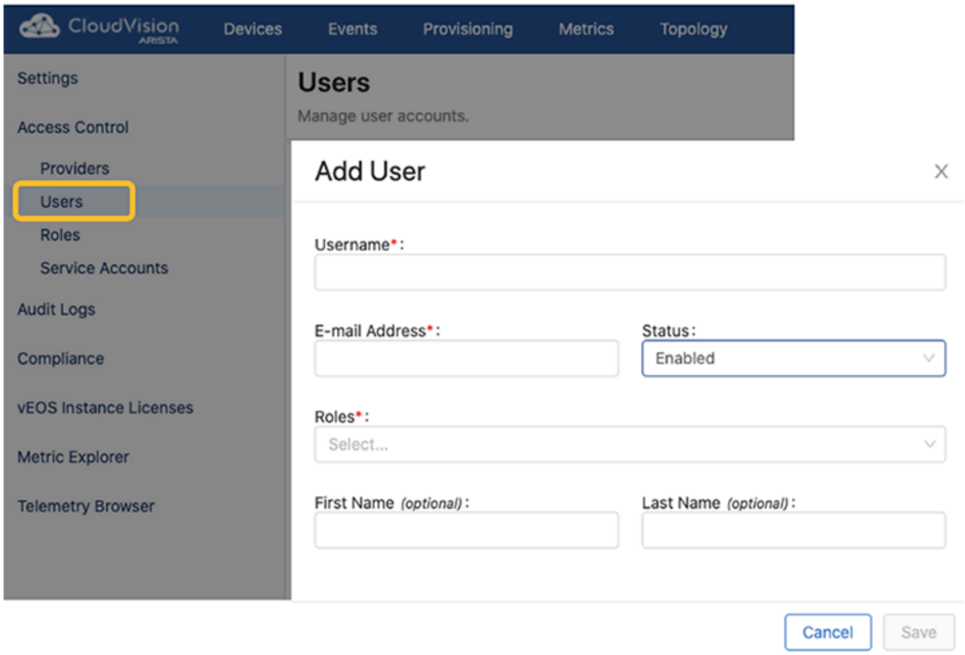
First Name (optional): first

Last Name (optional): last

These details can be updated on the Settings page.

Note: To make changes or add new users to CloudVision after the initial on-boarding, navigate to **Access Control** > **Users** under the CloudVision Settings.

Figure -4: Add User



Add User

Username*:

E-mail Address*:

Status: Enabled

Roles*: Select...

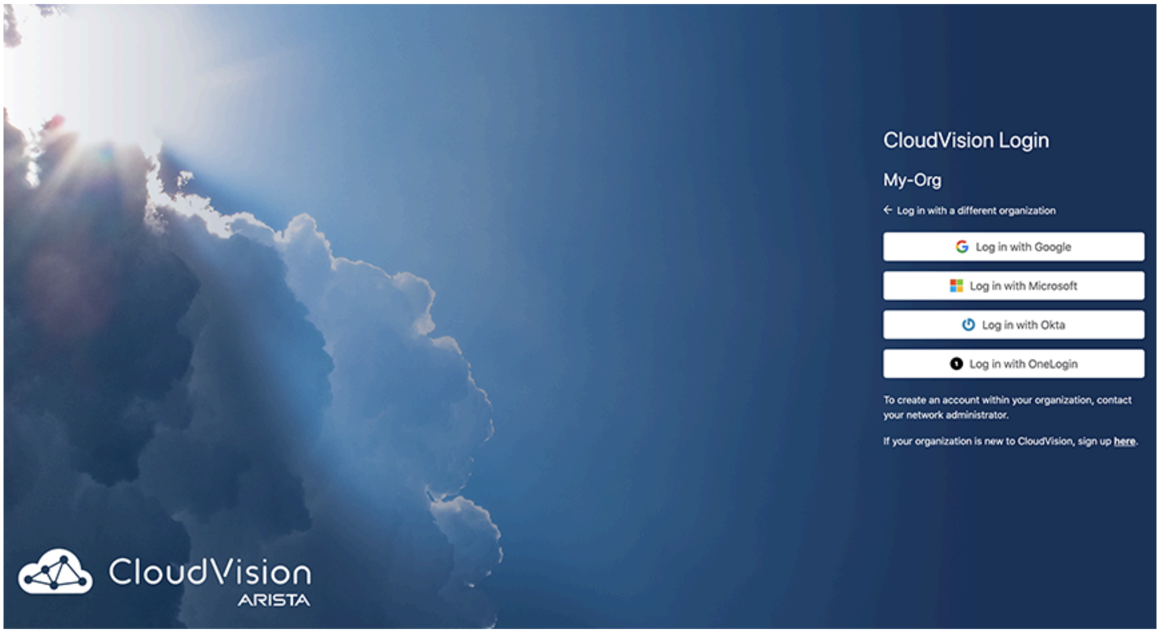
First Name *(optional)*:

Last Name *(optional)*:

1.7 Login to CloudVision

1. After selecting **Finish** you will get redirected to https://arista.io.
2. Enter the name of the *Organization* that was provided during the initial cluster setup. You can find the organization name in the welcome email.
3. Select the provider and login using the user account created in the previous section.

Figure -5: CloudVision Login



To create an account within your organization, contact your network administrator.

If your organization is new to CloudVision, sign up here.

1.8 Device Onboarding Prerequisites

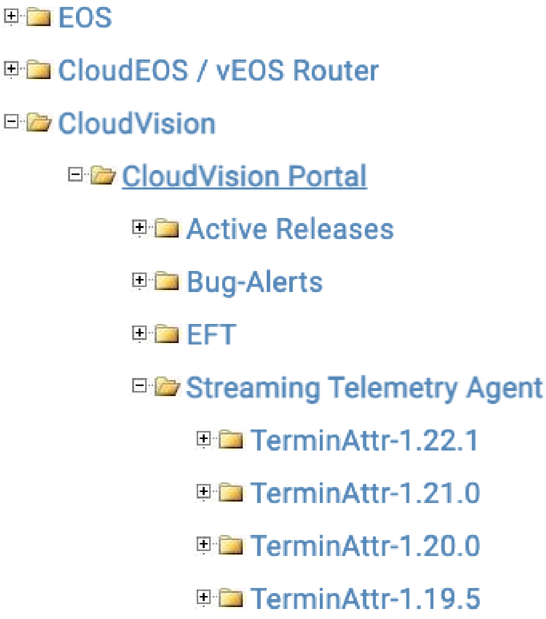
1.8.1 Software Requirements

Current minimum software requirements are:

- All supported EOS versions based on: https://www.arista.com/en/support/product-documentation/eos-life-cycle-policy
- TerminAttr 1.19.1+ (TerminAttr is the Streaming Telemetry Agent that is responsible for streaming the telemetry data to the CloudVision Service.)

Software can be downloaded from: https://www.arista.com/en/support/software-download. Streaming Telemetry Agent is available under the **CloudVision** -> **CloudVision Portal**:

Figure -6: Software Download



1.8.2 Connectivity Requirements

EOS devices need to be able to connect to **www.arista.io** & **apiserver.arista.io on port 443**.

Verify connectivity to CloudVision Service using the Ncat command:

```
HQ-DC-leaf1#bash
[admin@HQ-DC-leaf~]$ nc -zv www.arista.io 443
 Ncat: Version 7.50 ( https://nmap.org/ncat )
 Ncat: Connected to 35.221.29.186:443.
 Ncat: 0 bytes sent, 0 bytes received in 0.08 seconds.

[admin@HQ-DC-leaf~]$ nc -zv apiserver.arista.io 443
```

If you have multiple VRFs configured, change the VRF context. For eg. to change the VRF Context for a VRF named “MGMT”:

```
[admin@HQ-DC-leaf~]$ sudo ip netns exec ns-MGMT nc -zv www.arista.io 443
```

Connectivity Issues

1. Verify proper DNS resolution:

```
HQ-DC-leaf1#bash nslookup apiserver.arista.io
NOTE: If this is unsuccessful please check your DNS server configuration.
If no DNS servers present please add the “ip name-server” configuration as
 follows:
HQ-DC-leaf1(config)# ip name-server 8.8.8.8
```

2. If you have multiple VRFs configured, first change the VRF context:

```
[admin@HQ-DC-leaf~]$ sudo ip netns exec ns-MGMT nc -zv apiserver.arista.io
 443
```

1.9 Device Onboarding Workflow

Select the device onboarding option appropriate for your configuration:

- **Onboarding Devices: Token-Based Authentication**
- **Onboarding Devices: ZTP as-a-Service Requirements**
  - ZTP as-a-Service: Using a USB Key
  - ZTP as-a-Service: Using a Bootstrap Script
  - ZTP as-a-Service: Using Embedded Token

1.10 Onboarding Devices: Token-Based Authentication

To onboard a device without going through ZTP as-a-Service, users can use the token-based authentication mechanism. Please follow the below steps to get devices onboarded using the token-based authentication mechanism.

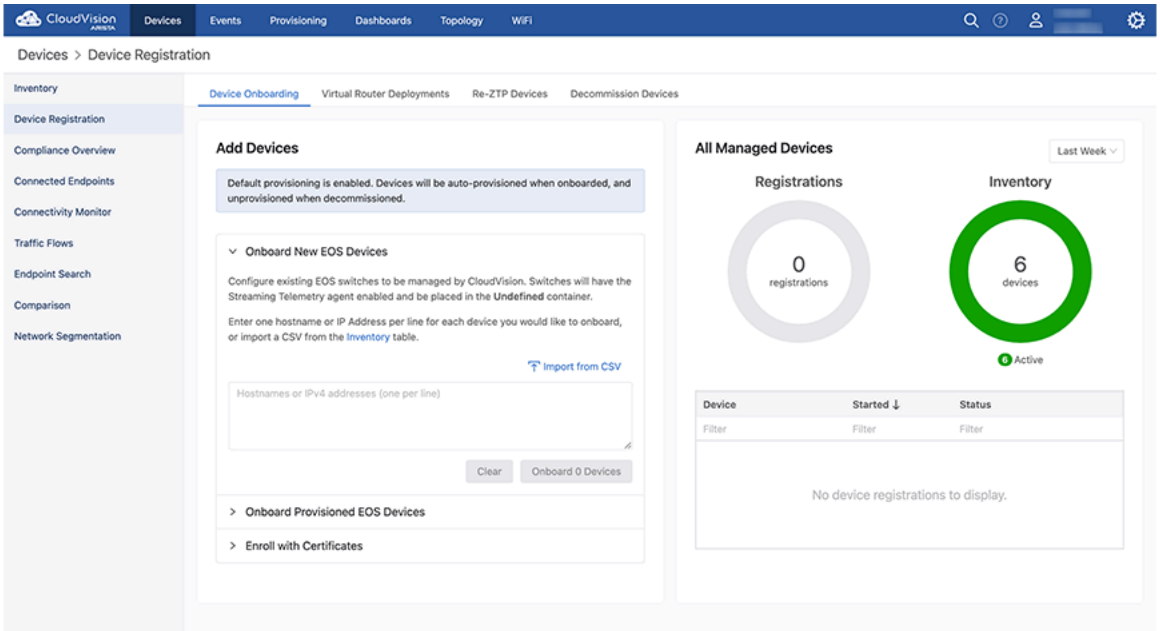
Onboarding Devices: Token-Based Authentication requires the following steps

1. Onboard devices
2. Create and use token for onboarding
3. Provision devices

Step 1: Onboard devices

To onboard the devices, navigate to: **Devices** > **Inventory** > **Onboard Devices**

Figure -7: Onboard Devices



Add Devices

Default provisioning is enabled. Devices will be auto-provisioned when onboarded, and unprovisioned when decommissioned.

Onboard New EOS Devices

Configure existing EOS switches to be managed by CloudVision. Switches will have the Streaming Telemetry agent enabled and be placed in the **Undefined** container.

Enter one hostname or IP Address per line for each device you would like to onboard, or import a CSV from the Inventory table.

Hostnames or IPv4 addresses (one per line)

All Managed Devices

Device	Started ↓	Status
Filter	Filter	Filter

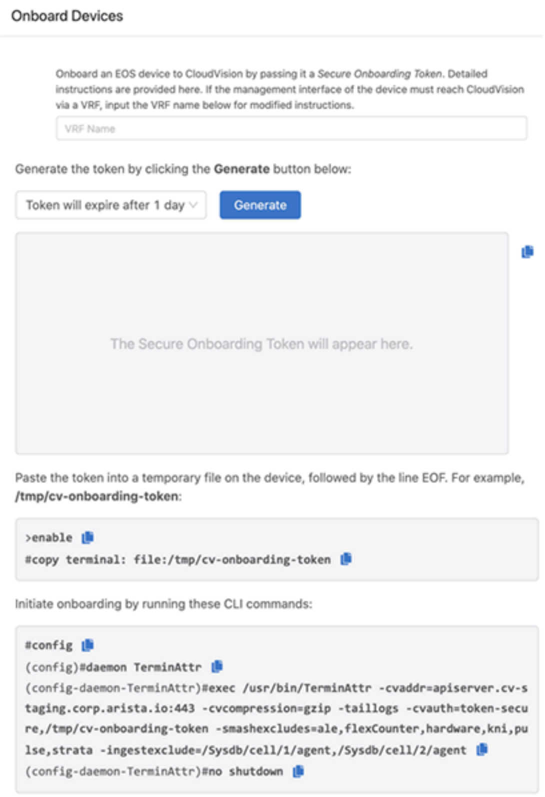
No device registrations to display.

Step 2: Create and use token for onboarding

Details on how to create a token, and using that token to onboard the devices are listed under **Onboard Devices**. Please follow the directions to create a token and get your devices onboarded to CloudVision Service.

Note: The same token can be used to onboard multiple devices. CloudVision Service will use the device serial number to correctly identify the device.

Figure -8: Generate a Token



Onboard Devices

Onboard an EOS device to CloudVision by passing it a *Secure Onboarding Token*. Detailed instructions are provided here. If the management interface of the device must reach CloudVision via a VRF, input the VRF name below for modified instructions.

VRF Name

Generate the token by clicking the **Generate** button below:

Token will expire after 1 day

The Secure Onboarding Token will appear here.

Paste the token into a temporary file on the device, followed by the line EOF. For example, **/tmp/cv-onboarding-token**:

```
>enable
#copy terminal: file:/tmp/cv-onboarding-token
```

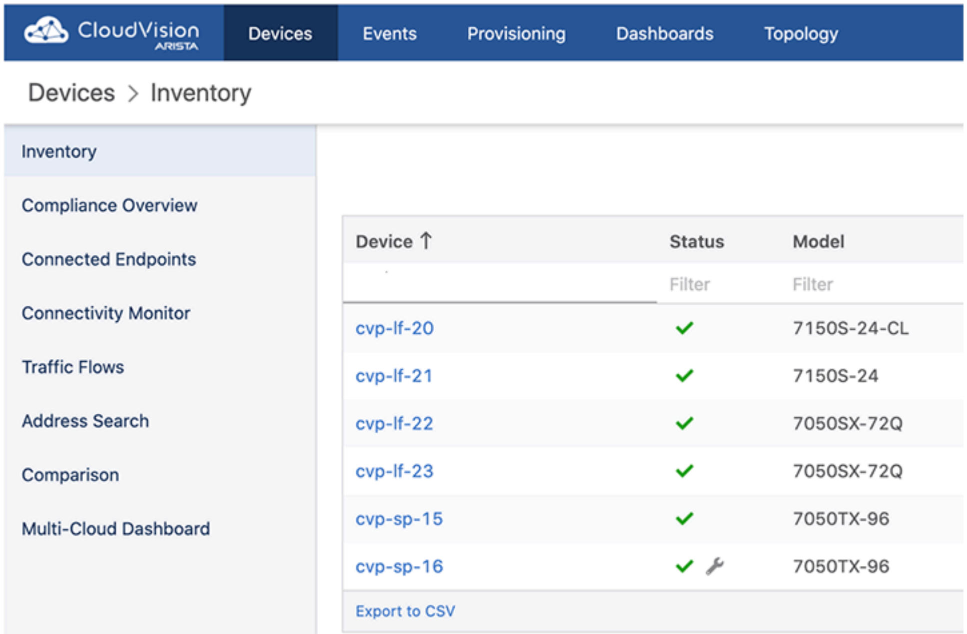
Initiate onboarding by running these CLI commands:

```
#config
(config)#daemon TerminAttr
(config-daemon-TerminAttr)#exec /usr/bin/TerminAttr -cvaddr=apiserver.cv-s
taging.corp.arista.io:443 -cvcompression=gzip -taillogs -cvauth=token-secu
re,/tmp/cv-onboarding-token -smashexcludes=ale,flexCounter,hardware,kni,pu
lse,strata -ingestexclude=/Sysdb/cell/1/agent,/Sysdb/cell/2/agent
(config-daemon-TerminAttr)#no shutdown
```

Step 3: Provision devices

After successfully onboard the devices, they should appear under the **Devices** tab.

Figure -9: Devices - Inventory



Device ↑	Status	Model
	Filter	Filter
cvp-lf-20	✓	7150S-24-CL
cvp-lf-21	✓	7150S-24
cvp-lf-22	✓	7050SX-72Q
cvp-lf-23	✓	7050SX-72Q
cvp-sp-15	✓	7050TX-96
cvp-sp-16	✓ 🔧	7050TX-96

Click on the wrench icon (#) to provision the device. This will take you to the device-specific page. Click on the **Device Overview** tab and then click on the **Provision Device** button to provision the device in CloudVision Service.

Note: Prior to clicking **Provision Device**, make sure the user account exists in the EOS device.

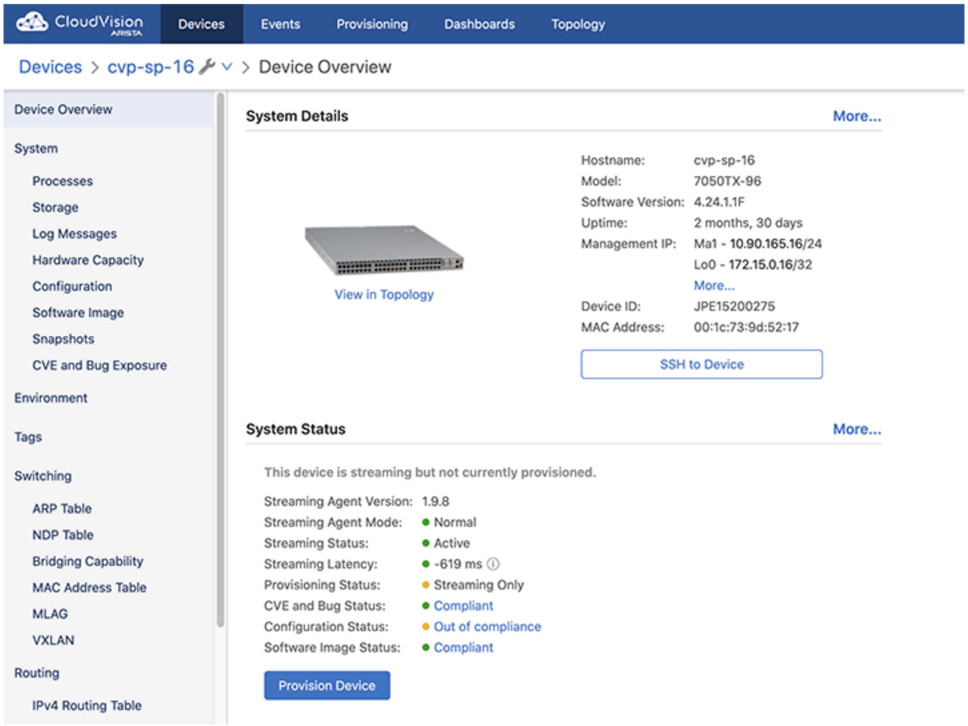
For example: Assuming *john.smith@company.com* is the email address used to login to CloudVision as-a-Service you need to have *john.smith* as a user configured in the device (or in TACACS+ server):

```
sw(config)#username john.smith privilege 15 <nopassword/secret>
```

If you have TACACS+ configured for authentication, in order for CloudVision as-a-Service to properly provision the device, the exact user account should already exist in the TACACS+ Server.

If you have a Radius server for EOS authentication, you need to add the `--disableaaa` argument into the TerminaAttr config.

Figure -10: Device Overview



System Details

Hostname: cvp-sp-16
Model: 7050TX-96
Software Version: 4.24.1.1F
Uptime: 2 months, 30 days
Management IP: Ma1 - 10.90.165.16/24
Lo0 - 172.15.0.16/32
More...
Device ID: JPE15200275
MAC Address: 00:1c:73:9d:52:17

System Status

This device is streaming but not currently provisioned.

Streaming Agent Version: 1.9.8
Streaming Agent Mode: ● Normal
Streaming Status: ● Active
Streaming Latency: ● -619 ms ⓘ
Provisioning Status: ● Streaming Only
CVE and Bug Status: ● Compliant
Configuration Status: ● Out of compliance
Software Image Status: ● Compliant

1.11 Onboarding Devices: ZTP as-a-Service Requirements

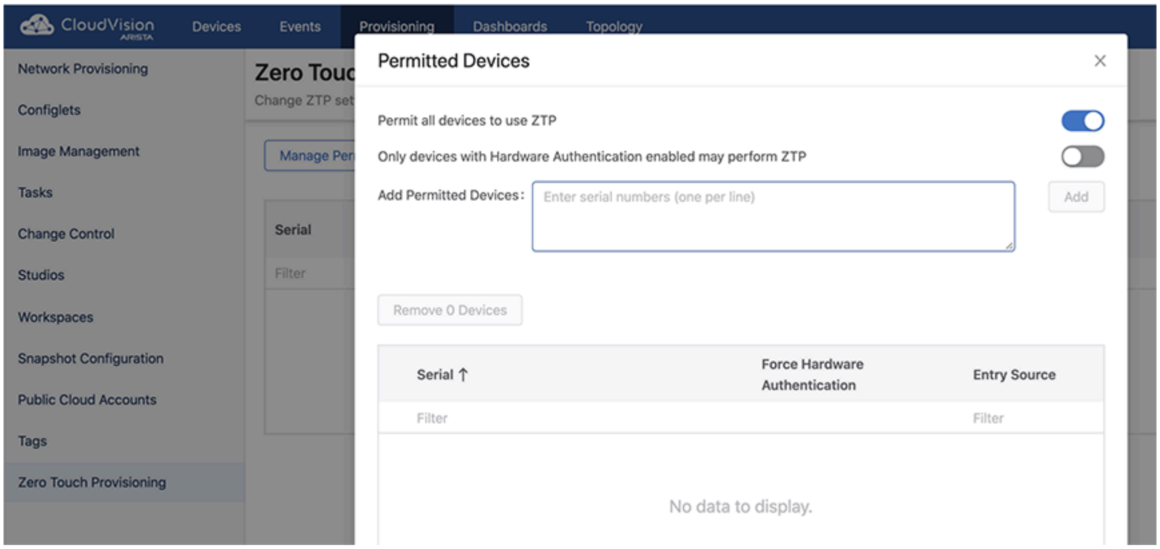
Arista’s Zero Touch Provisioning is used to configure a switch without user intervention. Built to fully leverage the power of Arista’s Extensible Operating System (EOS), ZTP as-a-Service provides a flexible solution to onboard EOS devices into CloudVision as-a-Service.

Requirements:

- DHCP Server: EOS device should be able to reach arista.io by obtaining valid IP settings from a DHCP server
- EOS Version: The device should be running **EOS version 4.25.5 or 4.26.1** or newer.

- Permit ZTP in CloudVision as-a-Service Cluster: ZTP as-a-Service should be enabled in the CVaaS cluster via: **Provisioning > Zero Touch Provisioning > Manage Permitted Devices**

Figure -11: Zero Touch Provisioning: Manage Permitted Devices



Permitted Devices ×

Permit all devices to use ZTP ●

Only devices with Hardware Authentication enabled may perform ZTP ○

Add Permitted Devices: Enter serial numbers (one per line) Add

Remove 0 Devices

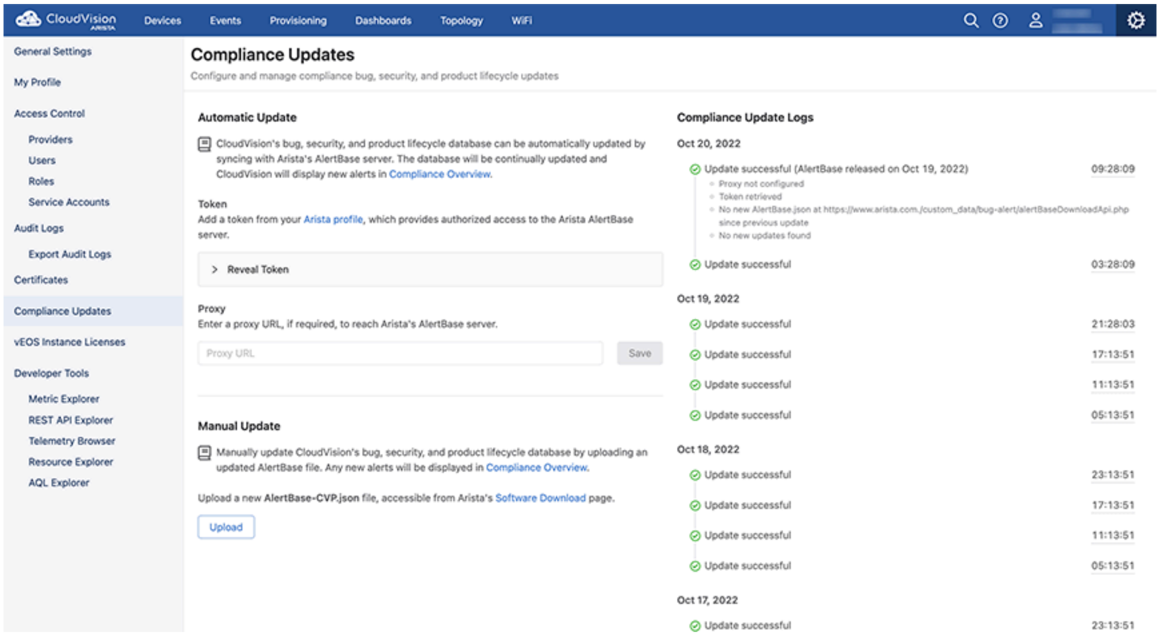
Serial ↑	Force Hardware Authentication	Entry Source
Filter		Filter

No data to display.

> **Note:** ZTP can be enabled globally for all devices or it can be managed per-device level using Serial Numbers.

- Add a compliance token required for ZTP:

  Figure -12: Compliance Screen



[redacted]

Compliance Updates

Configure and manage compliance bug, security, and product lifecycle updates

Automatic Update

CloudVision's bug, security, and product lifecycle database can be automatically updated by syncing with Arista's AlertBase server. The database will be continually updated and CloudVision will display new alerts in Compliance Overview.

Token

Add a token from your Arista profile, which provides authorized access to the Arista AlertBase server.

> Reveal Token

Proxy

Enter a proxy URL, if required, to reach Arista's AlertBase server.

Proxy URL Save

Manual Update

Manually update CloudVision's bug, security, and product lifecycle database by uploading an updated AlertBase file. Any new alerts will be displayed in Compliance Overview.

Upload a new **AlertBase-CVP.json** file, accessible from Arista's Software Download page.

Upload

Compliance Update Logs

```
Oct 20, 2022
  Update successful (AlertBase released on Oct 19, 2022)                09:28:09
    ◦ Proxy not configured
    ◦ Token retrieved
    ◦ No new AlertBase.json at https://www.arista.com./custom_data/bug-alert/alertBaseDownloadApi.php
      since previous update
    ◦ No new updates found
  Update successful                                                     03:28:09
Oct 19, 2022
  Update successful                                                     21:28:03
  Update successful                                                     17:13:51
  Update successful                                                     11:13:51
  Update successful                                                     05:13:51
Oct 18, 2022
  Update successful                                                     23:13:51
  Update successful                                                     17:13:51
  Update successful                                                     11:13:51
  Update successful                                                     05:13:51
Oct 17, 2022
  Update successful                                                     23:13:51
```

  - Navigate to the **Settings -> Compliance** section.
  - Follow the link on the page to go to your **arista.com** dashboard and copy the token.
  - Paste the token on the CVaaS Compliance page and click **Save**.

ZTP as-a-Service Options:

- Using Embedded Token
- Using Bootstrap Script

- Using a USB Key

1.11.1 ZTP as-a-Service: Using Embedded Token

For newer EOS devices which have the embedded token support, ZTP as-a-Service can be performed by configuring the DHCP server to provide the bootstrap URL.

Note: EOS version should be 4.26.1 or newer.

Note: For devices that have the Embedded Token support please refer to the Platform-Specific Feature Set Guide (ZTP Platform support for CloudVision as-a-Service).

You can use following command to verify whether the device has the Embedded token support:

```
Leaf-1A#show hardware eeprom
<truncated>
ZtpToken: xxxx
```

According to your specific CVaaS region please use the following regional CVaaS URLs in the DHCP server bootfile-name option (Option-67).

Note: For platforms with EOS 4.30.0F or newer EOS will automatically reach out to *arista.io* to enroll itself using the ZTPaaS Embedded Token. No need to specify the following arista.io URL.

- United States 1a: https://www.arista.io/ztp/bootstrap
- United States 1c: https://www.cv-prod-us-central1-c.arista.io/ztp/bootstrap
- Japan: https://www.cv-prod-apnortheast-1.arista.io/ztp/bootstrap
- Germany: https://www.cv-prod-euwest-2.arista.io/ztp/bootstrap
- Australia: https://www.cv-prod-ausoutheast-1.arista.io/ztp/bootstrap
- Canada: https://www.cv-prod-na-northeast1-b.arista.io/ztp/bootstrap

Example:

```
subnet 10.10.1.1 netmask 255.255.255.0 {
    range 10.10.1.1 10.10.1.253;
    option domain-name "dev.aristanetworks.com";
    option routers 10.10.1.250;
    option domain-name-servers 10.10.1.5;
    option ntp-servers time.google.com;

   host leaf-1A {
        hardware ethernet fc:bd:67:aa:22:33;
        fixed-address 10.10.1.180;
        option host-name "leaf-1A";
        option bootfile-name "https://www.arista.io/ztp/bootstrap";
    }
```

Note: By default, a device will be mapped to the primary CVaaS tenant of the customer. For customers that have multiple CVaaS tenants, in order to update the device to tenant mapping for a device please create a support ticket.

1.11.2 ZTP as-a-Service: Using a Bootstrap Script

ZTP as-a-Service can be enabled via a custom bootstrap script and using a DHCP server option to point to that bootstrap script. This method is recommended over the following USB method and can be used when onboarding a large number of devices.

Please follow the below steps to enable ZTP as-a-Service using a Bootstrap Script.

Step-1: Log in to the CloudVision as-a-Service cluster and generate a token using **Devices > Onboard Devices > Generate**.

Step-2: Prepare a bootstrap script and host it on an HTTP server. A sample script can be obtained by through:https://github.com/aristanetworks/cloudvision-ztpaas-utils

Note: If you are using a Windows machine, please watch out for the unnecessary characters when downloading this file. To troubleshoot whether unwanted characters are presented in the downloaded bootstrap script file, login to the switch bash prompt and open the file using: `vi /tmp/zt-download` command.

Make sure to provide the updated token information and other information in the bootstrap script.

For example:

```
############## USER INPUT #############
cvAddr = "www.cv-staging.corp.arista.io"
enrollment_token = "eyJhbGciOiJSUzI1Nixxx..."
############## USER INPUT #############
```

Note: Please use the following regional CVaaS URLs for the cvAddr field depending on your specific CVaaS region:

- United States 1a: https://www.arista.io/ztp/bootstrap
- United States 1c: https://www.cv-prod-us-central1-c.arista.io/ztp/bootstrap
- Japan: https://www.cv-prod-apnortheast-1.arista.io/ztp/bootstrap
- Germany: https://www.cv-prod-euwest-2.arista.io/ztp/bootstrap
- Australia: https://www.cv-prod-ausoutheast-1.arista.io/ztp/bootstrap
- Canada: https://www.cv-prod-na-northeast1-b.arista.io/ztp/bootstrap

Note: If the device is behind a non-transparent proxy please use the following **cvproxy** option:

```
# Add proxy url if device is behind proxy server, leave it as an empty
string otherwise
cvproxy = ""
```

Note: You can start an HTTP server using python (***`python3 -m http.server 8000 &`***), and host the *bootstrap.py* file, and then point the DHCP server to download from this server location.

For detailed information about the process please refer to:

https://aristanetworks.force.com/AristaCommunity/s/article/A-Practical-Guide-to-Zero-Touch-Provisioning-ZTP-in-Cloud-Vision-as-a-Service-CVaaS

Step-3: Direct the DHCP server to point to the bootstrap script via option-67/bootfile-name option:

Note: Make sure the **ntp-servers** option is set in your DHCP configuration.

For example:

```
subnet 10.10.1.1 netmask 255.255.255.0 {
    range 10.10.1.1 10.10.1.253;
    option domain-name "dev.aristanetworks.com";
    option routers 10.10.1.250;
    option domain-name-servers 10.10.1.5;
    option ntp-servers time.google.com;

   host leaf-1A {
        hardware ethernet fc:bd:67:aa:22:33;
        fixed-address 10.10.1.180;
        option host-name "leaf-1A";
        option bootfile-name "http://10.10.1.10:8000/bootstrap.py";
    }
```

Step-4: Boot up the EOS device into ZTP provisioning mode.

At this point, the ZTP process should begin and the device should be displayed in **Provisioning > Zero Touch Provisioning**.

Step-5: Once properly registered the device should also show up in the ***Undefined Container*** on the Network Provisioning page. Move the device into a named container and apply appropriate configlets. After submitting the change control the device should reboot and complete the ZTP as-a-Service process.

Note: Same bootstrap script and token can be used to onboard multiple EOS devices. Make sure the token has not expired before proceeding.

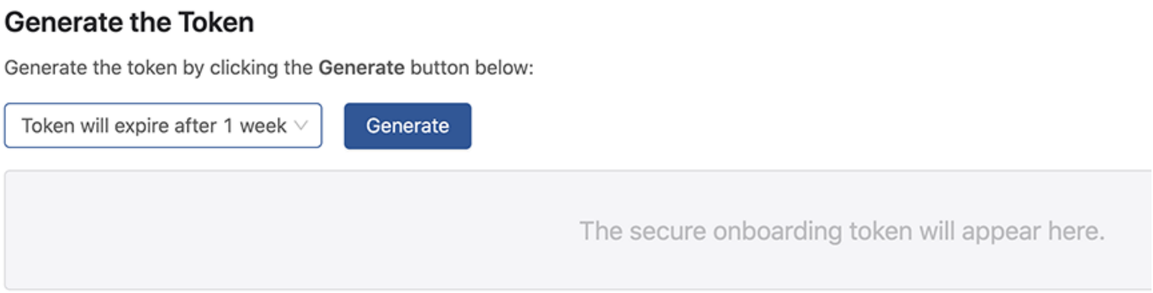
1.11.3 ZTP as-a-Service: Using a USB Key

A USB key can be used to provide the onboarding token and other information required for the ZTP process. Since the USB method can be cumbersome and needs to be used on one device at a time, it is recommended to use the Bootstrap Script methods for ZTP as-a-Service.

Please follow the below steps to enable ZTP as-a-Service using a USB Key.

Step 1: Log in to the CloudVision as-a-Service cluster and generate a token using **Devices > Onboard Devices > Generate.**

Figure -13: Onboard Devices: Generate the Token



Generate the Token

Generate the token by clicking the **Generate** button below:

Token will expire after 1 week
Generate
The secure onboarding token will appear here.

Note: The same token can be used to onboard multiple devices. No need to generate multiple tokens.

Step-2: Prepare a USB key.

- Create a directory called **ztp** inside the USB.
- Copy the token generated in step-1 into a file named **token.tok** in **ztp** directory.
- Create a file named **ztpConfig.yaml** (ztp/ztpConfig.yaml) and add the following content:

The configuration (***/mnt/usb1/ztp/ztpConfig.yaml***) should look like this:

```
bootstrapUrl: 'https://www.arista.io/ztp/bootstrap'
serverCaCertificate: ../../../etc/pki/tls/certs/ca-bundle.crt
enrollmentToken: token.tok
version: '1.0'
```

Note: Please use the following regional CVaaS URLs for the bootstrpUrl field depending on your specific CVaaS region:

- United States 1a: https://www.arista.io/ztp/bootstrap
- United States 1c: https://www.cv-prod-us-central1-c.arista.io/ztp/bootstrap
- Japan: https://www.cv-prod-apnortheast-1.arista.io/ztp/bootstrap

- Germany: https://www.cv-prod-euwest-2.arista.io/ztp/bootstrap
- Australia: https://www.cv-prod-ausoutheast-1.arista.io/ztp/bootstrap
- Canada: https://www.cv-prod-na-northeast1-b.arista.io/ztp/bootstrap

Step-3: Setup a DHCP server to serve routable IP settings (**Note:** Device should be able to reach ***apiserver.arista.io***).

Example configuarion for DHCPD:

```
subnet 10.10.10.128 netmask 255.255.255.128 {
    range 10.10.10.170 10.10.10.185;
    option domain-name "test.aristanetworks.com";
    option routers 10.10.10.129;
    option domain-name-servers 10.10.10.6;
    option ntp-servers time.google.com;

   host Switch-01 {
        hardware ethernet 94:8e:11:22:02:33;
        fixed-address 10.10.10.181;
        option host-name "Switch-01";
        option bootfile-name "tftp://none";
   }
}
```

Step-4: Plug in the USB to the EOS device and boot up into the ZTP provisioning mode. (The USB key will be mounted on the */mnt/usb1* directory).

Note: If the device is not in the ztp mode delete the following files and reboot: *rm /mnt/flash/startup-config & rm /mnt/flash/zerotouch-config*

At this point, the ZTP process should begin and the device should show up under the **Provisioning > Zero Touch Provisioning**.

Step-5: Once properly registered the device should also show up in the **Undefined Container** on the Network Provisioning page. Move the device into a named container and apply appropriate configlets. After submitting the change control the device should reboot and complete the ZTP as-a-Service process.

Note: Same USB key and token can be used to onboard multiple EOS devices. Make sure the token has not expired before proceeding.

1.11.4 Using Hardware Authentication with ZTP as-a-Service

During ZTP as-a-Service using both USB & Bootstrap Script methods, it is possible to enable an additional layer of authentication using the **Hardware Authentication** feature. EOS devices should have a Trusted Platform Module (TPM) chip onboard for Hardware Authentication to work. Hardware authentication can be enabled globally (for all the devices) or on a per-device basis.

To enable Hardware Authentication, navigate to the **Provisioning > Zero Touch Provisioning > Manage Permitted Devices**.

1.12 Connecting CloudVision Wifi Tenant

To connect your CloudVision Wifi tenant to CloudVision as a Service, to enable wifi visibility within CloudVision as-a-Service you must create a new key within the administrative section of the wifi portal.

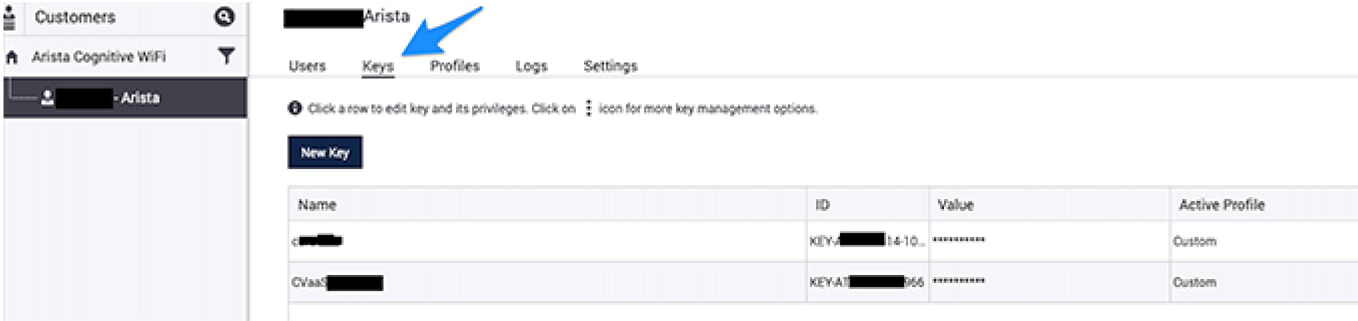
This enables viewing of the Wifi devices in Compliance view, Device view and Topology.

Provisioning and management of wifi devices must be done on the Wifi portal.

Instructions:

1. Go to your Launchpad portal, and navigate **Admin**, then click on **New Key**.

Figure -14: Launchpad Portal - New Key



Click a row to edit key and its privileges. Click on ⋮ icon for more key management options.

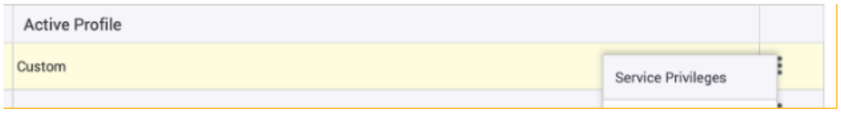
Name	ID	Value	Active Profile
c[redacted]	KEY-[redacted]14-10..	**********	Custom
CVaa[redacted]	KEY-A[redacted]966	**********	Custom

2. Create your key and save the Key ID and Value.

Note: If the newly created key **Active Profile** defaults to value **Custom** this must be updated to **Admin**.

3. Select **Service Privileges** in the drop down to the right of the active profile.

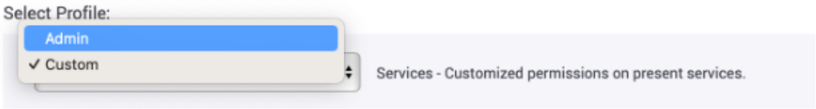
Figure -15: Service Privileges



Active Profile
Custom

4. Change the profile from **Custom** to **Admin** and save the new setting.

Figure -16: Change Profile



Select Profile:

Services - Customized permissions on present services.

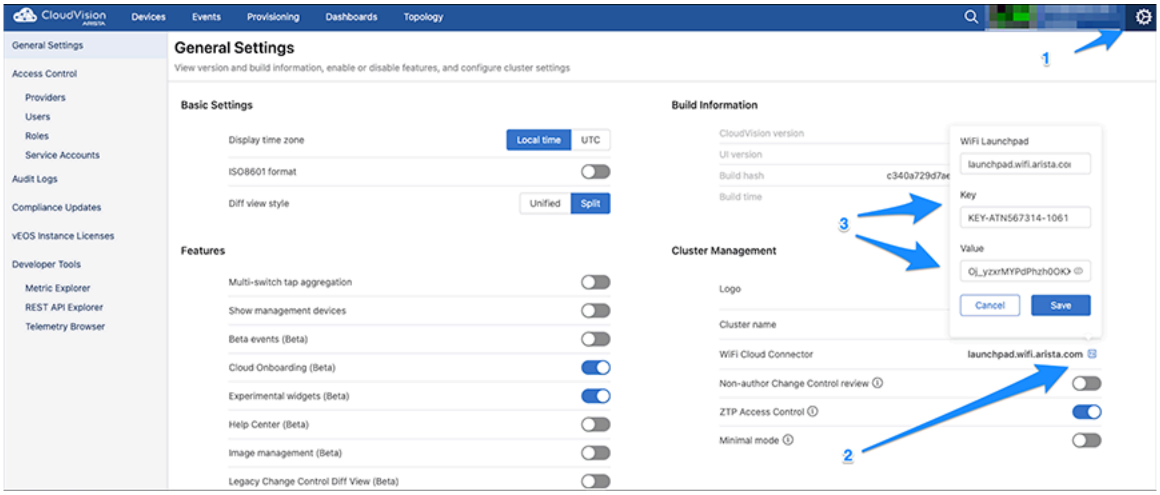
5. Go to CloudVision Service (Arista.io) and log in. Click the settings wheel on the upper right side of the screen. In **General settings**, you can add the Wifi Cloud Connector.

   a. Click the settings wheel upper right.
   b. Click the settings wheel upper right and select the **Wifi Cloud Connector** configuration button.
   c. Input the URL, Key ID, and Value.

      - **URL:** launchpad.wifi.arista.com (do not include https:// or trailing /)
      - **KeyID:** from Launchpad
      - **Key Value:** from Launchpad.

Note: Once the Key value has been saved in CloudVision, this field will show the encrypted value, if you need to add the key again, you must copy it from the LaunchPad portal.

Figure -17: Launch Pad - Settings



[redacted]

General Settings

View version and build information, enable or disable features, and configure cluster settings

Basic Settings

- Display time zone: Local time
- ISO8601 format: ○ off
- Diff view style: Split

Features

- Multi-switch tap aggregation: off
- Show management devices: off
- Beta events (Beta): off
- Cloud Onboarding (Beta): on
- Experimental widgets (Beta): on
- Help Center (Beta): off
- Image management (Beta): off
- Legacy Change Control Diff View (Beta): off

Build Information

- CloudVision version
- UI version
- Build hash: c340a729d7ae
- Build time

Cluster Management

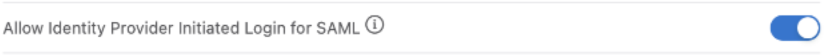
- Logo
- Cluster name
- WiFi Cloud Connector: launchpad.wifi.arista.com
- Non-author Change Control review: off
- ZTP Access Control: on
- Minimal mode: off

WiFi Launchpad: launchpad.wifi.arista.cor

Key: KEY-ATN567314-1061

Value: Oj_yzxrMYPdPhzh0OK›

Under Cluster Management, if **Allow Identity Provider Initiated Login for SAML** displays as an option, it must be toggled to enabled.



Allow Identity Provider Initiated Login for SAML ⓘ: on

1.13 Troubleshooting

1.13.1 Troubleshooting Connectivity Issues

Verify connectivity to CloudVision Service

Verify connectivity to CloudVision Service using the Ncat command:

```
HQ-DC-leaf1#bash
[admin@HQ-DC-leaf~]$ nc -zv apiserver.arista.io 443
Ncat: Version 7.50 ( https://nmap.org/ncat )
Ncat: Connected to 35.221.29.186:443.
Ncat: 0 bytes sent, 0 bytes received in 0.08 seconds.

[admin@HQ-DC-leaf~]$ nc -zv www.arista.io 443
```

If you have multiple VRFs configured, first change the VRF context:

```
[admin@HQ-DC-leaf~]$ sudo ip netns exec ns-MGMT
nc -zv apiserver.arista.io 443
```

Verify proper DNS resolution

```
HQ-DC-leaf1#bash nslookup apiserver.arista.io
```

Note: If this is unsuccessful please check your DNS server configuration. If no DNS servers present please add the *ip name-server* configuration as follows:

```
HQ-DC-leaf1(config)# ip name-server 8.8.8.8
```

1.13.2 Troubleshooting Device Onboarding Issues

TerminAttr Agent Version issues

One of the common causes for Device Onboarding issues is the Streaming Telemetry agent (aka: TerminAttr agent) version incompatibilities. Please verify the switch TerminAttr agent version is greater than or equal to the supported agent version for CloudVision Service.

Other issues

- TerminAttr agent log files might provide additional information to enhance the troubleshooting process. You can access the TerminAttr logs using following commands:

```
===== Output from /usr/bin/TerminAttr
['-cvaddr=apiserver.arista.io:443', '-cvcompression=gzip', '-cvvrf=MGMT',
'-taillogs', '-cvauth=token-secure,/tmp/cv-onboarding-token',
'-smashexcludes=ale,flexCounter,hardware,kni,pulse,strata',
'-ingestexclude=/Sysdb/cell/1/agent,/Sysdb/cell/2/agent'] (PID=2223)
started Mar 14 21:01:03.638345 ===
I0314 21:01:03.666579    2223 libmain.go:94] TerminAttr Version: v1.13.3
go1.15.8 386
```

- Additional commands to access the TerminAttr logs:

```
Switch-01#bash ls /var/log/agents/TerminAttr-*
/var/log/agents/TerminAttr-2223
Switch-01#bash cat /var/log/agents/TerminAttr-2223
```

1.13.3 Troubleshooting Streaming Telemetry Latency Issues

NTP Issues: If the switch clock is too far off the actual timing, this can lead in to streaming latency related problems. Verify NTP settings using `show ntp status`.

To configure NTP use the command: `switch(config)#ntp server <vrf> <vrf-name> time.google.com`

https://www.arista.com/en/um-eos/eos-system-clock-and-time-protocols

1.13.4 Troubleshooting ZTP as-a-Service Issues

Symptom:

Failing to download the startup-config from arista.io: Failed to download the startup-config from https://www.arista.io/ztp/bootstrap. `Error: HTTP response code said error`”:

Possible resolution:

Check whether the compliance token is added to the CVaaS account:

- Navigate to the **Settings -> Compliance** section.
- Follow the link on the page to go to your arista.com dashboard and copy the token.
- Paste the token on the CVaaS Compliance page and click **Save**.

Other common reasons for ZTP as-a-Service issues:

- **EOS version related issues:** EOS version should be 4.26.1 or newer for ZTPaaS
- **NTP issues:** Make sure your DHCP server has the NTP option set in the configuration (eg: `option ntp-servers time.google.com`)
- **Unnecessary character issues with Windows machines:** If you are using a Windows machine, please watch out for the unnecessary characters when downloading this file. To troubleshoot whether unwanted characters are presented in the downloaded bootstrap script file, login to the switch bash prompt and open the file using the: `vi / tmp/zt-download` command.

1.13.5 Troubleshooting Switch Provisioning and Configuration Issues

If the **Provision Device** is failing, or if any configuration or change control actions are failing, please make sure the current user's user account that is used to login to the CloudVision as-a-Service exists in the EOS device.

For example: Assuming *john.smith@company.com* is the email address used to login to CloudVision as-a-Service you need to have *john.smith* as a user configured in the device (or in TACACS+ server): `sw(config)#username john.smith privilege 15 <nopassword/secret>`

If you have TACACS+ configured for authentication, in order for CloudVision Service to properly provision the device, the exact user account should already exist in the TACACS+ Server.

If you have a Radius server for EOS authentication, you need to add the `--disableaaa` argument into the TerminaAttr config.

Following sample switch configuration shows how to configure commonly used CloudVision features such as **sflow/aaa-authentication**. Please refer to the EOS user manual (https://www.arista.com/en/um-eos/eos-overview) for more information.

```
!
daemon TerminAttr
 exec /usr/bin/TerminAttr -cvaddr=apiserver.arista.io:443
-cvcompression=gzip -cvvrf=MGMT <truncated>
   no shutdown
!
hostname Leaf-7050SX3-211
ip name-server!
ntp server vrf MGMT time.google.com
!
aaa authorization exec default local
!
username admin privilege 15 role network-admin secret <>
username john.smith privilege 15 role network-admin secret <>
!
vrf instance MGMT
!interface Management1
   vrf MGMT
   ip address 10.240.129.211/25
!
ip route vrf MGMT 0.0.0.0/0 10.240.129.129
!
!
sflow sample 65536
sflow polling-interval 120
sflow destination 127.0.0.1
sflow source-interface Loopback0
sflow run
!
interface Loopback0
!
interface Management1
   vrf MGMT
   ip address 10.240.129.211/25
```

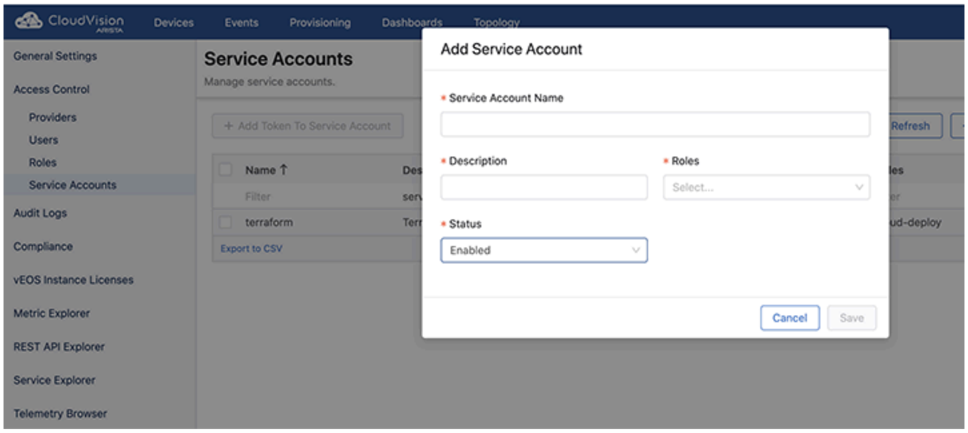
```
!
```

1.14 Automation with CloudVision as-a-Service

Generating a Service Account Token

In order to access the CloudVision as-a-Service and send API requests **Service Account Token** is needed. Navigate to the **Settings** -> **Access Control** -> **Service Accounts** to add a Service Account.

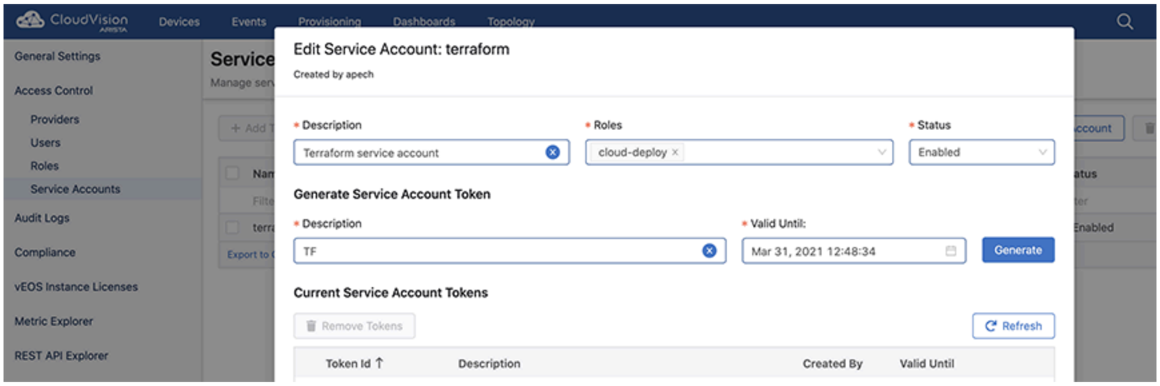
Figure -18: Add Service Account



Status: Enabled

Use the **Generate Service Account Token** section to create a new token by providing a description and an expiration date. This token can be used to send API calls to the CloudVision Service instance.

Figure -19: Edit Service Account Token



Description: Terraform service account

Roles: cloud-deploy

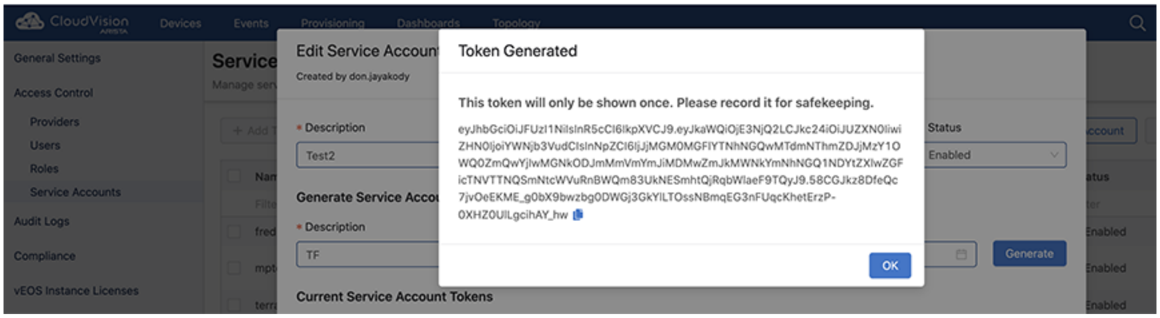
Status: Enabled

Description: TF

Valid Until: Mar 31, 2021 12:48:34

Note: The token will only be shown once. Make sure to copy this to a local file. During automation this token file will be used to send API calls to the CloudVision Service.

Figure -20: Token Generated



Edit Service Account

Created by don.jayakody

* Description: Test2

Generate Service Account

* Description: TF

Current Service Account Tokens

Token Generated

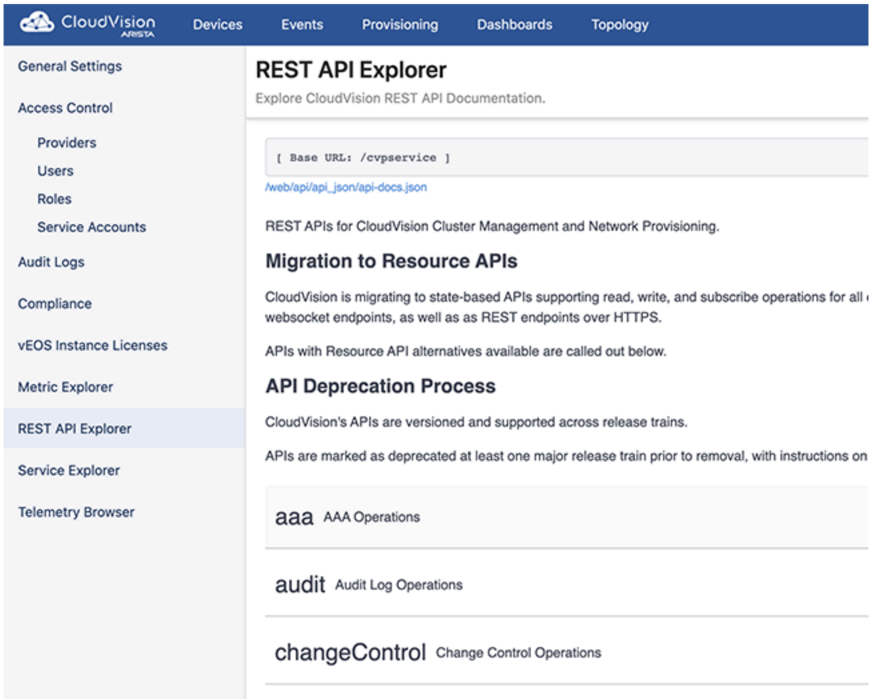
This token will only be shown once. Please record it for safekeeping.

```
eyJhbGciOiJFUzI1NiIsInR5cCI6IkpXVCJ9.eyJkaWQiOjE3NjQ2LCJkc24iOiJUZXN0Iiwi
ZHN0IjoiYWNjb3VudCIsInNpZCI6IjJjMGM0MGFlYTNhNGQwMTdmNThmZDJjMzY1O
WQ0ZmQwYjlwMGNkODJmMmVmYmJiMDMwZmJkMWNkYmNhNGQ1NDYtZXlwZGF
icTNVTTNQSmNtcWVuRnBWQm83UkNESmhtQjRqbWlaeF9TQyJ9.58CGJkz8DfeQc
7jvOeEKME_g0bX9bwzbg0DWGj3GkYlLTOssNBmqEG3nFUqcKhetErzP-
0XHZ0UlLgcihAY_hw
```

Accessing CloudVision Service REST API

CloudVision Service REST API swagger-ui cab be accessed by navigating to: **Settings** -> **REST API Explorer**.

Figure -21: REST API Explorer



REST API Explorer

Explore CloudVision REST API Documentation.

[Base URL: /cvpservice]

/web/api/api_json/api-docs.json

REST APIs for CloudVision Cluster Management and Network Provisioning.

Migration to Resource APIs

CloudVision is migrating to state-based APIs supporting read, write, and subscribe operations for all
websocket endpoints, as well as as REST endpoints over HTTPS.

APIs with Resource API alternatives available are called out below.

API Deprecation Process

CloudVision's APIs are versioned and supported across release trains.

APIs are marked as deprecated at least one major release train prior to removal, with instructions on

aaa AAA Operations

audit Audit Log Operations

changeControl Change Control Operations

Sending API Calls

According to your specific CVaaS region, please use the following regional CVaaS URLs to send API calls:

- United States 1a: https://www.arista.io/ztp/bootstrap
- United States 1c: https://www.cv-prod-us-central1-c.arista.io/ztp/bootstrap
- Japan: https://www.cv-prod-apnortheast-1.arista.io/ztp/bootstrap
- Germany: https://www.cv-prod-euwest-2.arista.io/ztp/bootstrap
- Australia: https://www.cv-prod-ausoutheast-1.arista.io/ztp/bootstrap
- Canada: https://www.cv-prod-na-northeast1-b.arista.io/ztp/bootstrap

Using Curl

Service account token can be used to login to the CloudVision Service and query the REST APIs using Curl commands:

Note: For this example create a file called *token* and copy and paste the service account token in there.

```
bash-3.2$ curl -X GET --header 'Accept: application/json'
'https://www.cv-staging.corp.arista.io/cvpservice/configlet/getConfigletByNam
e.do?name=CloudTracer'
-b access_token=`cat token`
{"key":"configlet_843806b0-a015-491b-af2b-12486a38d05f","name":"CloudTracer"}
```

Using Python

Python based CVPRAC module (https://github.com/aristanetworks/cvprac) provides a REST API client for Cloudvision. Install CVPRAC using **pip** or directly from the source as described in the Installation section. To send API calls to the CloudVision Service using CVPRAC module set the **is_cvaas** option to **True** as follows.

Note: Token is needed to send API calls to the CloudVision Service. Obtain a token using a Service Account as shown in the previous section.

```
>>> from cvprac.cvp_client import CvpClient;
>>> clnt = CvpClient()
>>> clnt.connect(nodes=['www.arista.io'], username='',
 password='', is_cvaas=True,
cvaas_token='eyJhbGciOi<truncated>')

>>> print(clnt.api.get_configlet_by_name('CloudTracer')){'key':
 'configlet_843806b0-a015-491b-af2b-12486a38d05f', 'name': 'CloudTracer',
 'reconciled': False, 'config': 'monitor connectivity\n host aws-us-east-1\n
ip 52.216.227.10\n, <truncated> 'typeStudioConfiglet': False}
```

Using Ansible

Starting with the release 2.1.1 Ansible CVP supports CloudVision as-a-Service.

CloudVision Ansible bundle can be downloaded from here: https://github.com/aristanetworks/ansible-cvp. To authenticate with a CloudVision as-a-Service instance update the authentication steps as follows:

```
# Default Ansible variables for authentication
ansible_host: < IP address or hostname to target >
ansible_user: cvaas # Shall not be changed. ansible will switch to cvaas mode
ansible_ssh_pass: < User token to use to connect to CVP instance >
ansible_connection: httpapi
ansible_network_os: eos
```

For additional details please refer to: https://github.com/aristanetworks/ansible-cvp/pull/235

1.15 CloudVision as-a-Service Support

If you require any assistance during the onboarding process please reach out to cvaas-onboarding@arista.com. For other support related questions please contact support@arista.com.