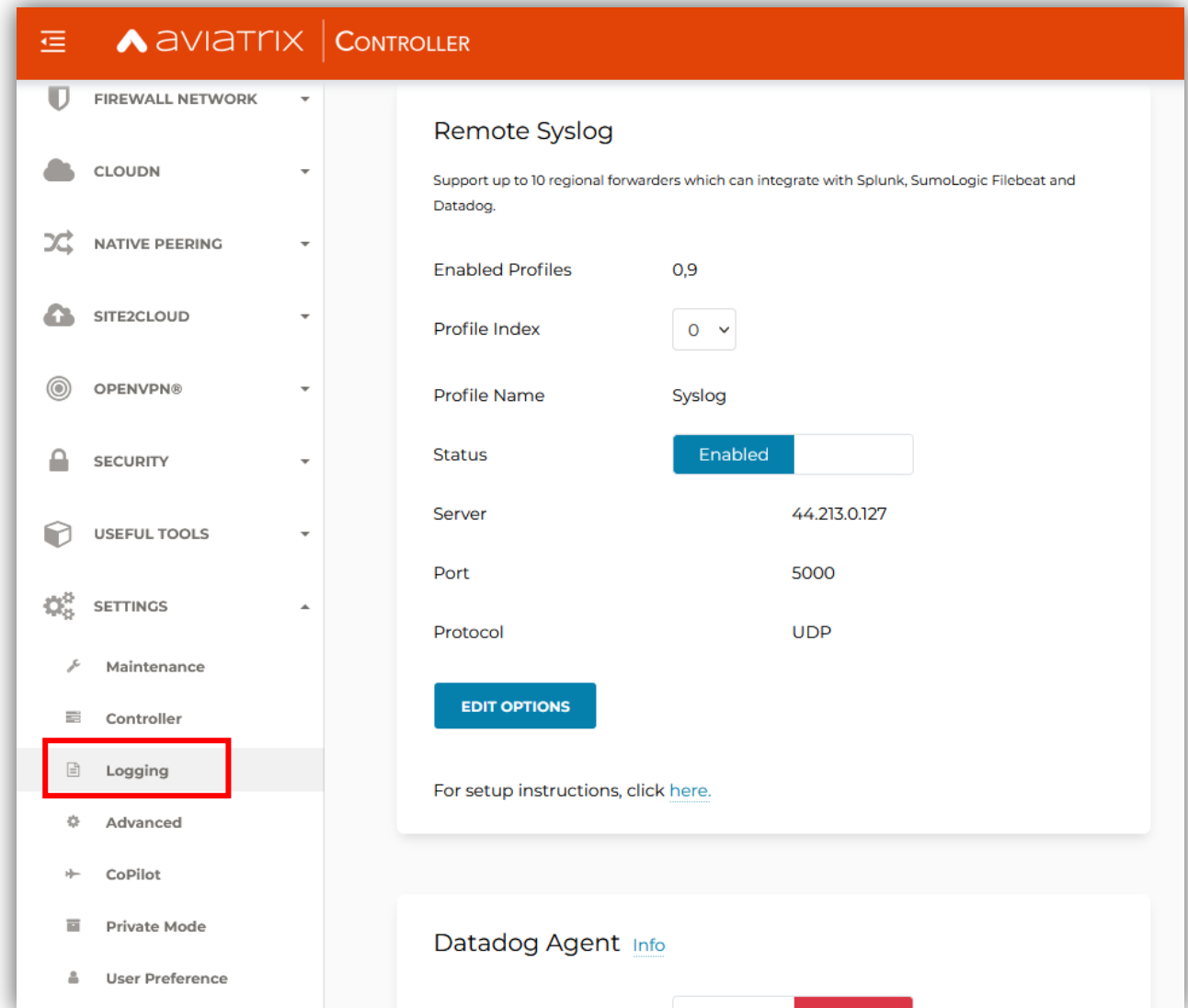




Operational Best Practices

CoPilot Syslog Setup (FQDN and Audit data)

- Make sure Logging is enabled on Controller > SETTINGS > Logging > Remote Syslog
 - ❑ Syslog can be exported to up to 9 different servers via Profiles
 - ❑ Make sure to use Profile Index 9 for CoPilot
 - ❑ Edit Options to select a subset of gateways to export
- Make sure, on CSP portal, following port is open on CoPilot instance:
 - ❑ **UDP 5000** (Syslog) – all Gateways



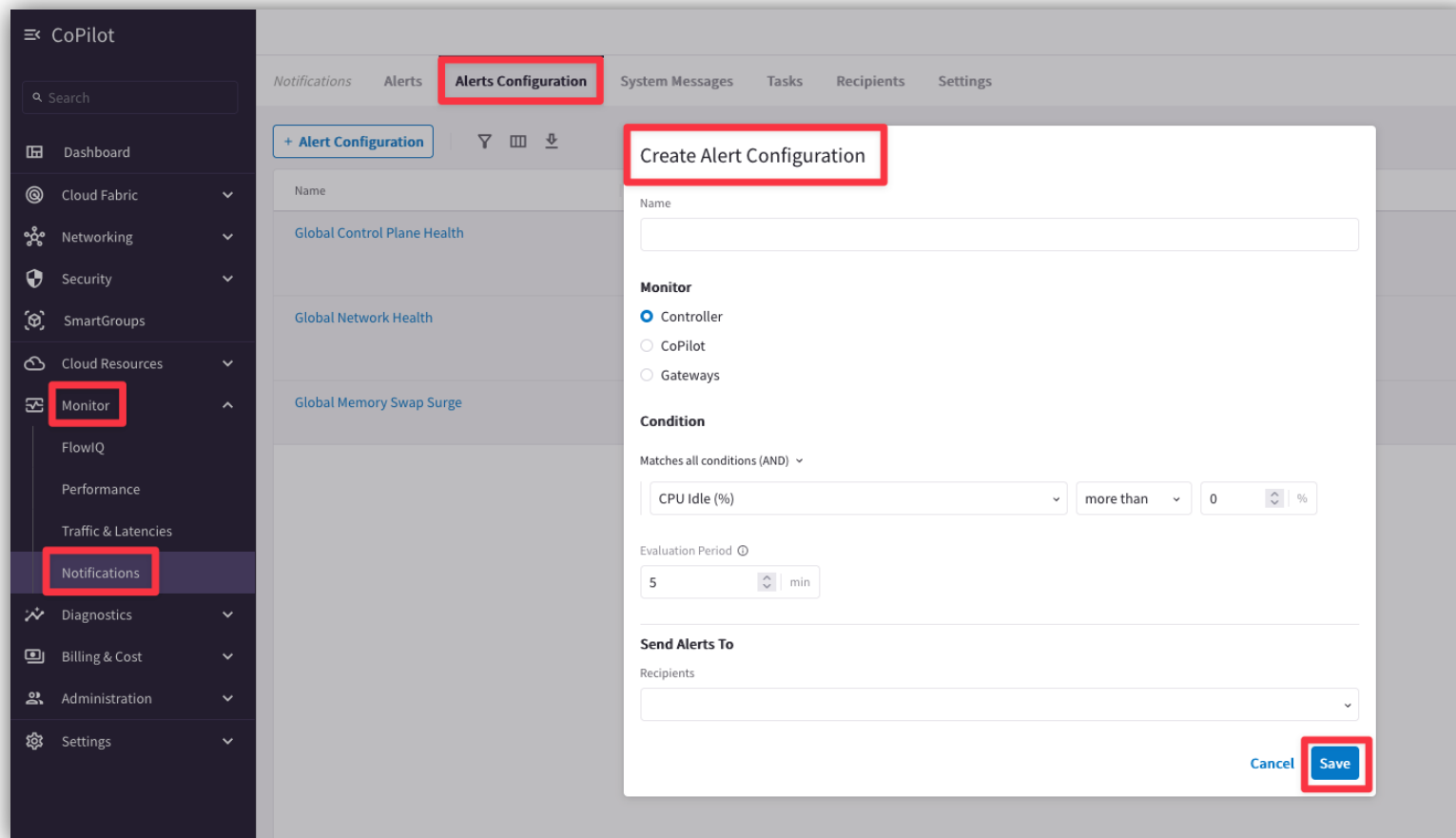
CoPilot NetFlow Setup (for FlowIQ and ThreatIQ data)

- Make sure NetFlow is enabled on Controller > SETTINGS > Logging > Netflow Agent
 - ❑ If port is changed from default of 31283, it needs to match on CoPilot
 - ❑ Edit Options to select a subset of gateways to export
- Make sure, on CSP portal, following ports are open on CoPilot instance:
 - ❑ UDP 31283 (NetFlow) – all Gateways
 - ❑ TCP 443 (HTTPS) – all clients

The screenshot displays the Aviatrix Controller web interface. On the left, a navigation sidebar lists various sections: FIREWALL NETWORK, CLOUDN, NATIVE PEERING, SITE2CLOUD, OPENVPN®, SECURITY, USEFUL TOOLS, SETTINGS, Maintenance, Controller, Logging (highlighted with a red box), Advanced, CoPilot, and Private Mode. The main content area shows the 'Datadog Agent' status as 'Disabled' and the 'Netflow Agent' status as 'Enabled'. The 'Netflow Agent' section includes fields for 'Netflow Server IP' (a blue box), 'Port' (31283), and 'Version' (9). An 'EDIT OPTIONS' button is visible below these fields. At the bottom of the Netflow Agent section, a link states 'For setup instructions, click [here](#).'

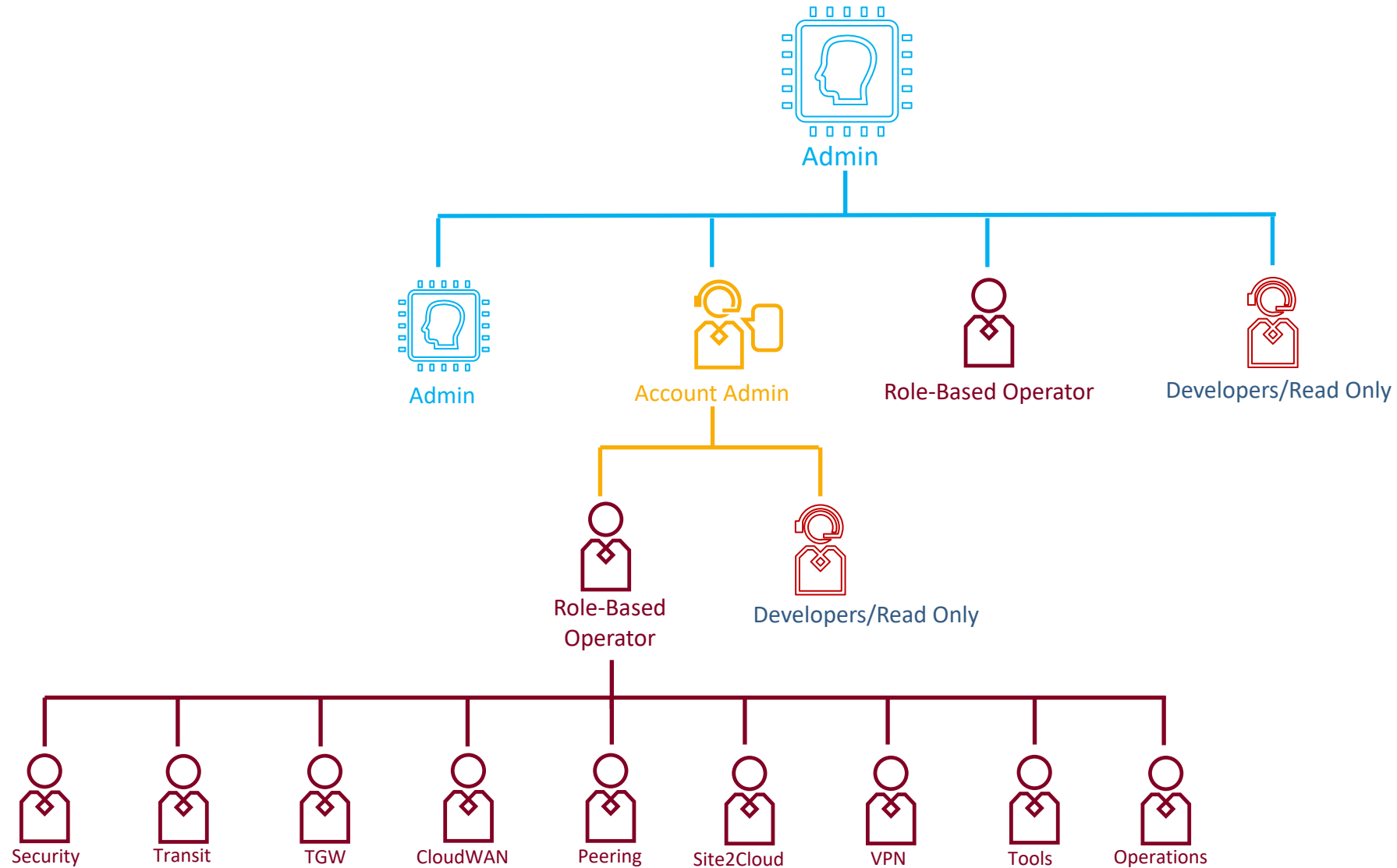
CoPilot Alerts Configuration

1. Webhooks Integrations work with any 3rd party integration (Slack, PagerDuty, ServiceNow, etc.)
2. Add webhook endpoints (can send payload as JSON or text)
3. Provide custom tags in the payload to classify triggered events and further integrate into your systems
4. Get alerted via webhook and email for the same alert



Role-Based Access Control (RBAC)

RBAC: Role-Based Access Control



Authentication Phase

- Users can be authenticated:
 - **Locally** on the Aviatrix Controller
 - Onboard Users (Admin, Operators, Developers, Read-Only)
 - Allowed to reset their password
 - Using **SAML IDP**
 - Onboard Users (Admin, Operators, Developers, Read-Only)
 - Other functionality depends on IDP

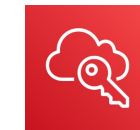


onelogin

okta



G Suite



AWS SSO



User Access- CoPilot

The screenshot displays the AviaTrix CoPilot User Access interface. On the left is a dark sidebar with navigation options: CoPilot, Search, Dashboard, Cloud Fabric, Networking, Security, SmartGroups, Cloud Resources, Monitor, Diagnostics, Billing & Cost, Administration (highlighted with a red box), User Access (highlighted with a red box), Reports, Audit, and Settings. The main content area has tabs for User Access, Users (highlighted with a red box), Permission Group, and Access Management. Below the Users tab is a '+ User' button (highlighted with a red box) and icons for filters, table view, and download. A table lists existing users:

Name	Email	Permission Groups
admin	ace.lab@aviatrix.com	admin
copilot_service_account	ace.lab@aviatrix.com	copilot_permission
student	ace.lab@aviatrix.com	admin

An 'Add User' modal is open in the foreground, containing the following fields:

- Username:
- Email:
- Password: (with an eye icon for visibility toggle)
- Confirm Password: (with an eye icon for visibility toggle)
- Permission Groups: (dropdown menu)

At the bottom of the modal are 'Cancel' and 'Save' buttons.

Permission Sets – CoPilot/Controller

Create Permission Group

Name

Users

Access Accounts

CoPilot Visibility Controller Permissions

Select All Views Clear All Views Search and Select

- ✓ AirSpace
- ✓ Networking
- ✓ Security
- ✓ SmartGroups
- ✓ Cloud Resources
- ✓ Monitor

Cancel Save

- ✓ AirSpace
- ✓ Networking
- ✓ Security
- ✓ SmartGroups
- ✓ Cloud Resources
- ✓ Monitor
- ✓ Troubleshoot
- ✓ Billing & Cost
- ✓ Administration
- ✓ Settings

RBAC Example – Okta

 **RBAC User : saad-developer@aviatrix.com**

 **RBAC User : saad@aviatrix.com**

 **RBAC User : saad_A-B@aviatrix.com**

 **RBAC User : saad-security@aviatrix.com**

read_only

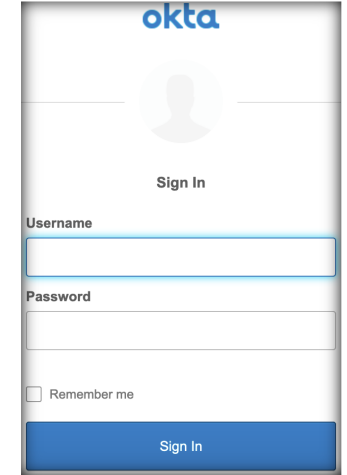
Super-Users

Account-Admin

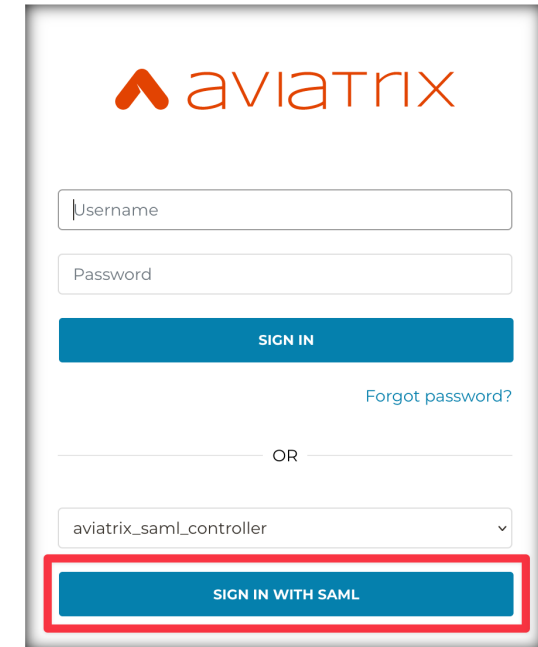
Account Admins (A&B)

Account Admins (C&D)

Security-Users

Okta Sign In form showing Username, Password, Remember me checkbox, and Sign In button.



AviaTrix Sign In form showing Username, Password, SIGN IN button, Forgot password? link, OR separator, and a dropdown menu with 'aviatrix_saml_controller' selected. The 'SIGN IN WITH SAML' button is highlighted with a red box.



Admin/Super-Users
Saad



Account Admins
Saad-A&B



Security-Users
Saad-Security



Developers/Read Only
Saad-Developer

RBAC-User

Permissions

saad-developer

Read Only

saad

Super User (Admin)

saad_A-B

Account Admin for Accounts A&B Only

saad-security

Security User





Aviatrix Controller High Availability (HA)

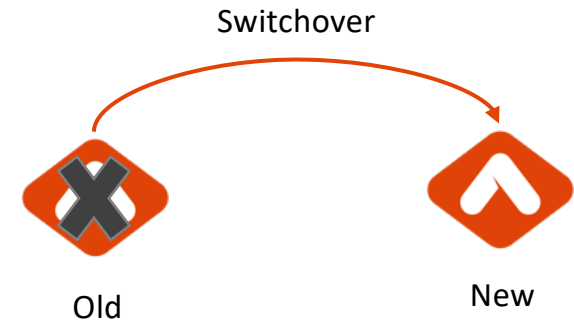
Aviatrix Controller High Availability (HA)

- Very important: Controller is not in the data path
- If Controller is down → Data Plane still functions
- Your cloud network is still up and running
- Do not compare on-prem to cloud
 - Hardware devices cannot be replaced / software is more flexible
 - Cloud operating models are different
 - Cloud processes are different
 - We need a fresh and different look to solve



Aviatrix Controller HA Process

- Takes minutes to switch over to new controller
 - Depends on factors such as AWS latency, instance type, size of the DB, etc.
- Previous controller is terminated
- All existing configuration is restored
- New Private IP is assigned (new AZ)
- New controller stays at the same version as previous

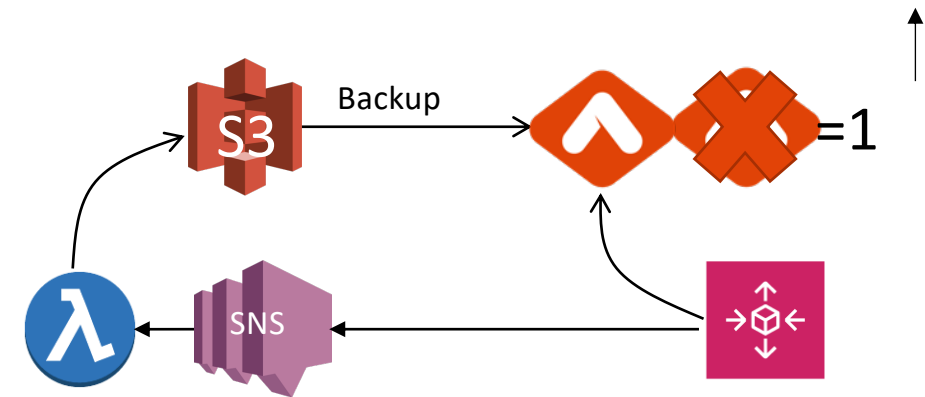


https://docs.aviatrix.com/HowTos/controller_ha.html

<https://github.com/AviatrixSystems/Controller-HA-for-AWS/>

Aviatrix Controller HA Process

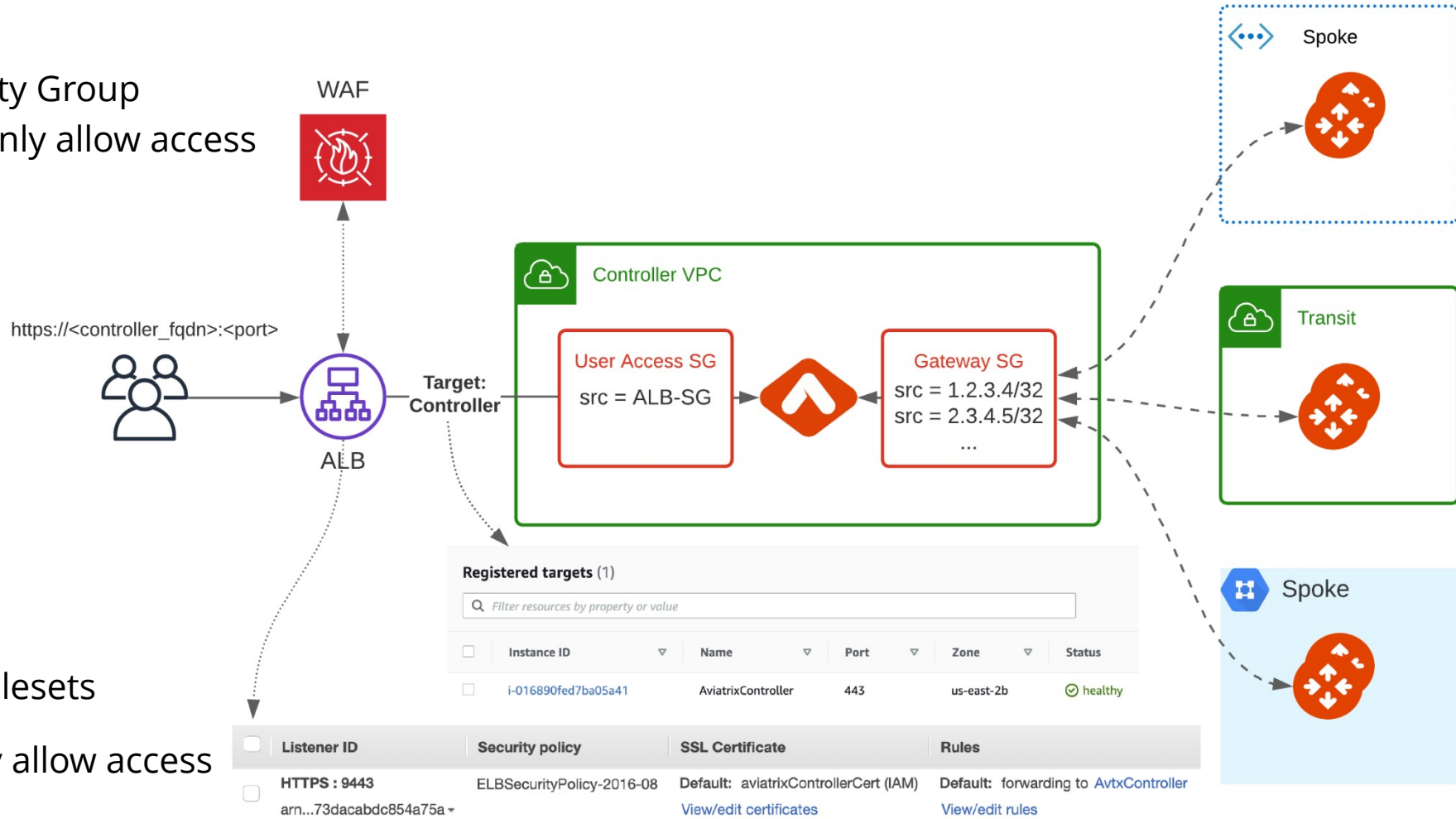
- Aviatrix Controller HA operates by relying on an AWS Auto Scaling Group
- The Auto Scaling Group has a desired capacity of 1
- If the Controller EC2 instance is stopped or terminated, it will be automatically re-deployed by the Auto Scaling Group
- An AWS Lambda script is notified via SNS when new instances are launched by the Auto Scaling Group
- This script handles configuration restore using the most recent Controller backup file, stored in S3



Securing Aviatrix Controller with Application Load Balancer

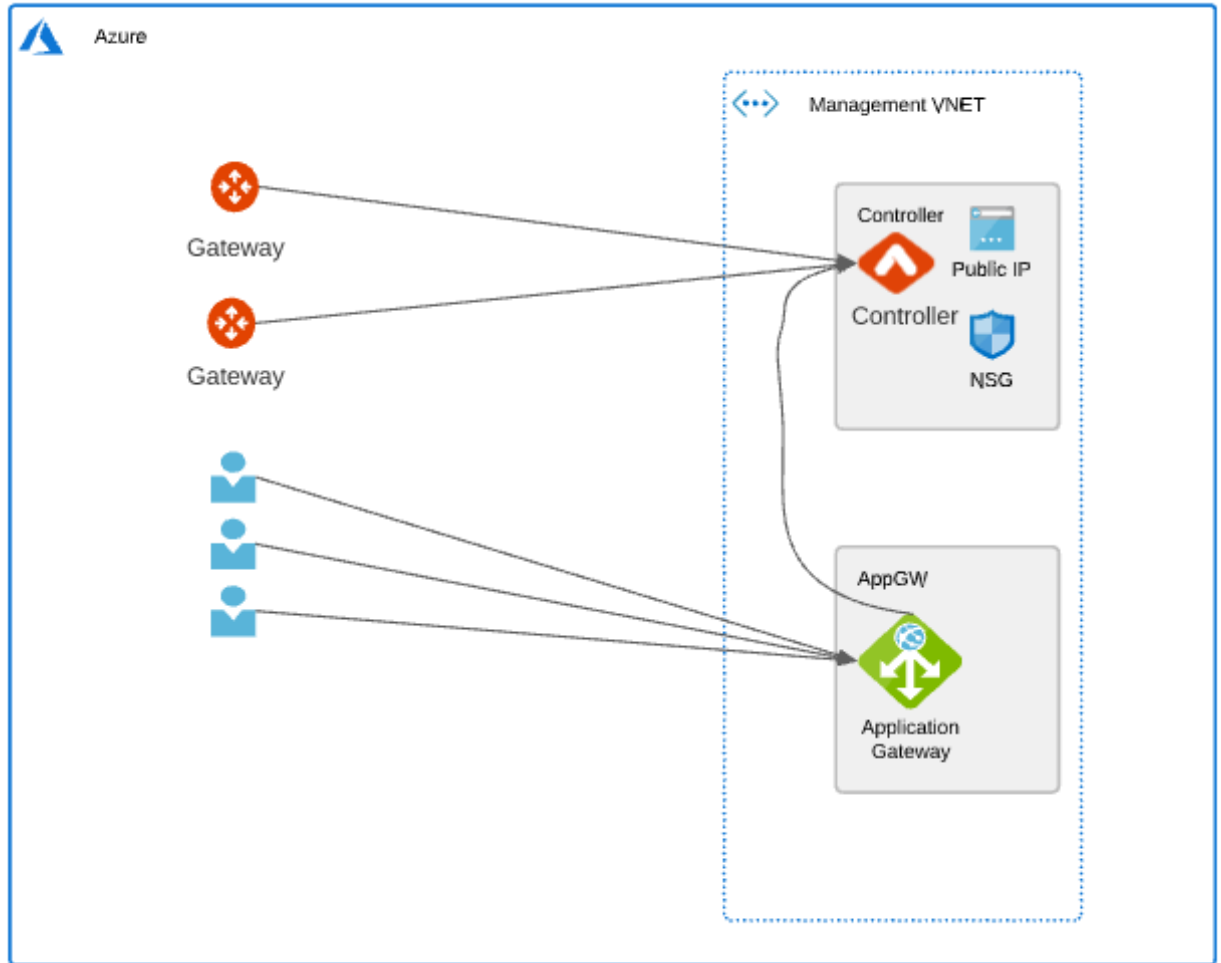
Applies to any cloud

- Confirm that the Controller Security Group Management is NOT disabled to only allow access to the Controller EIP from Aviatrix Gateways
- Create a new internet facing ALB
- Modify main Controller Security Group to only allow access from the ALB Security Group
- Enable WAF on the ALB with AWS Managed Rules
- Adjust ALB idle timeout, modify rulesets
- Modify ALB Security Group to only allow access from the admin user IP



Azure

- Use WAF with Azure Managed rules on Application Gateway to limit usual web hacks/attacks against Controller
- Only allow user access from the Application Gateway subnet to Controller on port 443 (Controller Security Groups management feature is a pre-requisite for gateway communication to Controller)
- Allow configuring user access on non-standard HTTPS listener port
- Terminate SSL connection on Application Gateway to leverage cloud native certificate management and WAF capability to inspect and log requests
- L7 health-check on the Controller



Gateway and Controller Sizing

Controller Sizing

- Controller uses multiple cores to handle the API query load generated by CoPilot → **Minimum 4 core instance**
- Resizing:
 - If you do not use User VPN
 - ❑ Stopping the controller to resize does not impact the data traffic
 - ❑ Always good practice to backup controller before performing upgrade
 - If you use User VPN
 - ❑ No impact to connected users, but new connections could not be established during the stop and resize
- Maintenance Windows for resizing usually do not require more than 15 minutes

Gateway Sizing

- Gateway selection affects expected throughput
- If you decide to enable **High Performance Encryption**
 - Use Jumbo MTU and to verify MTU along the path
 - Go to TROUBLESHOOT > Diagnostics > Network
 - Select a gateway and destination IP address, click **Trace Path**
 - It will display MTU of the devices along the path
- **Secure Egress**
 - T2.micro is not adequate, for instance
 - But test it out and adjust accordingly based on CSP quotas*
 - *CSPs have quotas on PPS, but often do not publish them

Gateway and Controller Upgrading & Updating

Types of Upgrades and Updates

- Software Upgrade

- Replaces relevant Platform (i.e., Controller) and **selected** Gateway packages, configuration files, and binaries to Target version
- Part of regular maintenance operations
- Hitless

- Image Upgrade

- Replaces **selected** Gateway cloud image (AMI, VHD, etc.) to the newer version
- Doesn't change Aviatrix software version
- Less frequent
- Incurs traffic disruption

- Security Patches

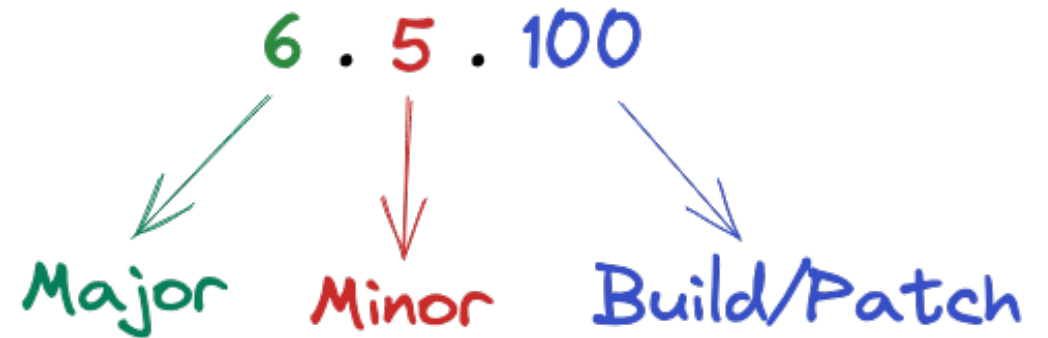
- Released when security updates to underlying software components become available.
- Most security patches are hitless (review the release notes)

- Software Patches

- Released to address compatibility issues when they arise (if you are using any applications or configurations affected by the patch.
- Most software patches are hitless (review the release notes)

Terminology

- Software Major, Minor, Build Release
 - Numbering convention
 - Example: Aviatrix Release 6.5.100



Supported Upgrade Paths

- Upgrading Builds (within same minor release)

- You automatically get the latest build and cannot select the build number.
- Process might skip over previously released build numbers.



- Upgrading Minor Release Version (within same major release)

- You must upgrade each minor release sequentially.



- Upgrading Major Release Version

- You must upgrade each major release sequentially.



Software Rollback

- Software roll back to Gateway software previous version
- Previous version may or may not be the latest patch/build version available
- Replaces the entire Gateway (image + software) → expect brief disruption
- Gateway Image version may automatically be downgraded if required
- Does not apply to Controller

Upgrade Scenarios

- At any point in time, the Controller supports 2 unique Gateway software versions :
 - **Target Version:** same version as the Controller
 - **Previous:** previous version of the Controller
- Example of supported scenario
 - Upgrade the Controller from 6.5 to 6.5.100
 - Upgrade a group of Gateways to 6.5.100
 - Remaining Gateways run 6.5
- Example of unsupported scenario
 - Upgrade the Controller from 6.5 to 6.5.100
 - Upgrade a group of Gateways to 6.5.100
 - Remaining Gateways run 6.5
 - Upgrade the Controller to 6.5.200
 - Not supported: All Gateways must be upgraded to 6.5.100 before upgrading the Controller to 6.5.200

Common Scenario – Rolling Upgrades

Upgrade all Secondary Gateways in a particular CSP region

- Upgrade of the Controller has been performed
- Use the Gateway Selective Upgrade capability
 - Add CSP filter
 - Add region filter
 - Add Gateway Type filter
- Optionally perform a dry run upgrade of the selected Gateways

Selective Gateway Upgrade [Info](#)

Total Gateways: 19

Completed: 19

[▶ DRY RUN](#) [↑ SOFTWARE UPGRADE](#) [↑ IMAGE UPGRADE](#) [↓ SOFTWARE ROLLBACK](#) [↻](#)

Page Size: 50

[COLUMN MENU](#)

<input checked="" type="checkbox"/>	Name	Cloud	Region	Gateway Type	Account	Current Version
<input type="checkbox"/>						
<input checked="" type="checkbox"/>	aws-us-east-1-transit2-agw	AWS	us-east-1	Primary	uhoozbhoy	6.5.1922
<input checked="" type="checkbox"/>	aws-us-east-1-transit2-agw-hagw	AWS	us-east-1	Secondary	uhoozbhoy	6.5.1922
<input checked="" type="checkbox"/>	aws-us-east-1-spoke2-agw	AWS	us-east-1	Primary	uhoozbhoy	6.5.1922
<input checked="" type="checkbox"/>	aws-us-east-1-spoke1-agw	AWS	us-east-1	Primary	uhoozbhoy	6.5.1922
<input checked="" type="checkbox"/>	aws-us-east-2-transit1-agw	AWS	us-east-2	Primary	uhoozbhoy	6.5.1922
<input checked="" type="checkbox"/>	aws-us-east-2-transit1-agw-hagw	AWS	us-east-2	Secondary	uhoozbhoy	6.5.1922
<input checked="" type="checkbox"/>	azure-us-west-transit4-agw	Azure ARM	West US	Primary	azure-uhoozbhoy	6.5.1922
<input checked="" type="checkbox"/>	azure-us-west-transit4-agw-hagw	Azure ARM	West US	Secondary	azure-uhoozbhoy	6.5.1922

[↑ APPLY COLUMNS](#) [↻ UNSELECT ALL](#)

- ☒ Current Version
- ☒ Target Version
- ☒ Rollback Image Version
- ☒ Previous Image Version
- ☒ Current Image Version
- ☒ Target Image Version
- ☒ Kernel Version
- ☒ Distribution Version
- ☒ Account
- ☒ Cloud
- ☒ Region
- ☒ Gateway Type
- ☒ Gateway Role

Support Resources

Support Portal

- Aviatrix customers may visit Support portal – <https://support.aviatrix.com> to access:
 - Knowledge Base with videos
 - Documentation
 - Community
 - History of tickets
 - CSP outage tracker
- Sign up for Email Notifications from Controller

Email Notifications

Manage the status of your Aviatrix system and ensure your teams receive important notification emails sent by Aviatrix.

Enter email aliases for teams that can respond to each type of alert. If you enter the same email for all four fields, that email account could be overwhelmed. [Read more](#)

The email aliases collected will solely be used for the purpose described here. For more information, please refer to our [Privacy Policy](#)

ACCOUNT AND CERTIFICATE ALERTS

Receive important account and certification information.

Administrator Email Alias

ace.lab@aviatrix.com

VERIFY

SECURITY EVENTS

Receive security and CVE (Common Vulnerabilities and Exposures) notification emails.

Security Admin Email Alias

security-admin-group@yourcompany.com

VERIFY

CRITICAL ALERTS

Receive field notices and **critical** notices. These alerts ensure that you can respond to urgent events.

IT Admin Email Alias

it-support@yourcompany.com

VERIFY

STATUS CHANGE NOTIFICATIONS

Receive system/tunnel status notification emails.

IT Admin Email Alias

it-admin-group@yourcompany.com

VERIFY

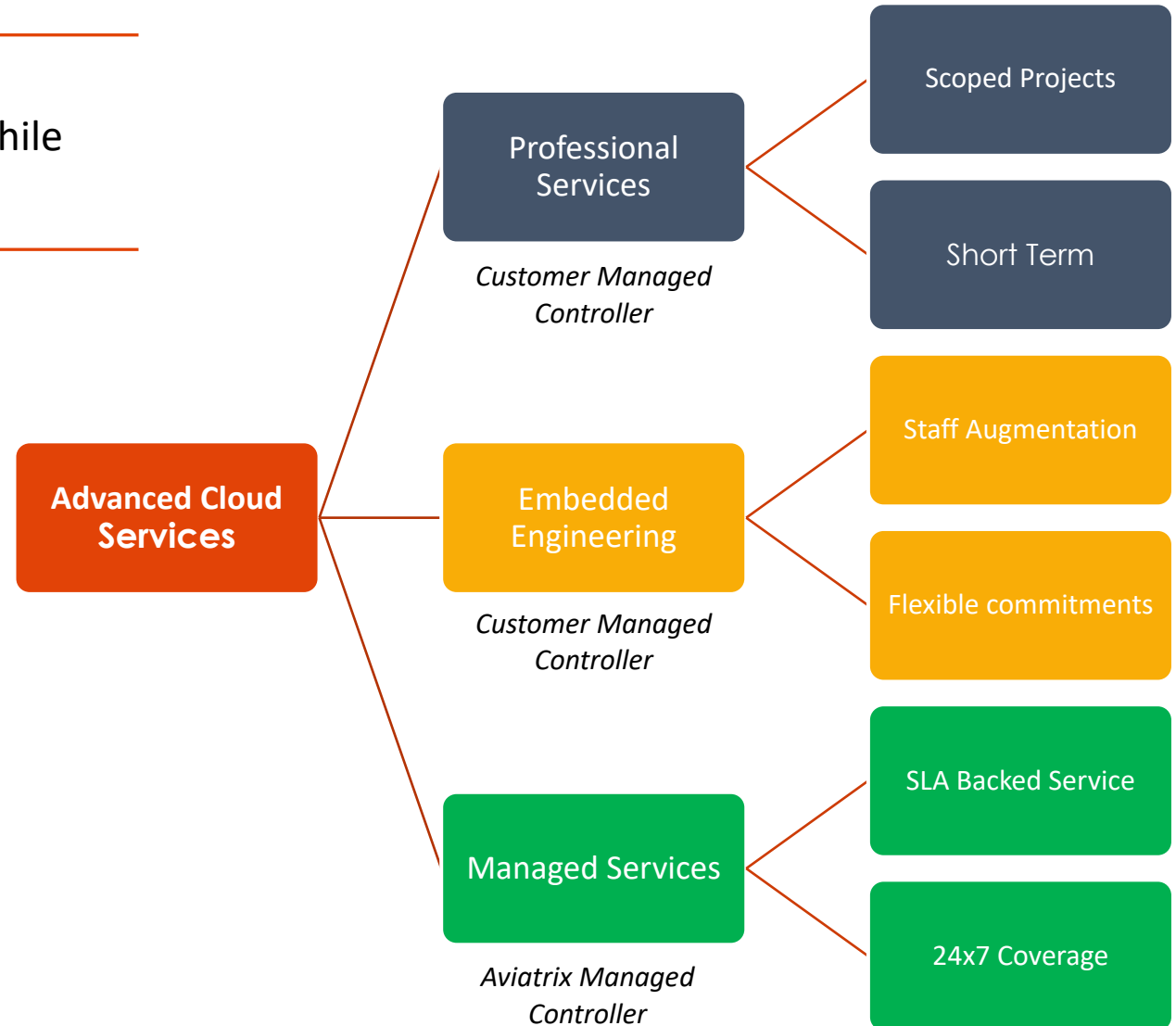
Status Change Notification Interval (seconds)

60

ACS Offering

Advanced Cloud Services is a portfolio of offerings enabling Aviatrix to support your cloud network while you focus on your business

- Customization of all offerings
- Expertise across all major CSPs
- Global 24x7 coverage





**Next: Lets Troubleshoot
together!**