Introductory Lab Guide

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Logistics

- **Venue Requirements:** Internet connectivity, desks and chairs, projector with laptop hookup for presentation
- The organizing team is comprised of one speaker and 1-2 technical staff to help out and answer questions
- Participants bring their own laptops and use Dome9's lab AWS accounts
- Participants walk through the labs either individually or in pods of 2-3
- **Format:** 10 minutes upfront presentation, followed by self-directed labs with check-in at the beginning and end of each lab
- **Workshop Duration**: 3.5 hours, including lunch
- **Target Audience:** Technical security users (security engineers, architects, DevOps) who have heard of Dome9 and know what Dome9 offers

AWS and Dome9 Setup

Exercise 1.1: Setup lab environment (Login to your lab AWS account)

The instructor should provide you with an AWS Account for this workshop. Ensure you have an AWS account setup before proceeding.

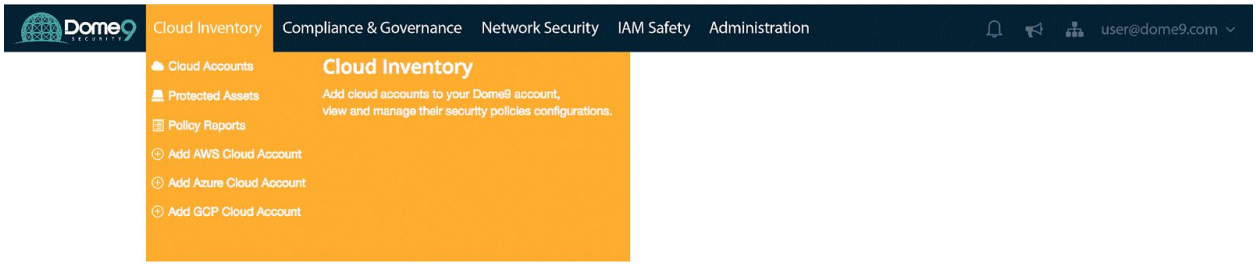
Exercise Complete!

Exercise 1.2: Connect Dome9 to your new AWS account

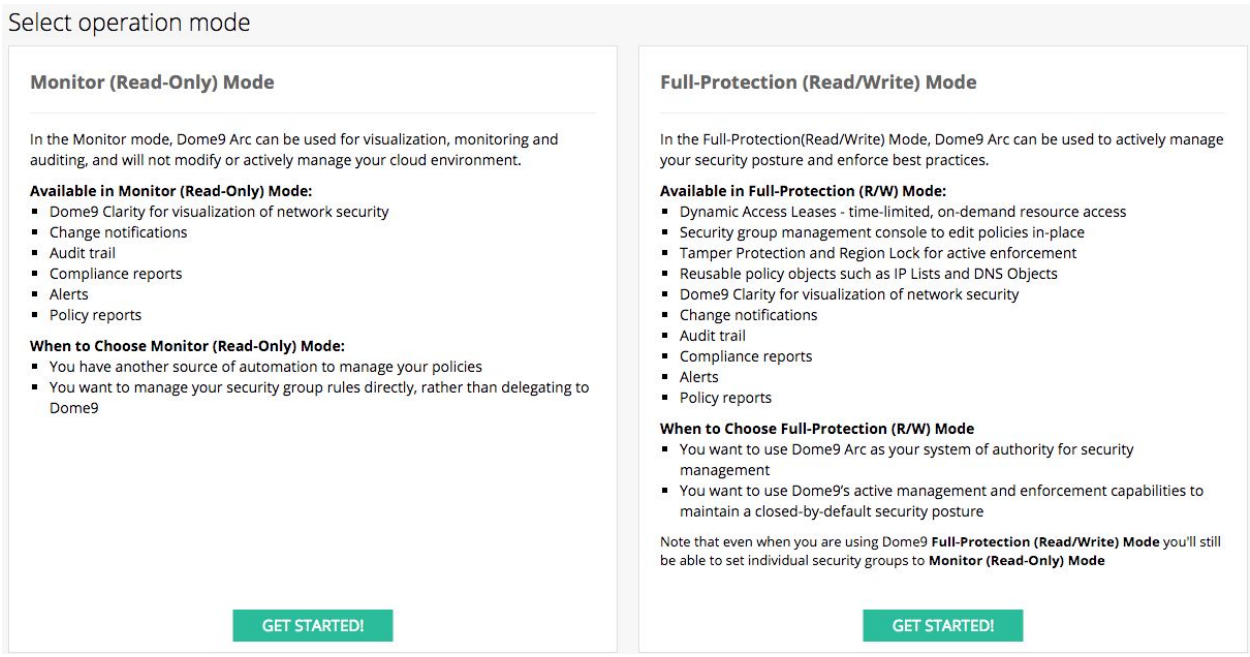
Onboard an AWS account

Onboarding an AWS account involves creating policies and attaching it to roles for Dome9 to use. For simplicity, the policies and roles have already been created. Follow these steps to onboard your AWS account to Dome9.

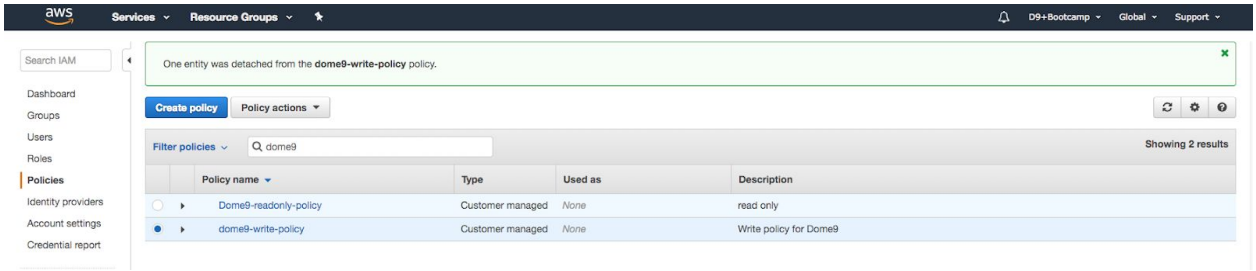
1. On the Dome9 console navigate to **Cloud Inventory** and select Add AWS Account.



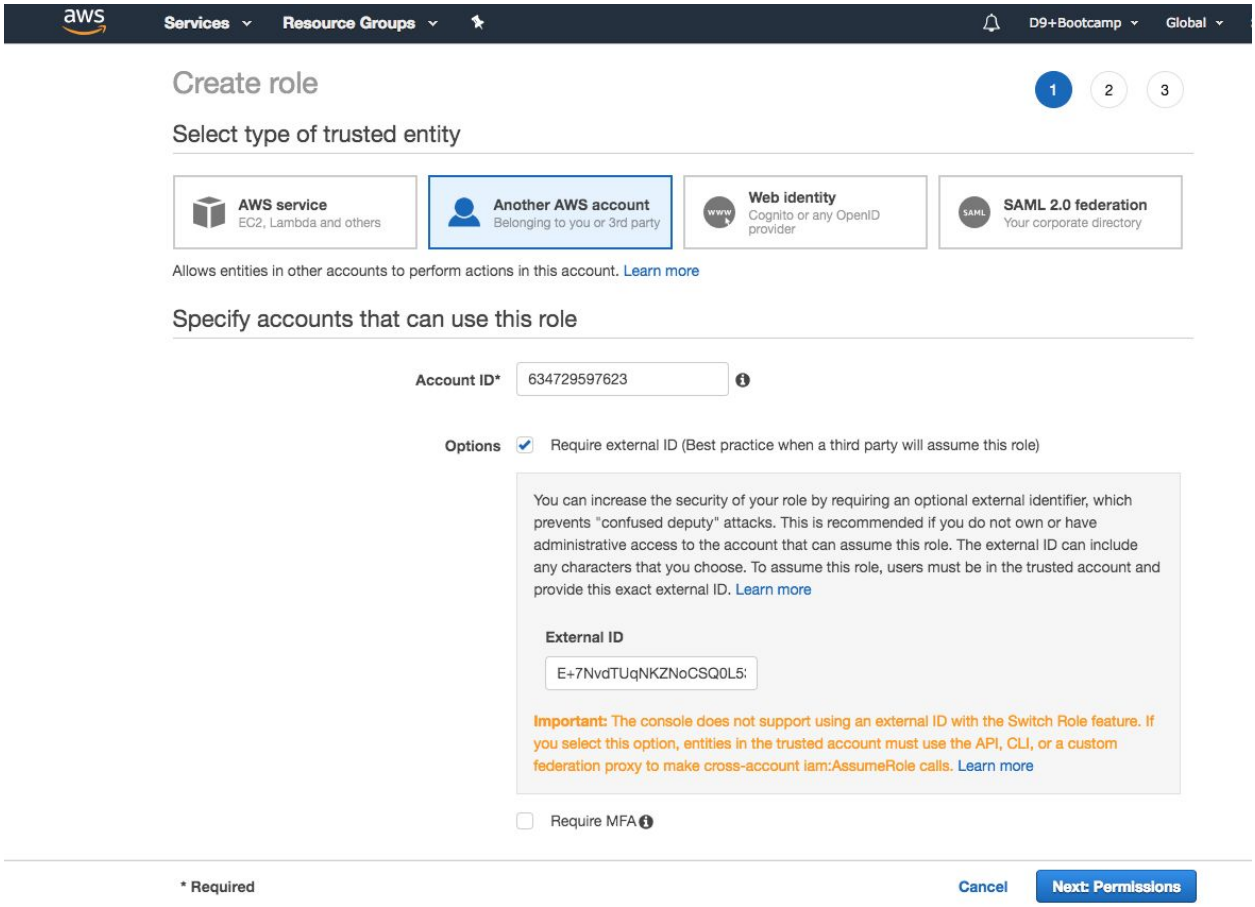
2. Select the Dome9 operation mode, **Read-Only** to be used for the account.



3. Click next again
4. Sign to the AWS console (aws.amazon.com) in a new browser tab or window (keep the Dome9 console open, as you will be switching between the two in the following steps).
5. Click **Services** and select the **IAM**
6. Select **Policies** and search for Dome9 and you should see two policies created. Click and review the policy for read only.



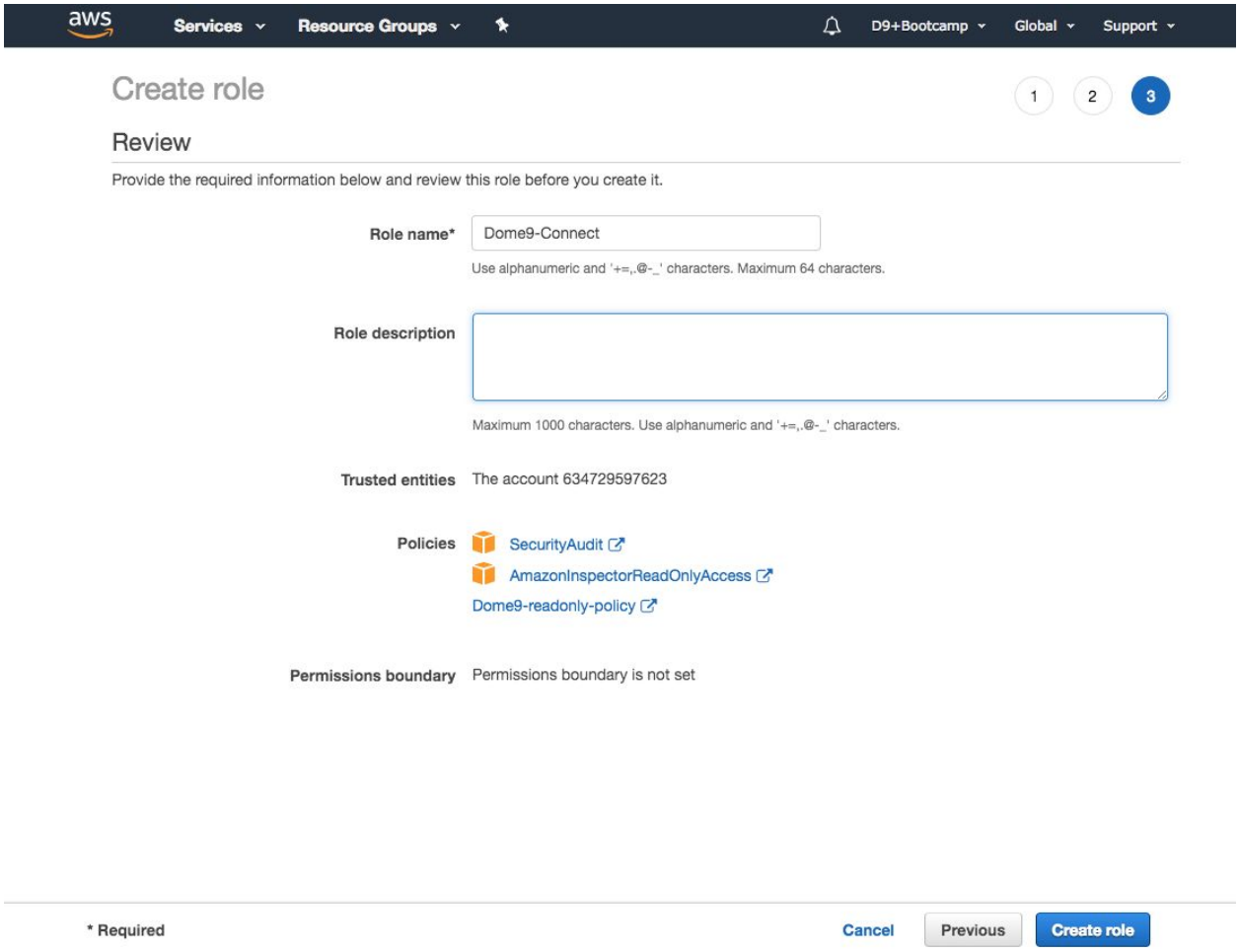
7. In the AWS console, click **Roles** and **“Create new Role”**
8. Select Role Type: **‘Another AWS Account‘,** under options mark the **‘Required External ID‘** option.
9. Enter the following:
    - AccountId: 634729597623
    - External ID: E+7NvdTUqNKZNoCSQ0L53@64
    - Require MFA: NOT checked



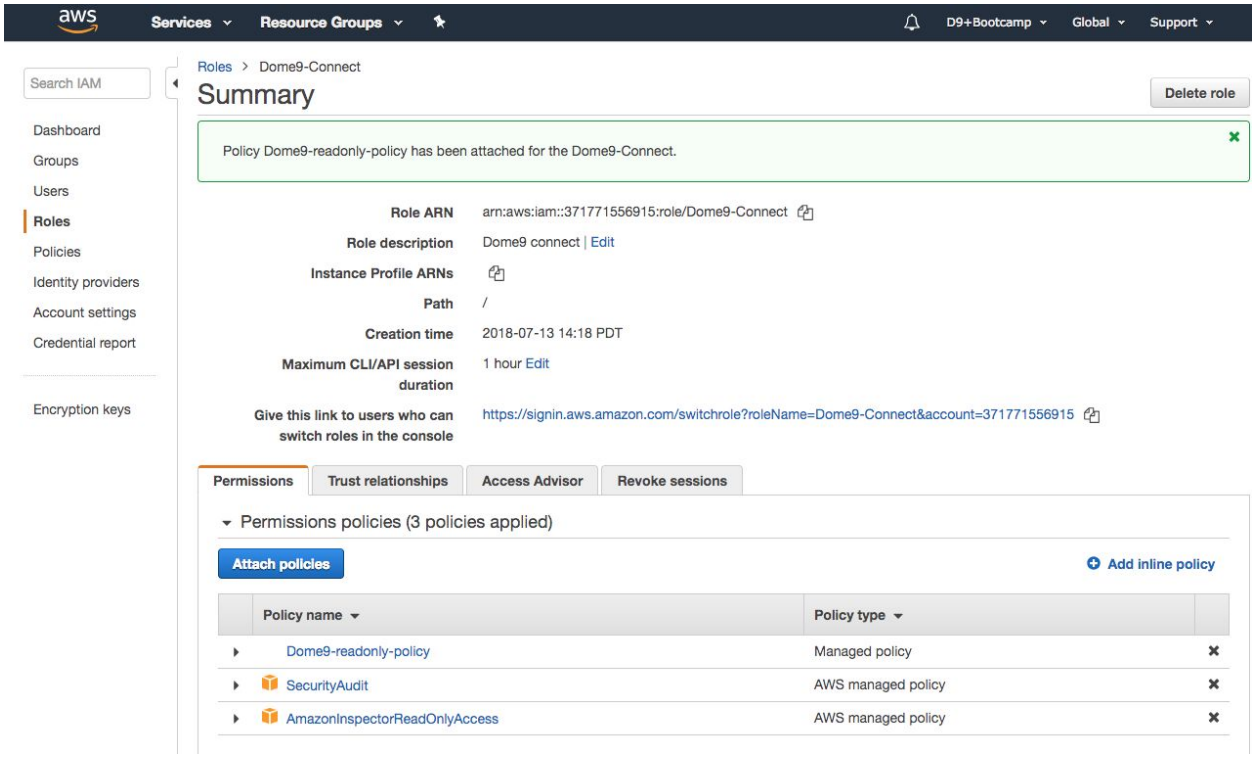
10. **READONLY**: Make sure the following policies are selected:

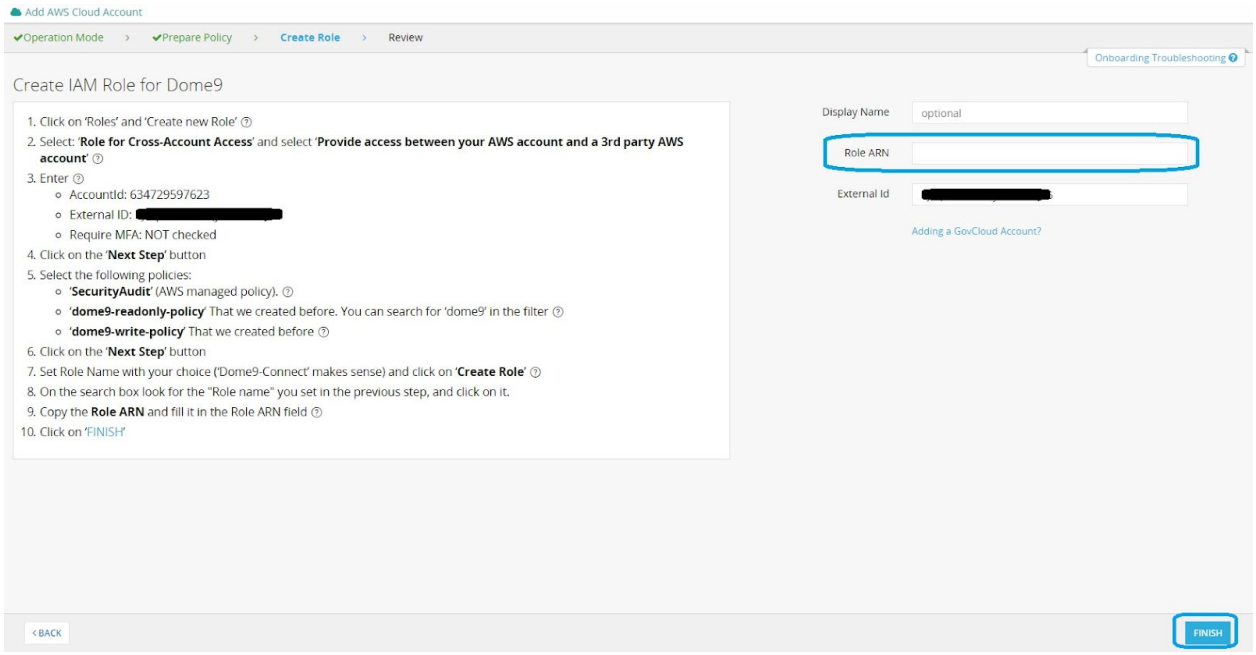
- **SecurityAudit** (AWS managed policy).
- **AmazonInspectorReadOnlyAccess** (AWS managed policy).
- **dome9-readonly-policy,** that you created before. You can search for 'dome9' in the filter

11. Set Role Name with your choice ('Dome9-Connect' makes sense) and click on **'Create Role'**



12. Copy the **Role ARN** value, and enter it in the **Role ARN** field in the Dome9 console.





13. Click '**Finish**'

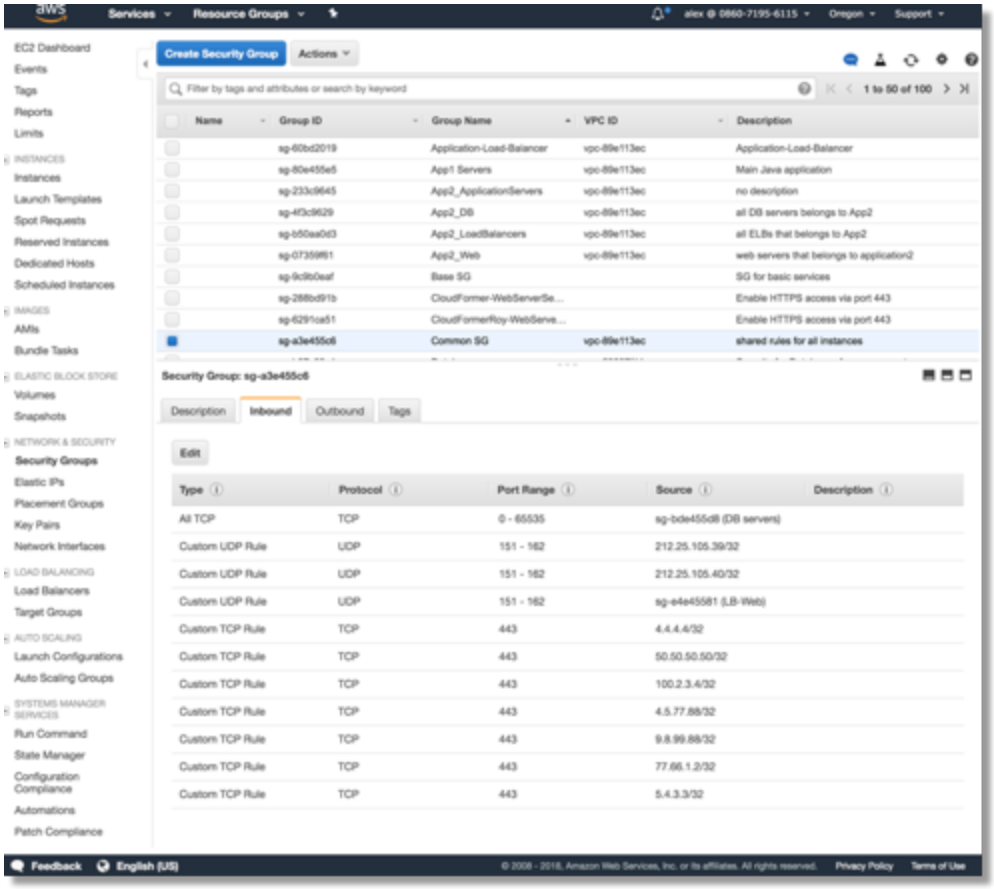
14. Review the onboarded cloud account summary.
15. At the end of the onboarding process all the Security Groups will be in **Read Only** mode.

Exercise Complete! You have now connected your Dome9 to your AWS account

Security Architecture Review Lab

Exercise 2.1: Explore AWS Environment

In your AWS account, navigate to **N.Virginia region**. Take a moment to notice anything out of the ordinary. Explore EC2 instances, Security Groups, IAM and other services. **(There are 5 configuration mistakes in the lab, can you find them?)**



Exercise Complete! You have now explored your AWS instances and reviewed your security policies in AWS.

Exercise 2.2: Conduct inventory/asset review

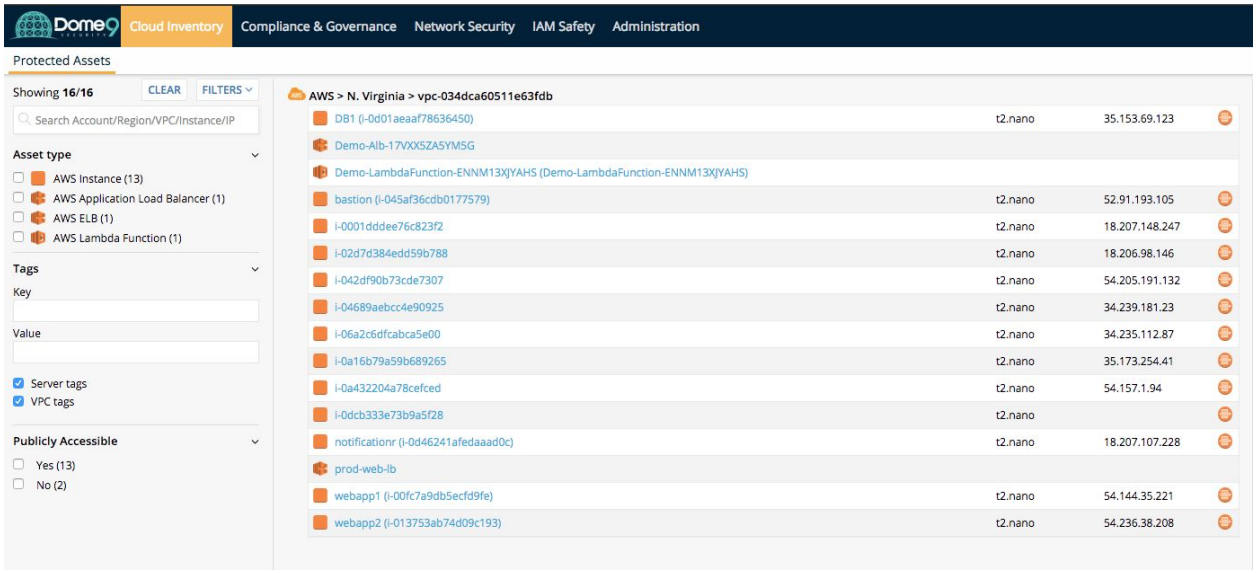
Switch into your Dome9 console for the remaining part of this module

Dome9 presents a single console view of all your assets, on all platforms, from which you can search or filter for specific assets of interest, and see details about their security posture. In this section of the Dome9 console, you can see a summary of all the assets in your VPCs that are protected by Dome9. These assets can include, for example, instances (such as EC2s), RDSs, and load balancers. Dome9 fetches

information about these assets from the cloud platforms (AWS, Azure, Google) and presents it in a console view.

1) View your Protected Assets

The main page shows a list of your assets that are protected by Dome9, organized by region. Filter the list using the filters on the left, or search for assets by name in the search bar.



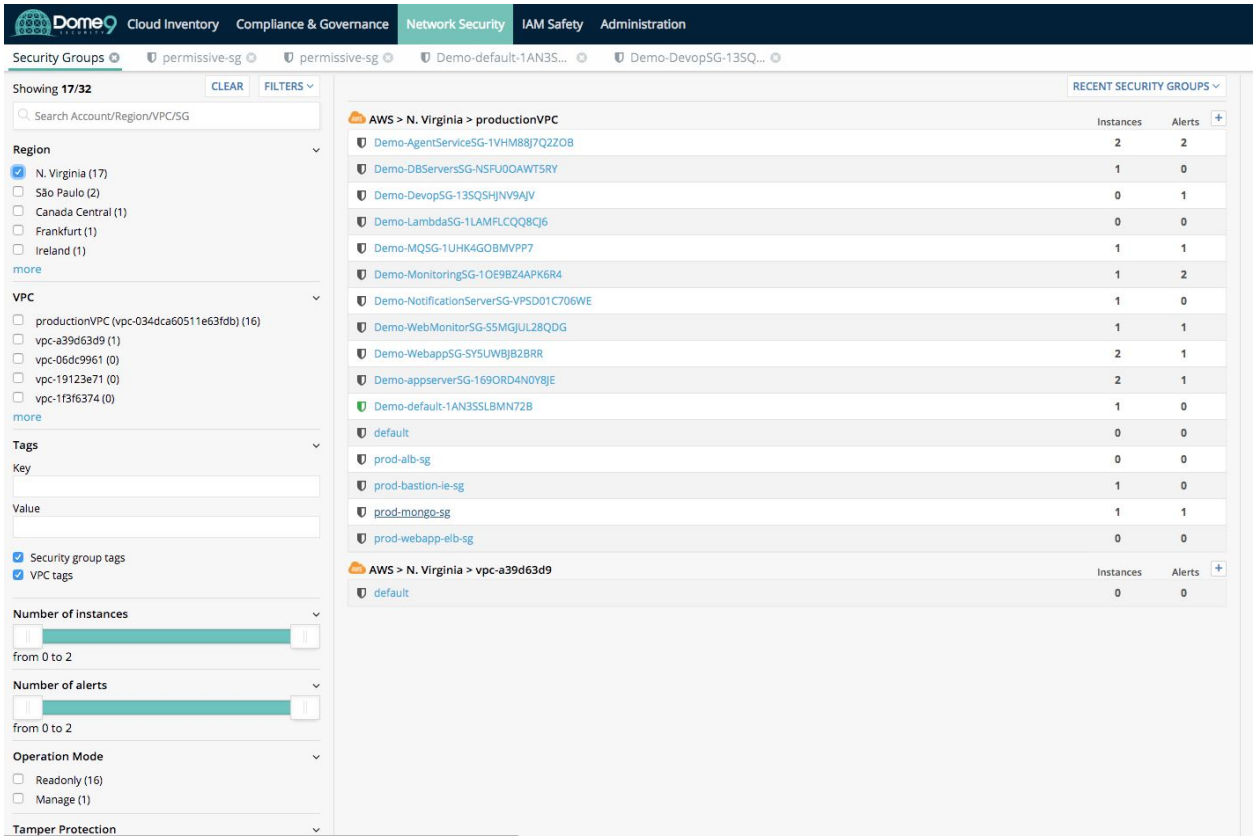
For each asset in the list, the type, and its external IP address (if it has one) are shown.

Click on one of the assets in the list to see more details for it.

2) View your Security Groups

The main page shows a list of all your managed security groups, in all your Dome9 managed accounts, on all cloud providers.

Filter the list using the search box or filter options on the left. You can filter by account, VPC, cloud region, protection method (full, read-only), and the number of instances or alerts.



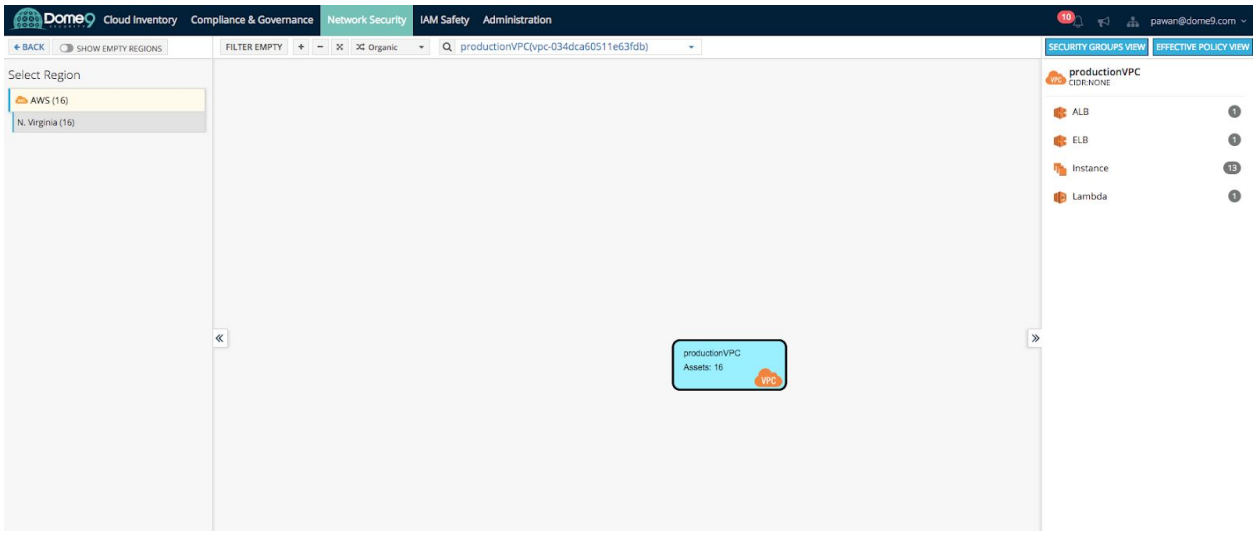
Exercise Complete! You have now explored your AWS instances and reviewed your inventory within the protected asset view of Dome9.

Exercise 2.3: Visualize security architecture

Dome9 Clarity gives a graphical visualization of the security groups in your cloud environment, and their effects on the cloud assets in the environment. It shows the security groups, traffic sources, and permitted traffic paths in the cloud network. The view is organized logically, according to the level of exposure of the Security Group to the external world. You can use Clarity to analyze your cloud network for security issues such as access to sensitive components from the internet, or to troubleshoot it for connectivity issues such as blocked paths to components.

1) Select a cloud environment

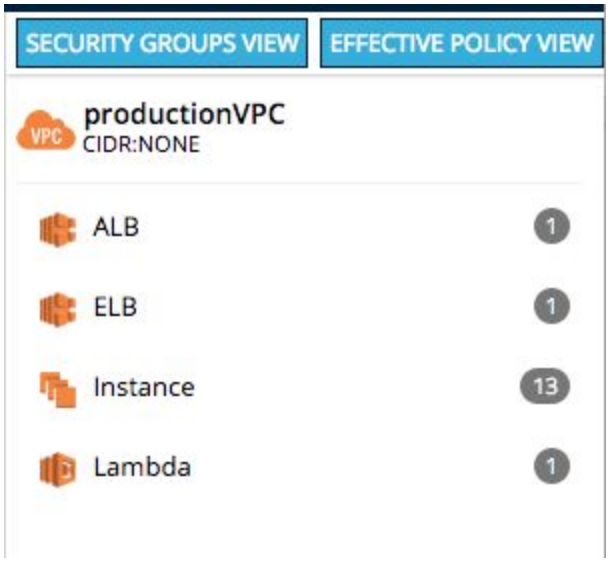
Select **Clarity** from the main menu. A list of your cloud accounts is shown on the left.



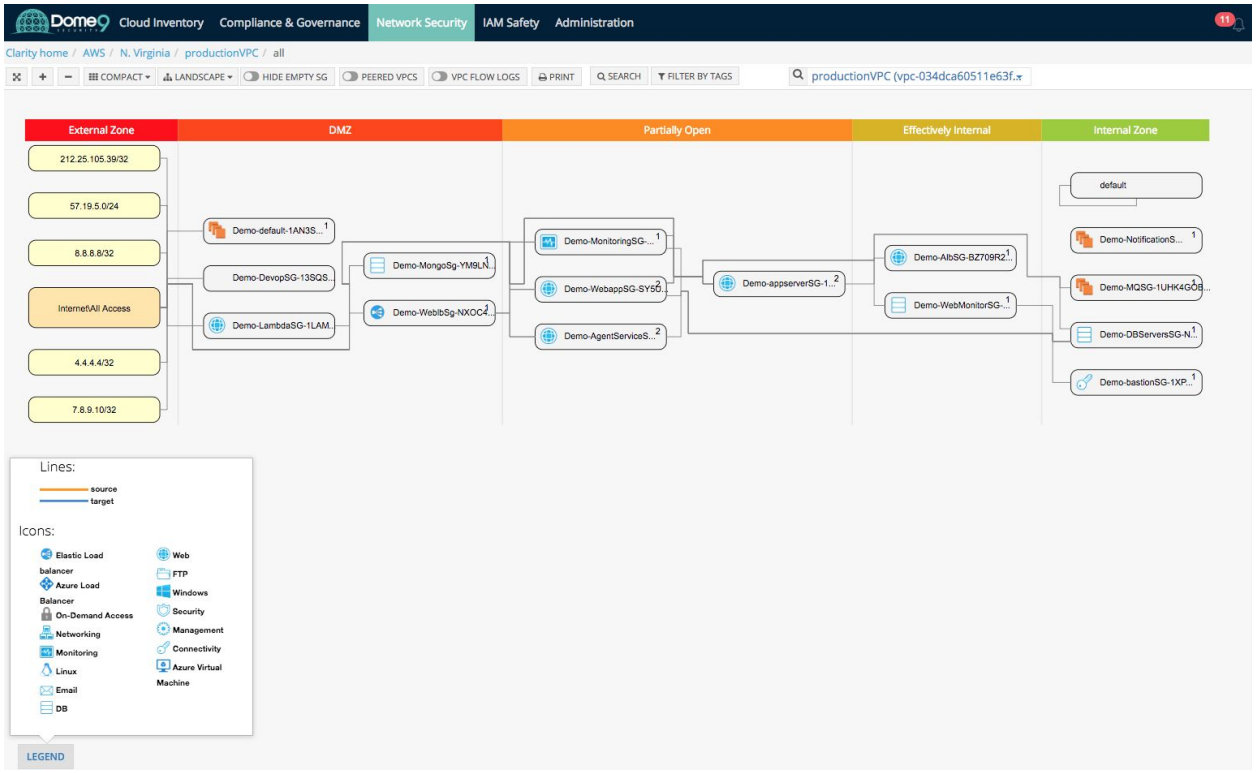
2) View an environment with the Security Group view

In this step, an environment will be visualized with the Security Group view. This view shows all the Security Groups.

a) In Clarity, select a cloud environment in one of your accounts (in the previous section), and then select **Security Groups** from the list in the menu bar on the upper right.

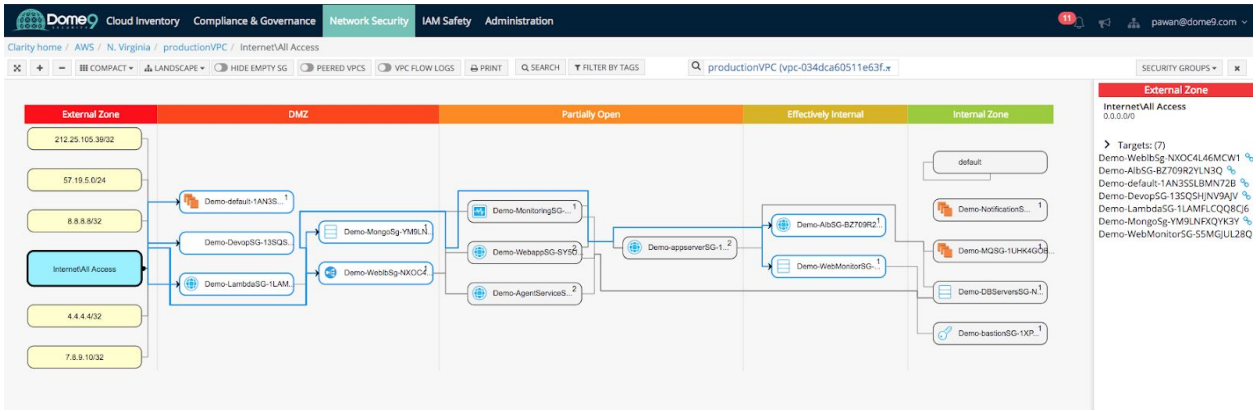


You can tell how the security groups (SG) interact with each other and can now understand whether any internal assets are communicating with the public world based on their inbound and outbound rules. The different swimlanes (which are auto classified by Dome9, so customers don't need to manually create them) represent security groups with various levels of exposure to the public.



b) Click the **Legend** button to show what each icon represents.

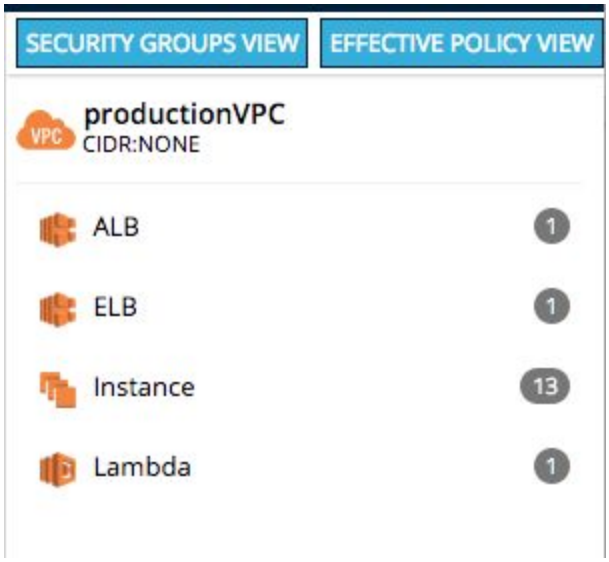
c) Click on **Internet/All Access** block. The source block is highlighted in the view, and the Security Groups that affect this source are highlighted.



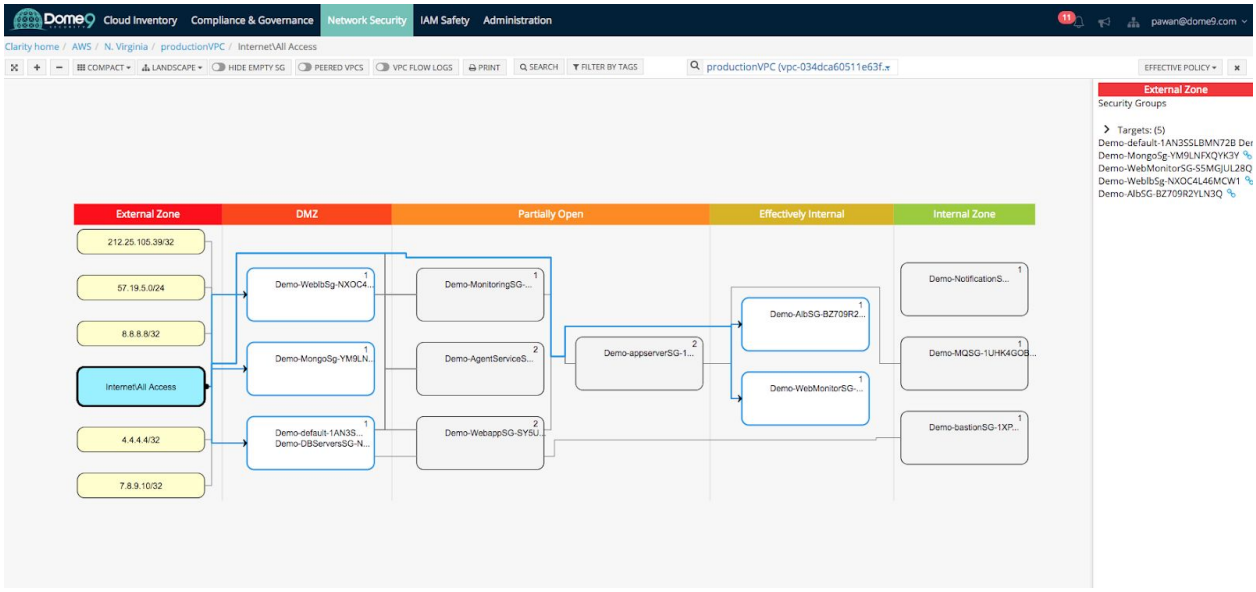
3) <u>View an environment in the Effective Policy view</u>

The Effective Policy view groups Security Groups that affect a common asset, and hides those that do not affect any assets.

a) Select **Effective Policy** in the list in the menu bar at the upper right.



b) This shows the VPC in the Effective Policy view



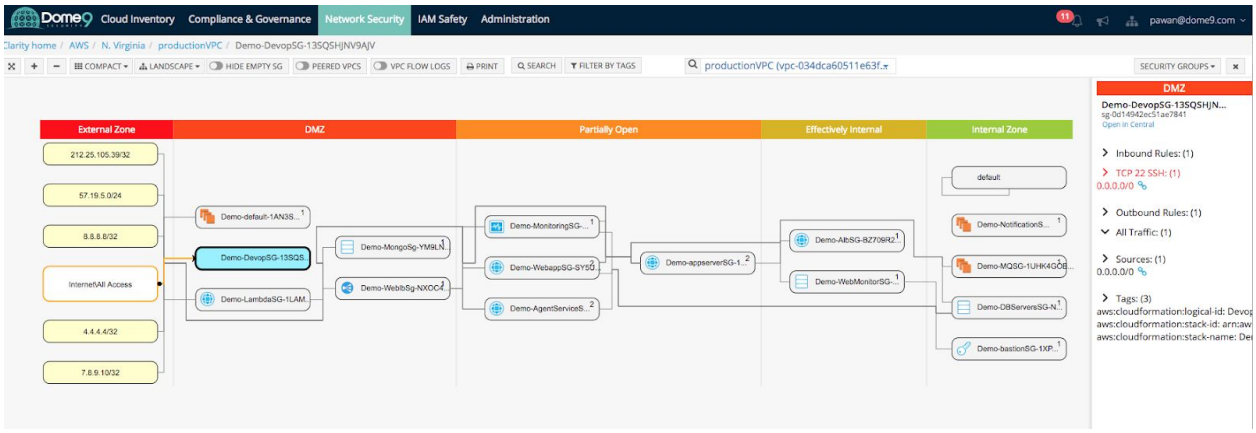
c) This view also shows the Security Groups and Sources, organized by zone. In this view, however, the Security Groups that affect the same asset are grouped together. Security Groups that affect a number of assets may appear several times in the view. Security Groups that do not affect any assets are hidden.

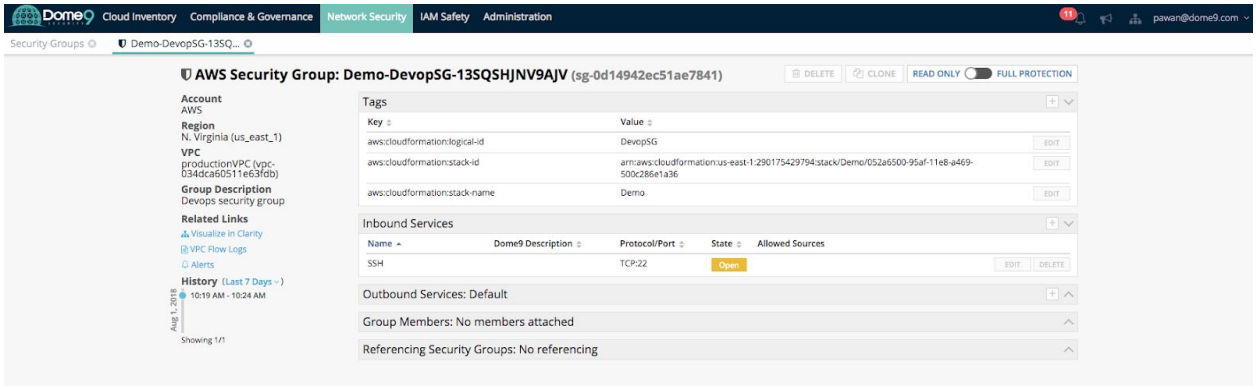
Exercise Complete! You have visualized your AWS security configurations in the VPC from a logical firewall view (SG view) and instance policy view (effective policy view)

Exercise 2.4: Identify zombie security group

Let's go back into Clarity's security group view. See if you can identify a zombie security group. This is a SG that has no instance attached to it but has an exposed policy (TCP 22 0.0.0.0/0) to the public.

Answer: Don't peek just yet..





This is a low severity issue yet is important to be aware of as it is just one click away from exposing your internal servers. With Clarity you can find such issues and take appropriate actions to fix such misconfigurations.

Exercise Complete! You have now identified the zombie security group exposure

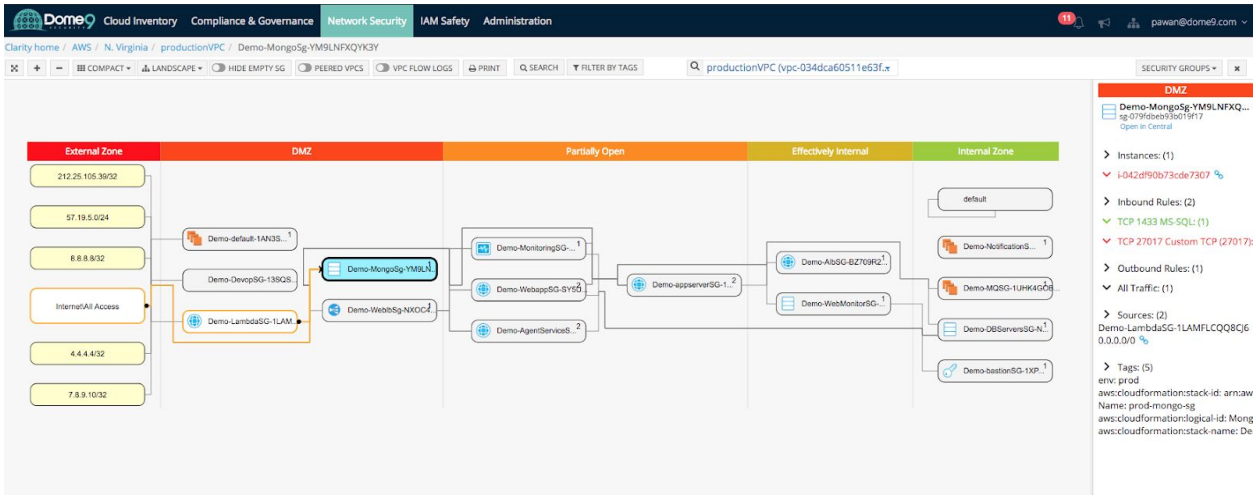
Exercise 2.5: Identify publicly accessible databases

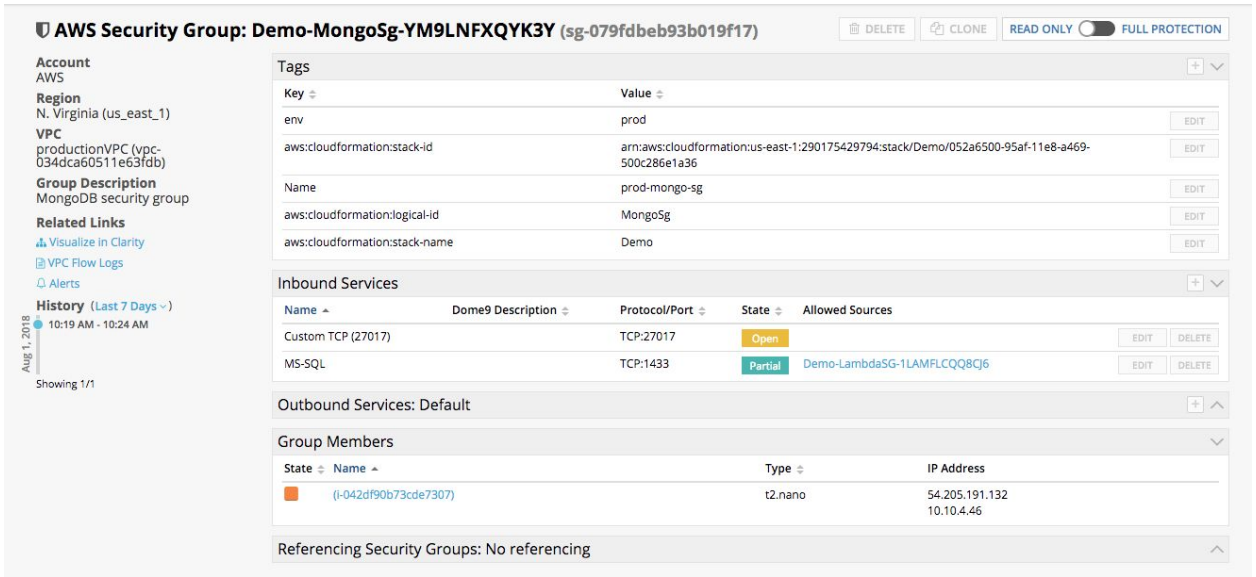
In this section, we will investigate and find 2 different database exposures. Let's jump into Clarity.

Challenge 1: Detect DB Exposure – part 1 (easy)

In Clarity, try to find an exposed DB:

Answer: Here you see that this SG has 0.0.0.0/0 on port 27017 associated with the mongoDB instance. This is a high severity issue as one of your internal DB servers is now wide open. Click on the SG for more details.



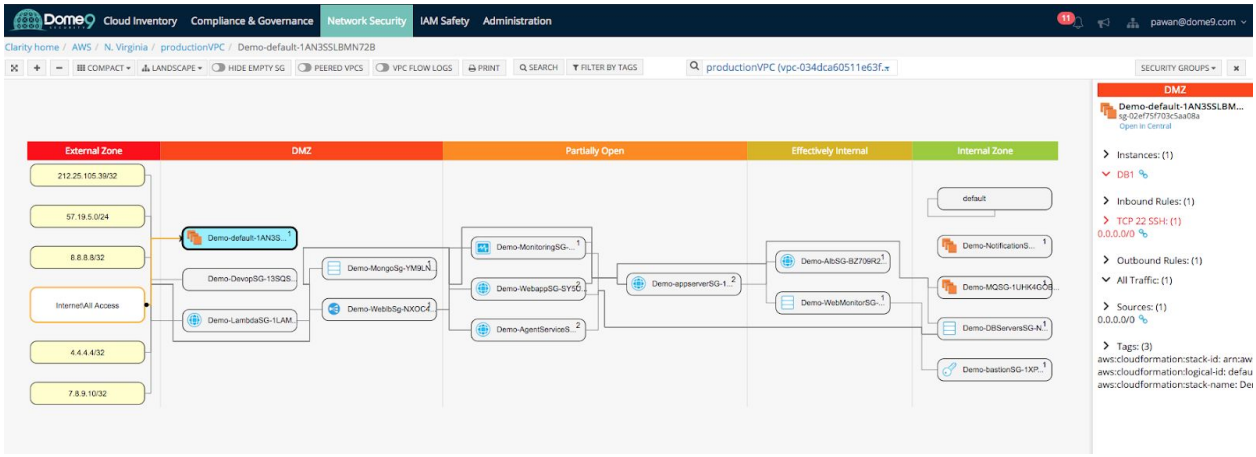


You can see the open port in this view. We will fix these issues in the next lab.

Challenge 2: Detect DB Exposure – part 2 (hard)

Find another exposed DB, this one is a bit tricky.

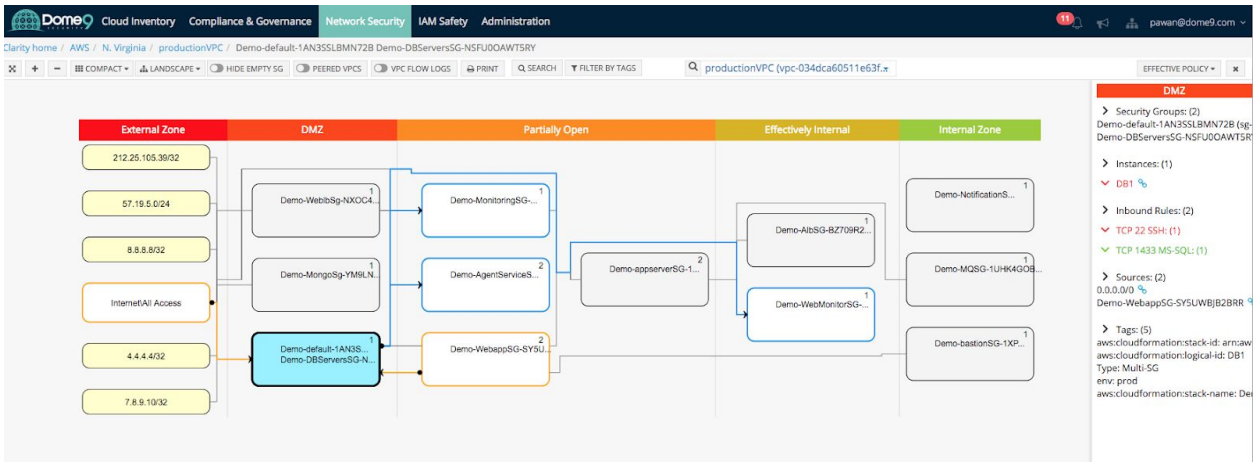
Answer: Click the default SG and hover over the right. Here you see default SG with SSH wide open and that DB1 is associated with this default SG making the database exposed to the public



In the effective policy view below – you can see default SG is in the DMZ zone and has one instance assignment (DB1, which is also part of the DB servers group).

Digging deeper, we realize that even if the rules associated with the security group are correct, an instance can still be assigned to the wrong security group. This is due to a misconfiguration that occurred due to assignment of multiple security groups, and specifically an incorrect default SG to DB1 instance.

The effective policy view brings this to light and tells you what security groups an instance belongs to, and therefore what the effective security policy is. Now it is clear – DB1 is exposed because it belongs to not only the internal DB Servers SG, but also to the Default SG which is in the DMZ.



Exercise Complete! You have now investigated both database exposures in Clarity

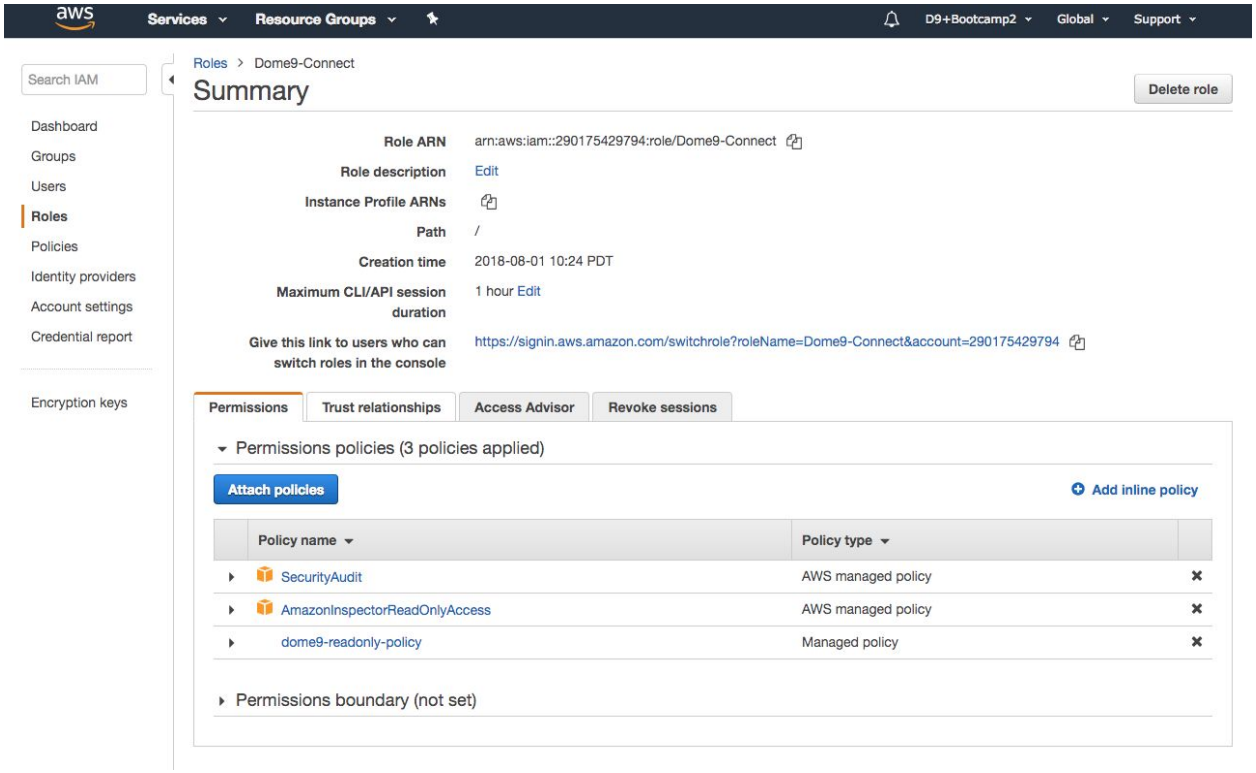
Security Posture Management Lab

Exercise 3.1: Enforce security policy

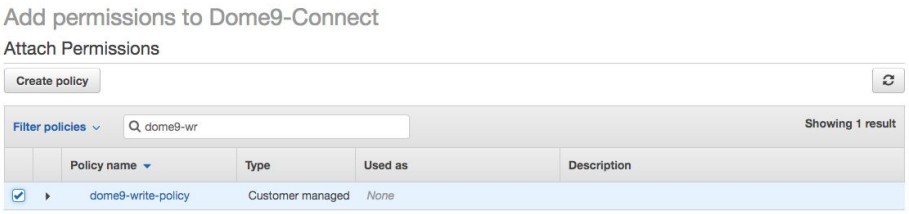
Fix misconfiguration in default security group by deleting the open SSH rule. For the purpose of this lab, lets keep it completely closed.

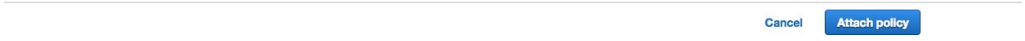
But first, we need to attach the Dome9-write-policy to the AWS account in order to have write access and make changes.

Go into your **AWS account**, navigate to **IAM**, and click **roles** and select **Dome9-Connect**



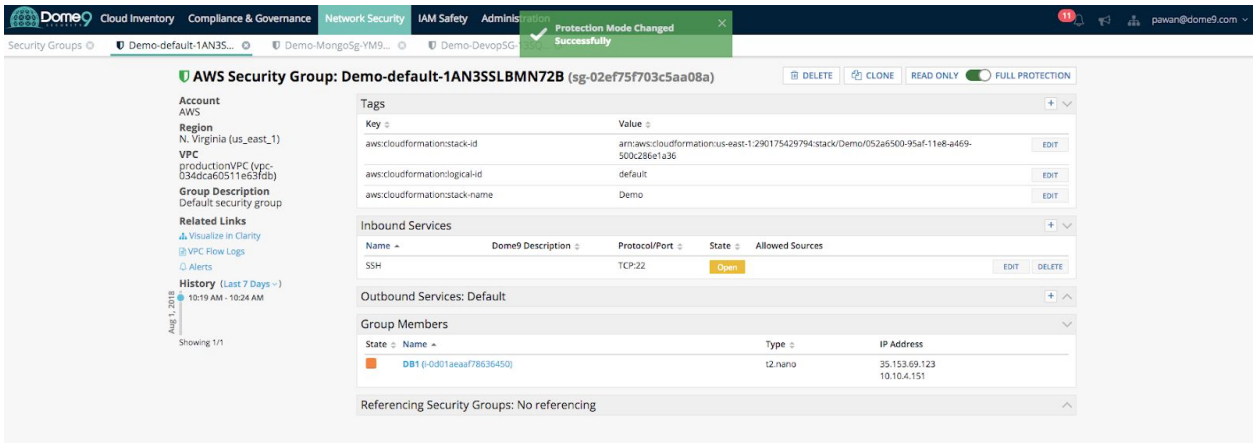
Attach the policy



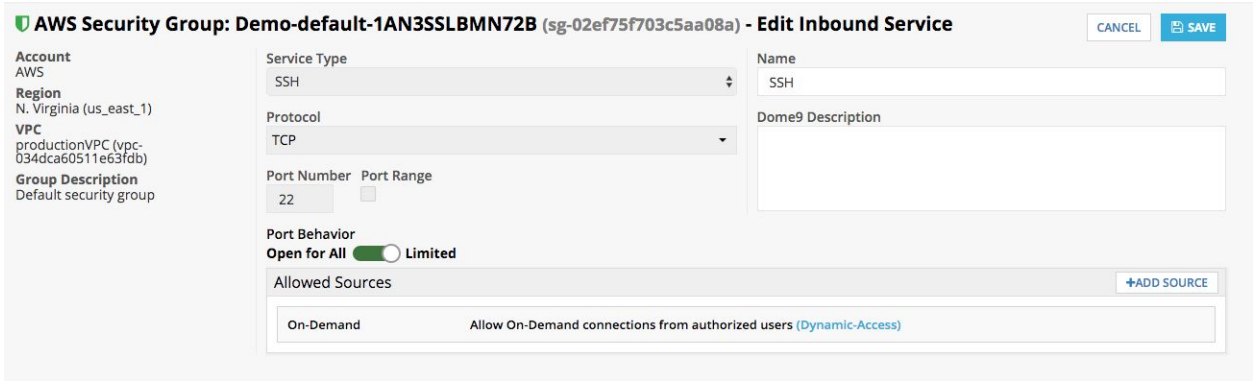


You should have write policy enabled to turn on active protection capabilities in Dome9

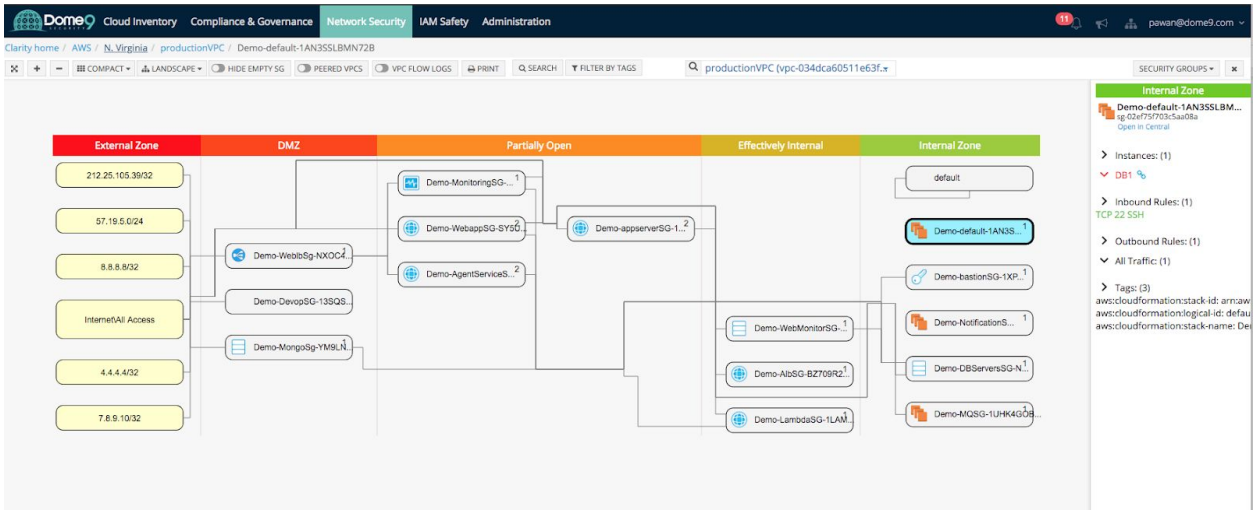
Now back in **Dome9 console** - go to Clarity, click the default SG we saw as the culprit, and turn on full protection mode at the top right in the entity explorer view:



Fix the issue by closing the SG for now



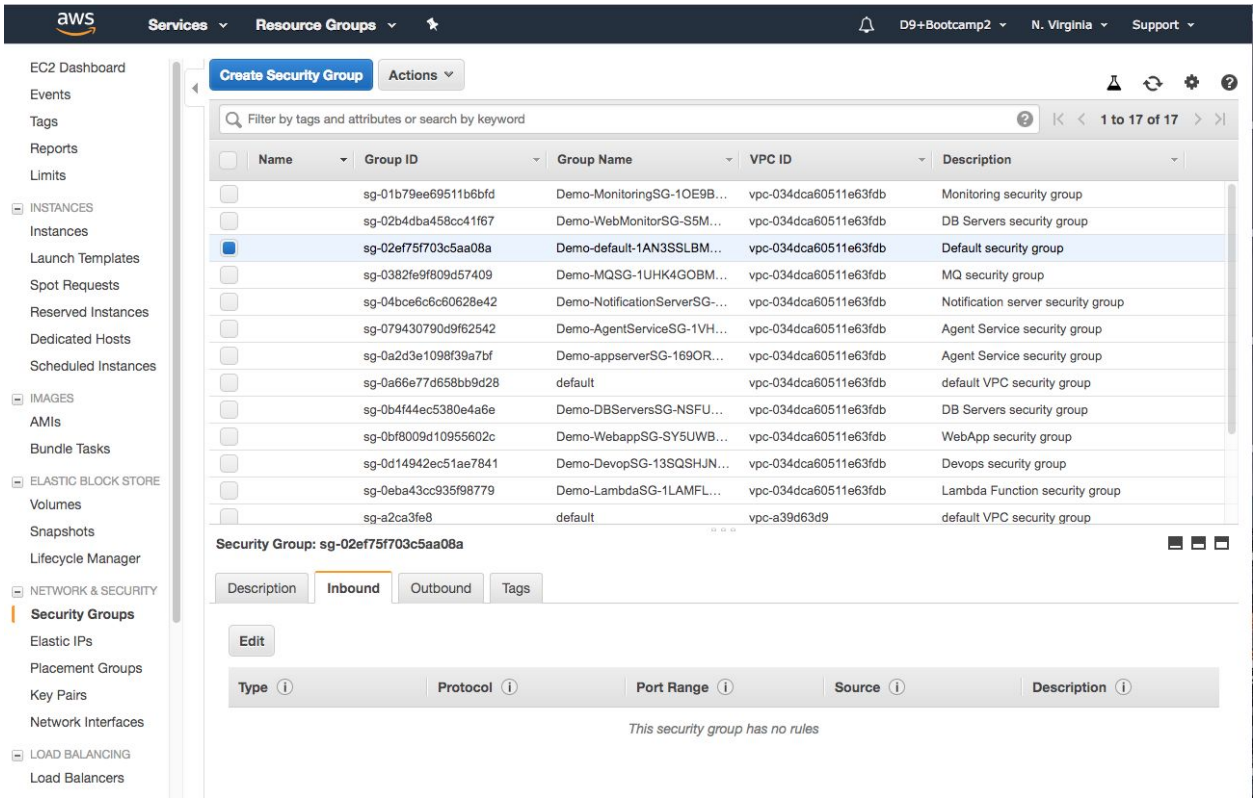
You can also check Clarity to see the correct topology below:



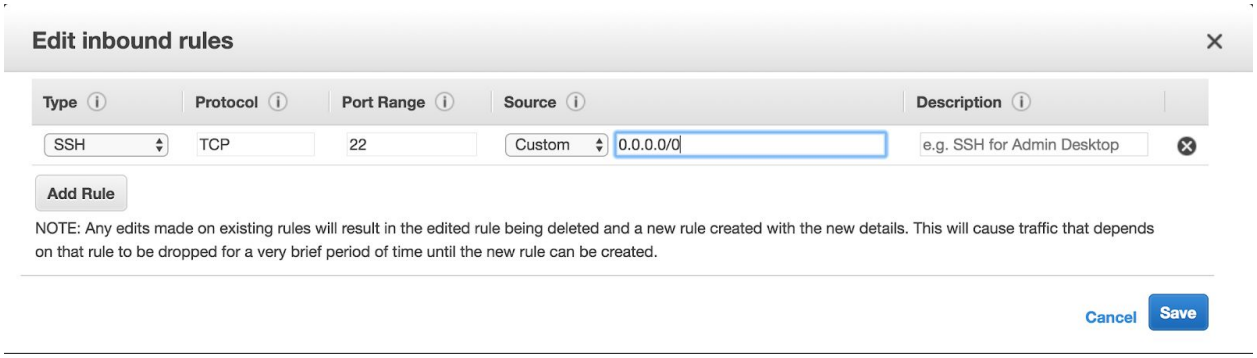
Exercise Complete! You have now fixed the misconfigured security group.

Exercise 3.2: Active protection – SG level

Let's try to mess with this by making changes in the AWS console. Make SG change in AWS by going to the default SG.

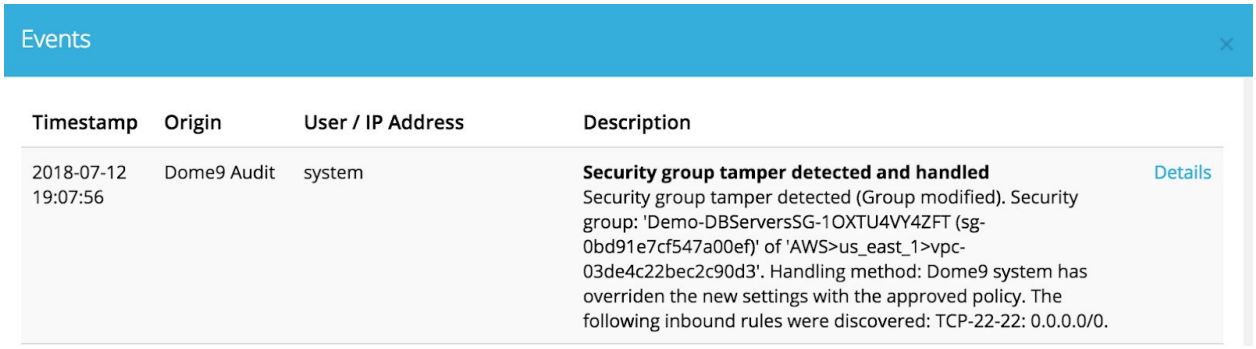


And now enable 0.0.0.0/0 SSH rule for default SG

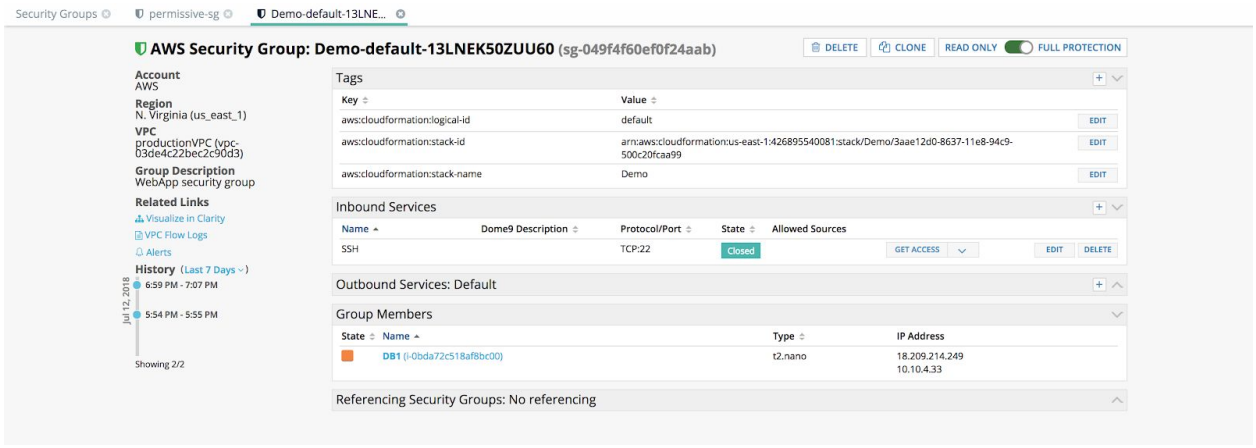


You should now be able to see the change in Dome9 console. Dome9 also rolls configuration back and adds the user event in the audit trail for further analysis.

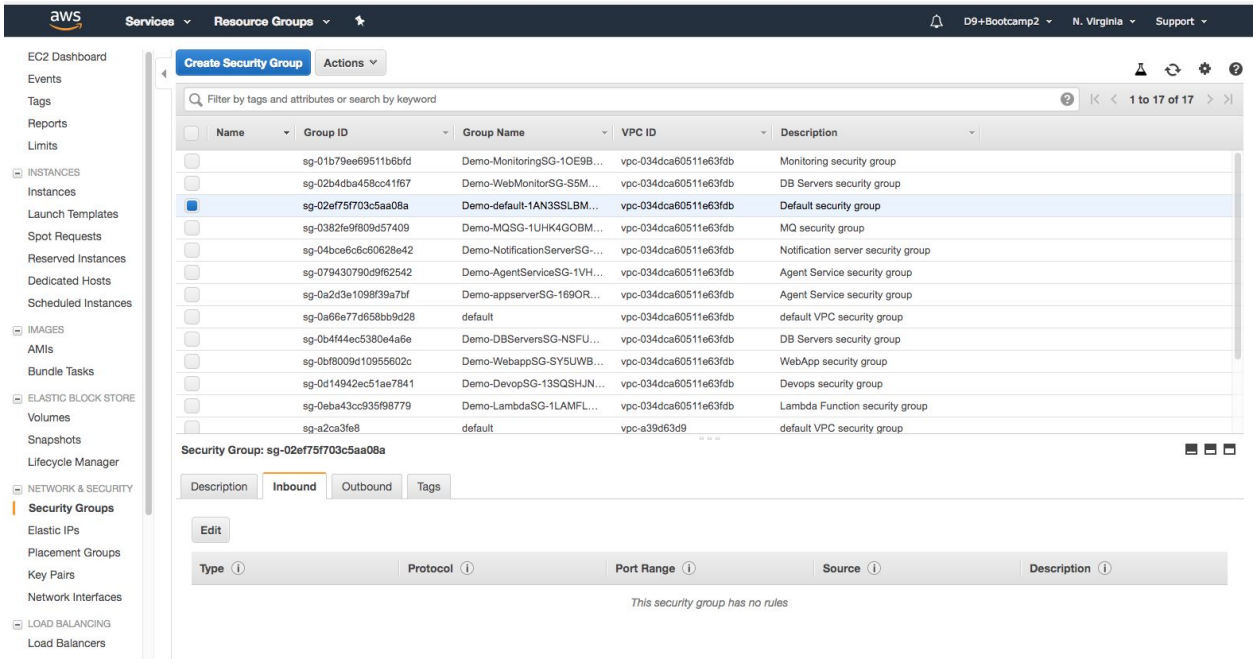
You can see the activity trail in the audit log which is extracted context from CloudTrail



You should see the configuration reversed back to the gold standard configuration



You can also confirm it in the AWS console

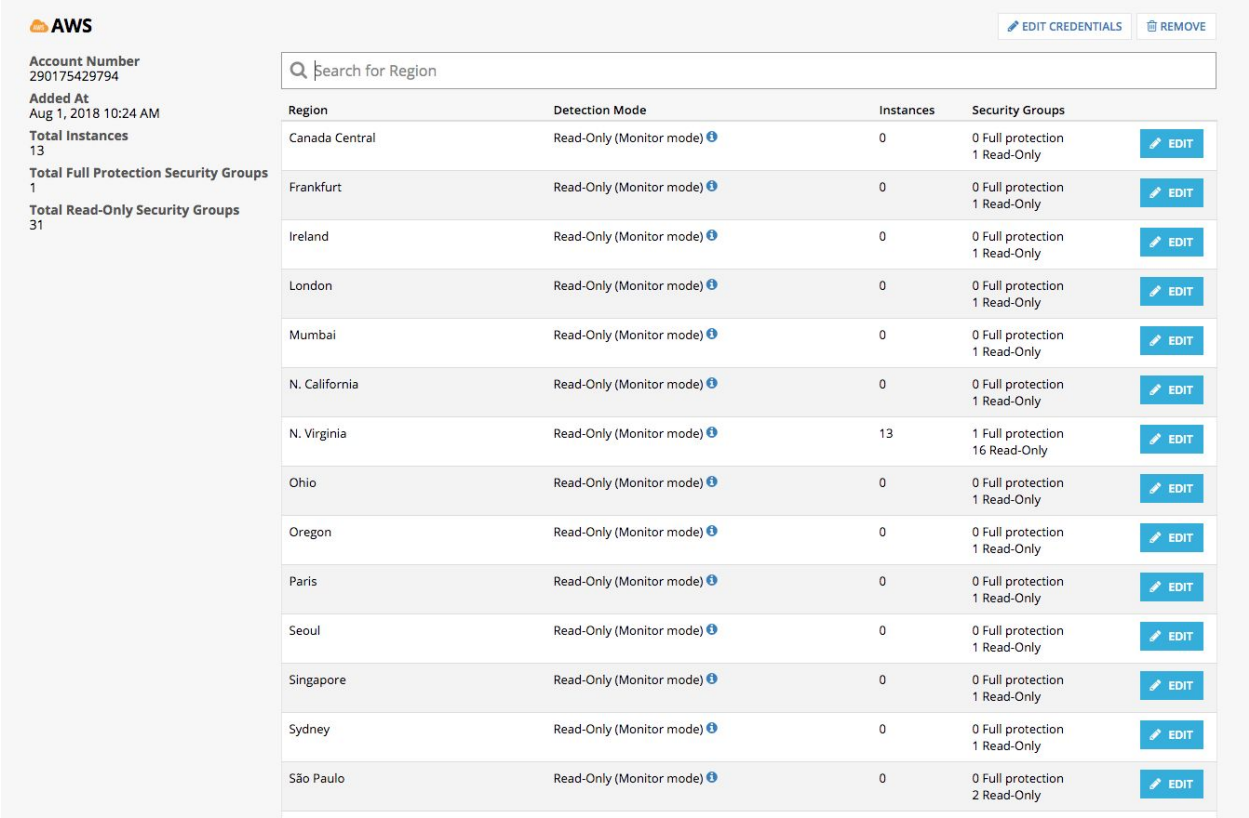


Exercise Complete! You have now enabled enforcement of security policies and eliminate configuration drift at a security group level in AWS

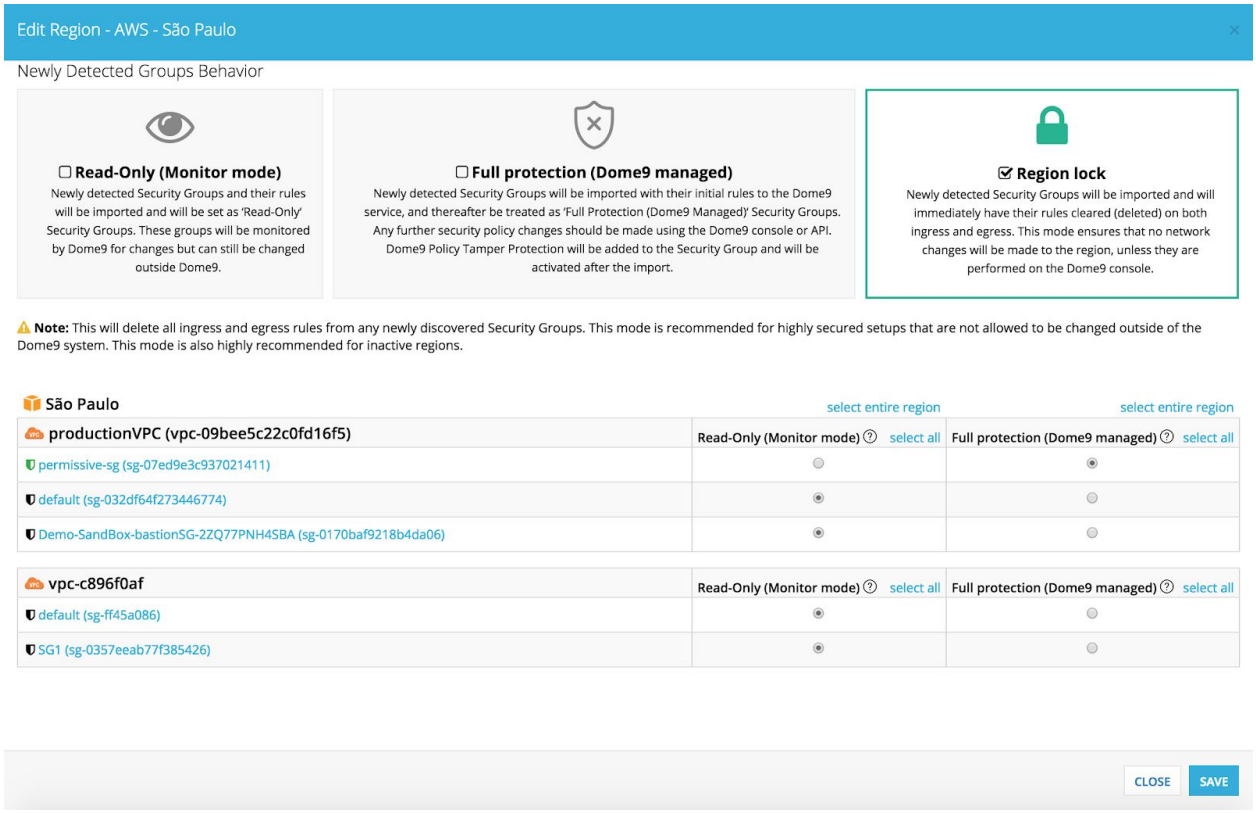
Exercise 3.2: Active protection – Region level

Let's turn on Region Lock first in Dome9 (Lock down Sao Paolo region)

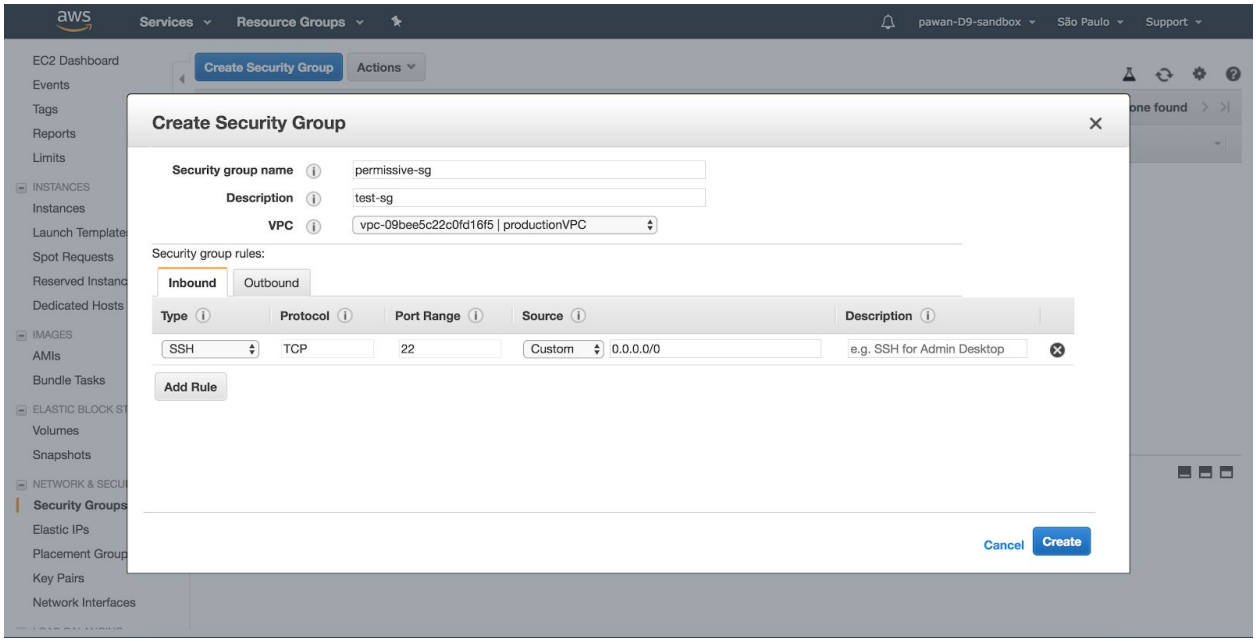
Go to the cloud inventory and select cloud accounts and navigate to Sao Paolo region.



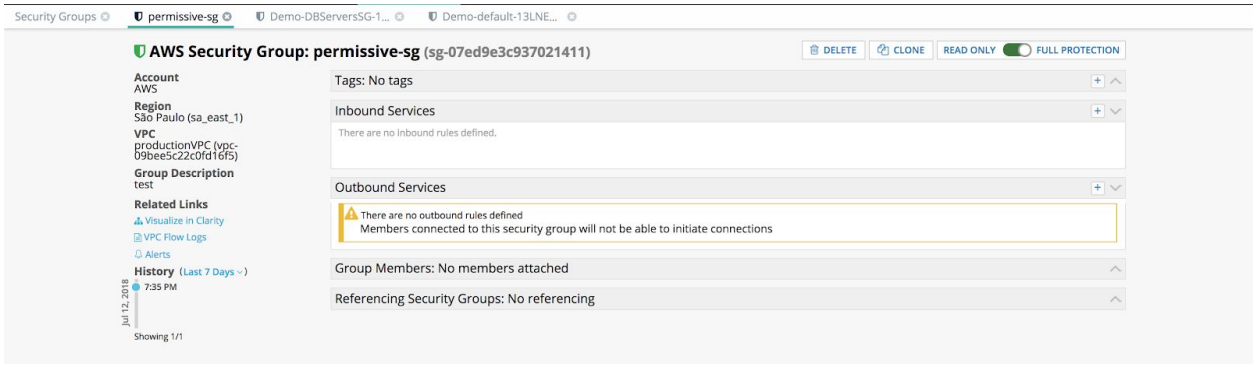
Let's assume this would be an unused foreign region where you would not expect activity happening. You can turn on Region Lock to ensure no changes are made to this region unless its from within Dome9.



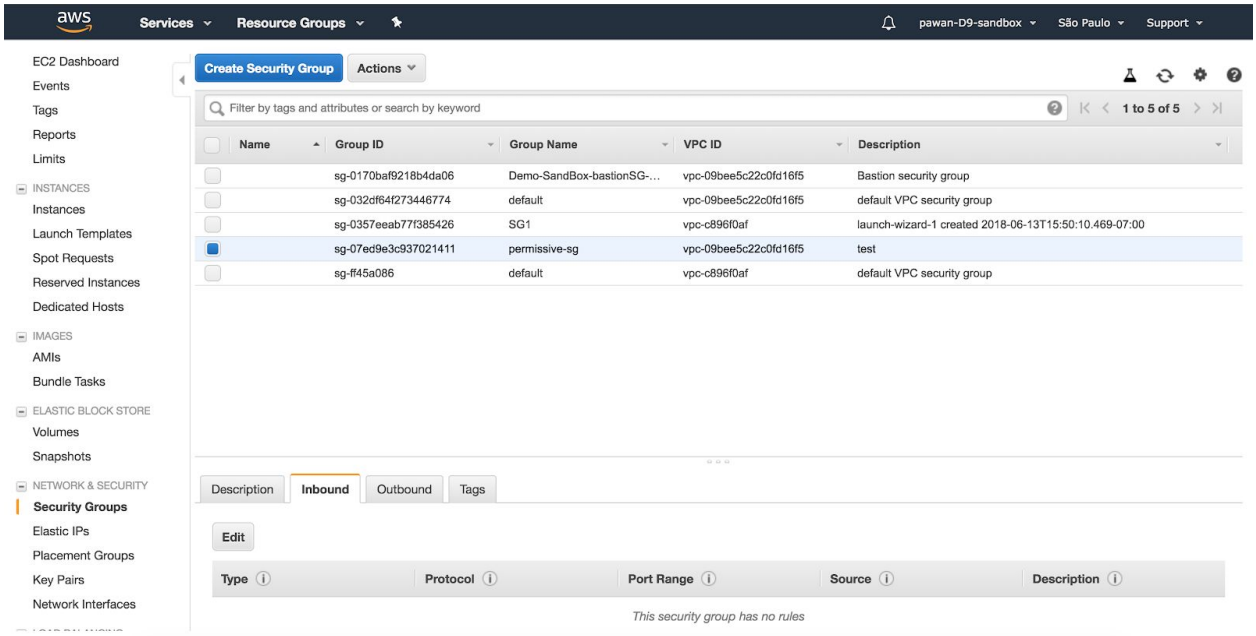
Go to the AWS console and create a new SG in Sao Paolo



Go back to Dome9 console, you should see this new SG's inbound/outbound rules deleted.



You can also confirm it in the AWS console in Sao Paolo

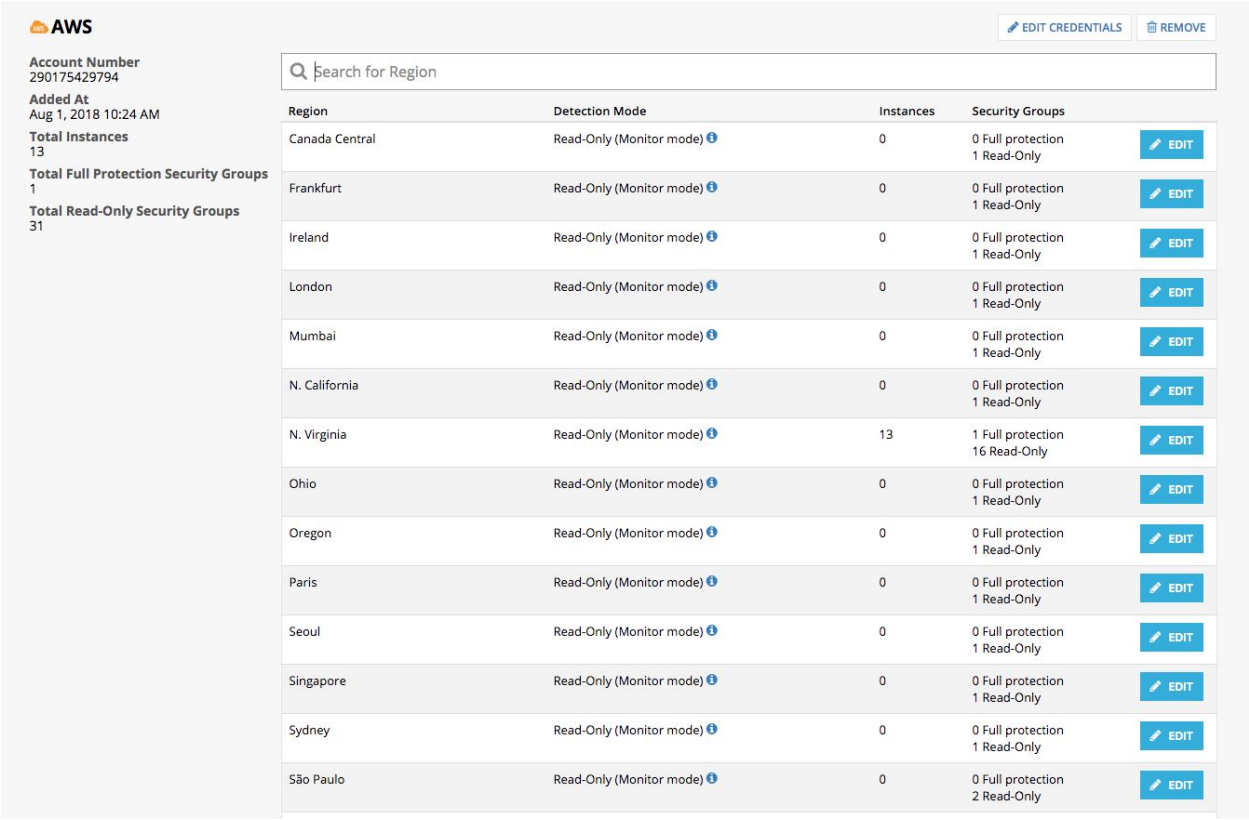


Exercise Complete! You have now enabled enforcement of security policies and eliminate configuration drift at a region level in AWS.

Application Infrastructure Security Lab

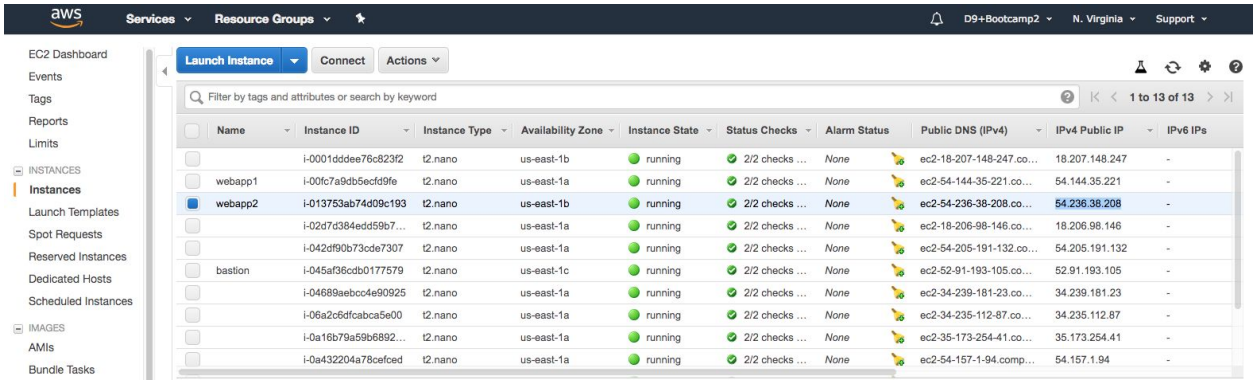
Exercise 4.1: Access internal HTTP application via browser

In **Dome9 console** - Make sure you turn on **full protection mode** for **N.Virginia Region** in the cloud accounts.

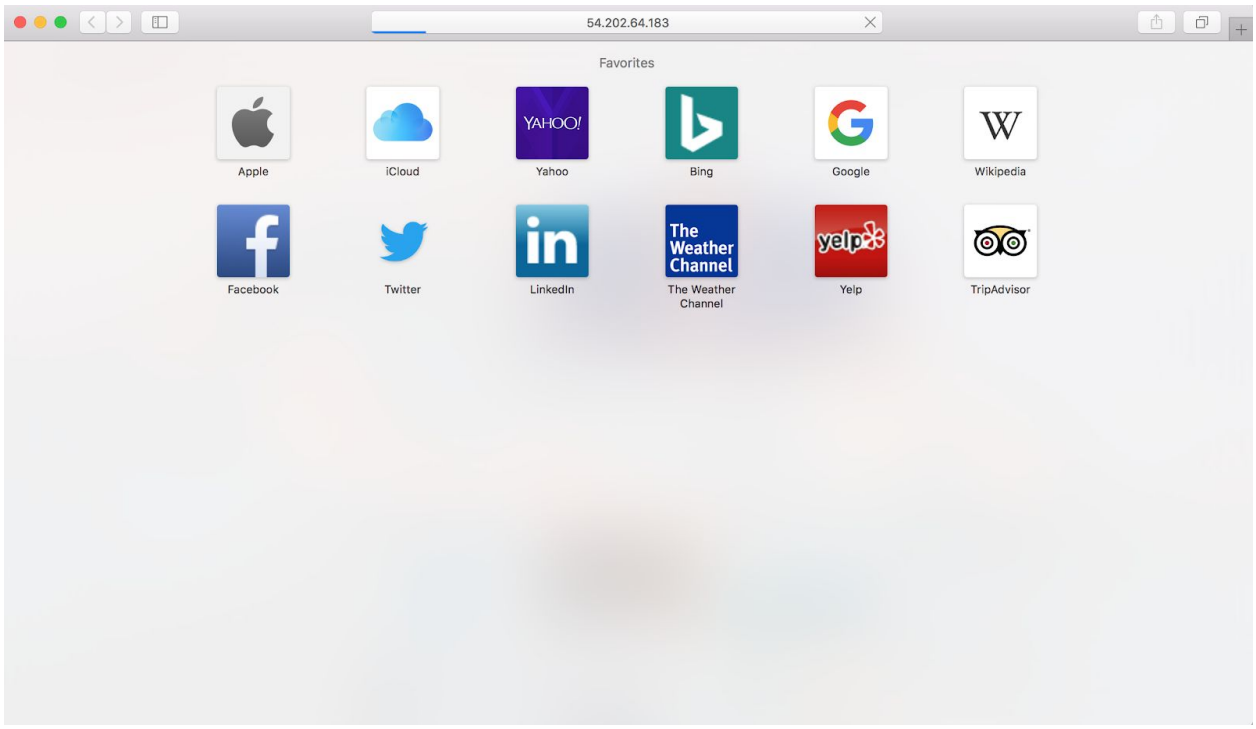


This part of the lab shows how you can get on demand access to ports and services using Dome9 Dynamic access feature. For this lab, we have a web server running but access is closed off. Let's try to access it

Navigate to the web application IP, this is the webapp2 IP that you can find from the EC2 console in AWS



Navigate to the IP:



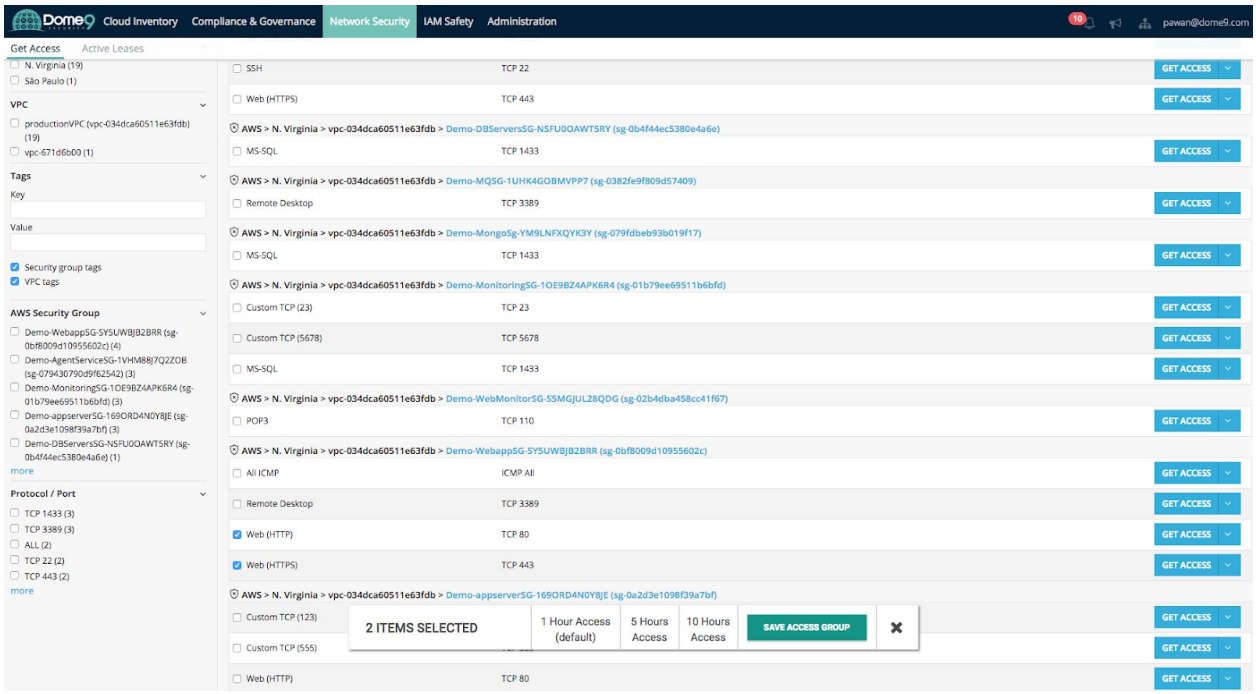
You should see nothing pop up. This is because by default, the connection to this web server is blocked. As a best practice, ports and services are closed by default and are opened just on demand to access the service for a pre-defined period of time. Now let's see how that works.

Exercise Complete!

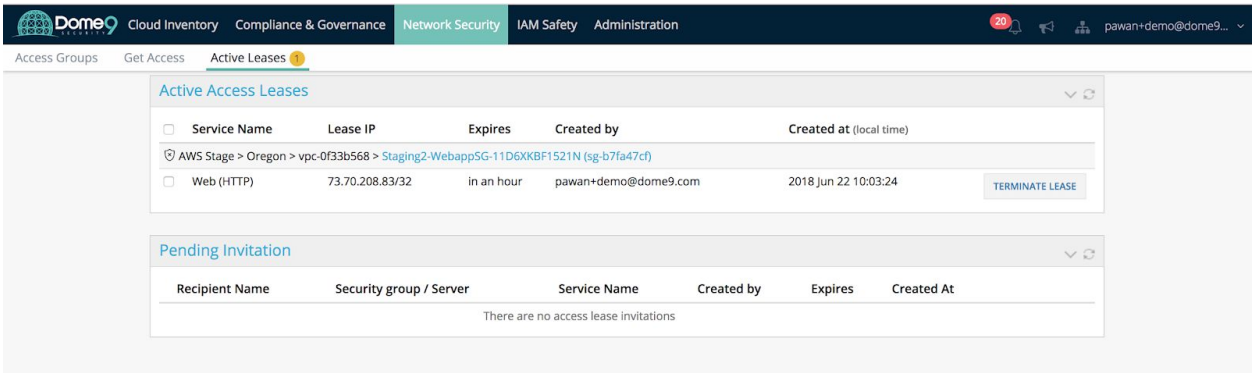
Exercise 4.2: Dynamic access leases

In Dome9 - Navigate to dynamic access in the network security menu bar

Click “Get Access” and select webappSG access for http TCP port 80/443, and save it as **“Demo”**



Now you have an active lease, associated with your IP for a period of time (1 hour in this case)



Now jump back to your browser and see if you were able to access the web page.

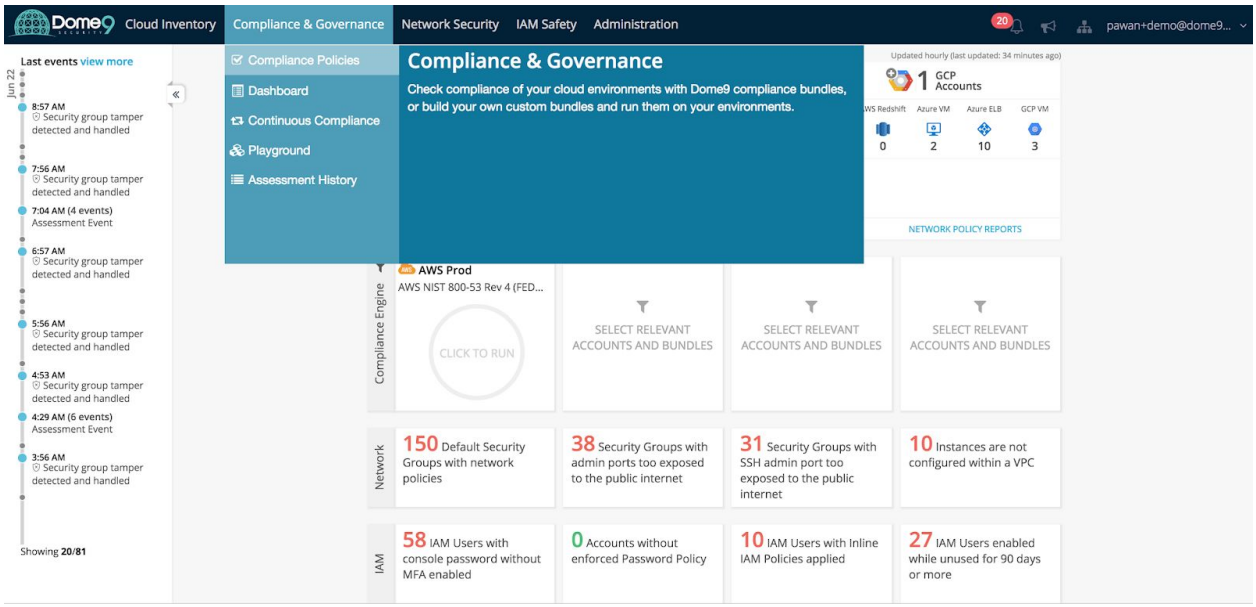
This concludes the lab on application security hardening and best practices. Let's now move on to the final lab which will cover compliance and governance.

Exercise Complete! You have now successfully opened up the web service for just in time access and thereby followed proper security hardening practice

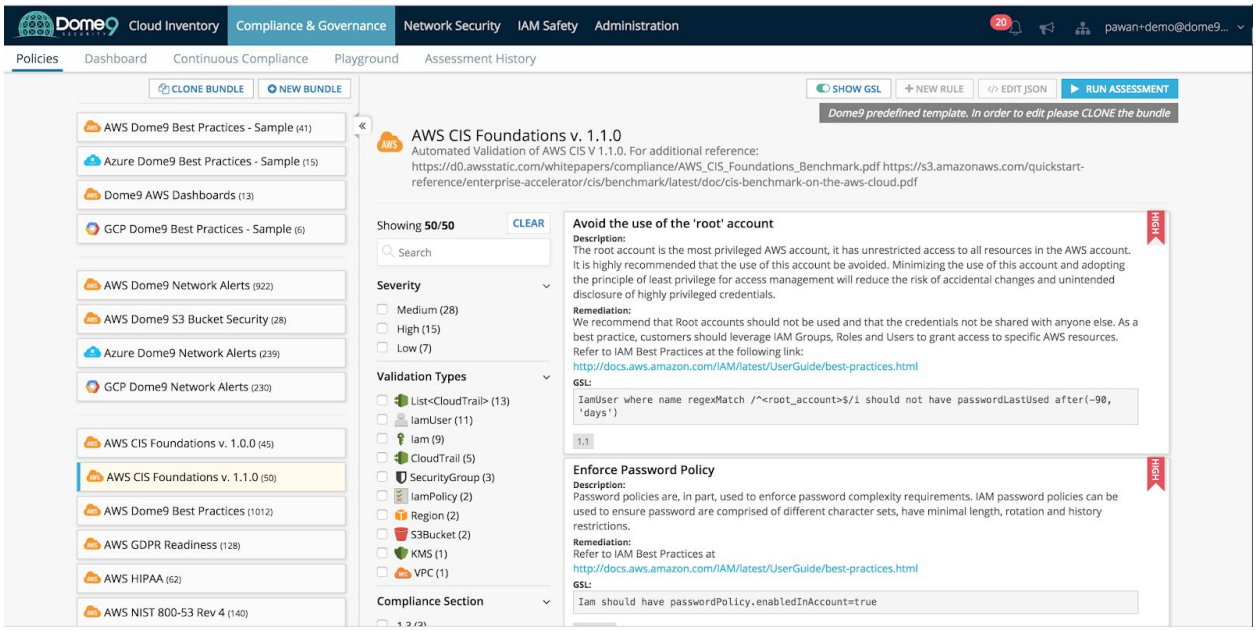
Compliance and Governance Lab

Exercise 5.1: Compliance assessment

1. Navigate to Compliance Engine Tab

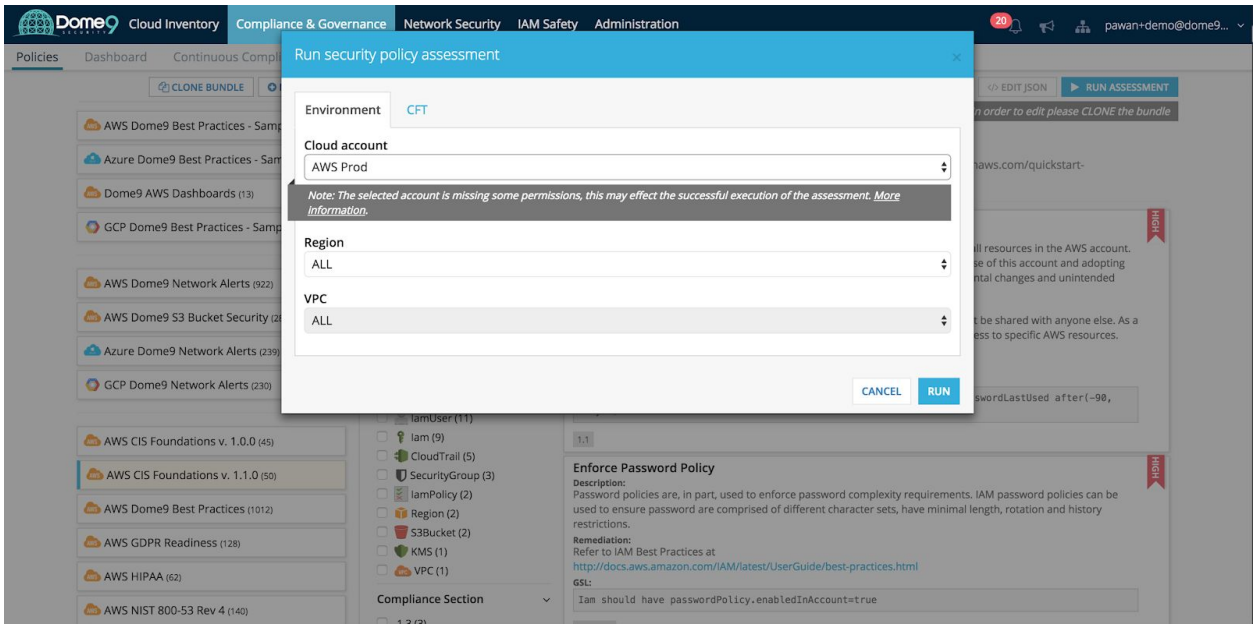


2. Explore Compliance Engine page



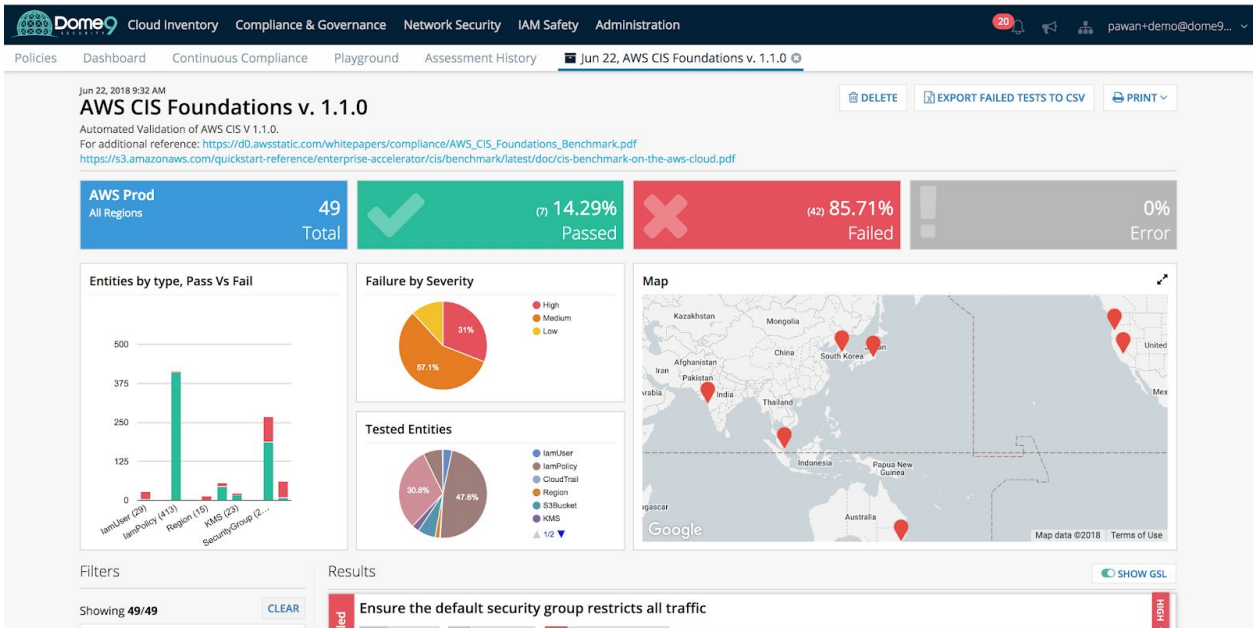
Dome9 Compliance Engine monitors and scans your AWS/Azure/GCP infrastructure to ensure alignment with compliance standards such as PCI-DSS, NIST 800-53, GDPR, CIS etc.

3. Select CIS Benchmarks and run bundle assessment



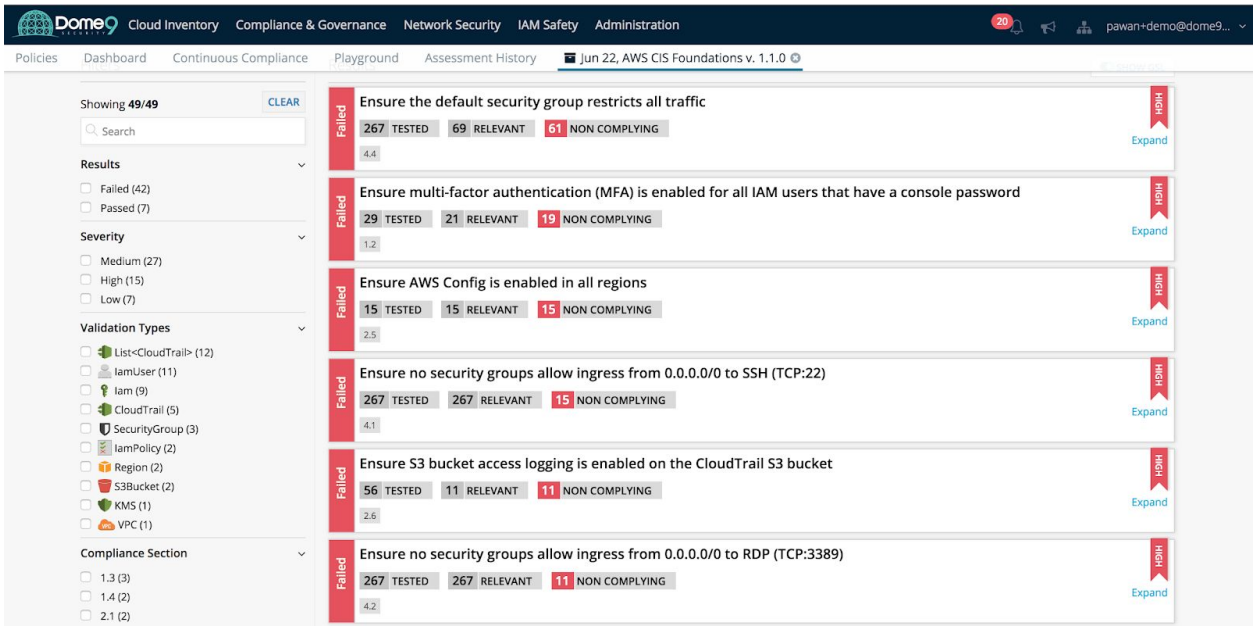
Select your AWS environment in the cloud account section. Dome9 also provides the option to BYOC (Bring your own CFT) and scan your template before pushing to production.

5. Analyze the report findings



Within a few seconds, the Compliance Engine runs an assessment and provides detailed findings in an easy to use dashboard. You can see the number of test cases passed vs failed, as well as test cases segmented geographically, across regions and by test severities.

6. Analyze key test results for Security Group section



A few cases you can check on:

1. Ensure password policy on
2. Cloud Trail enabled in all regions
3. VPC flow logs enabled
4. Ensure default security group does not allow 0.0.0.0/0 to SSH

7. Analyze test cases for S3 bucket

1. Ensure bucket is not publically accessible
2. Ensure versioning is turned on

3. Ensure encryption is on.

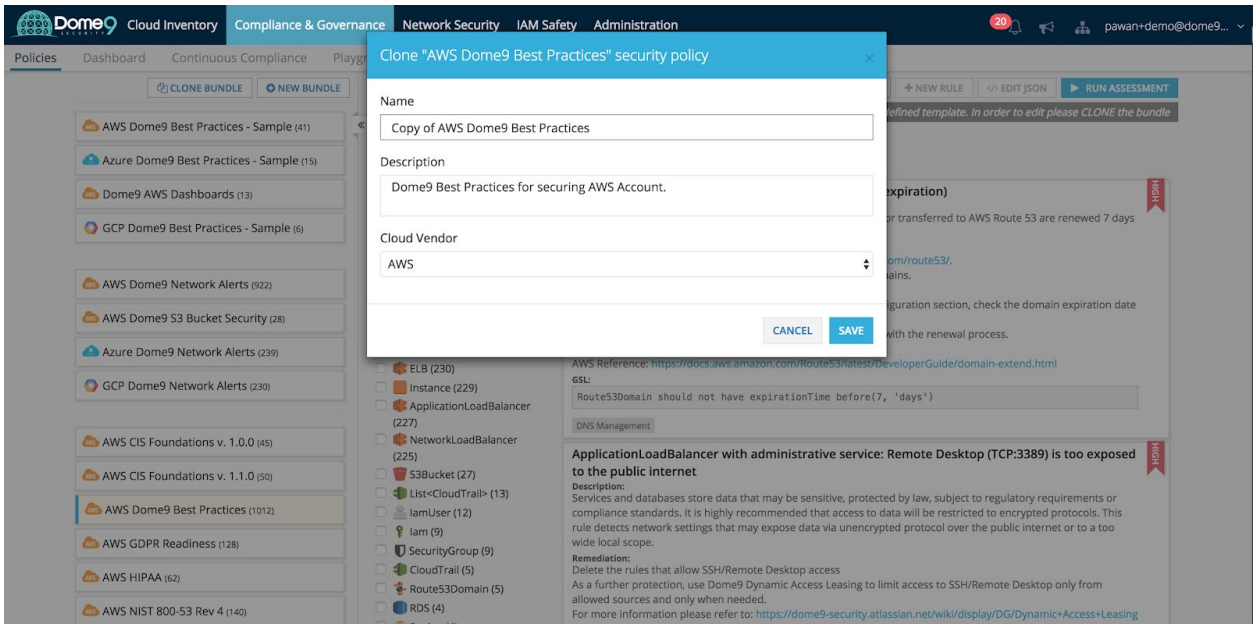
Exercise Complete! You have now successfully explored CIS best practices, and the test cases associated with this framework.

Exercise 4.2: Custom Governance Rules

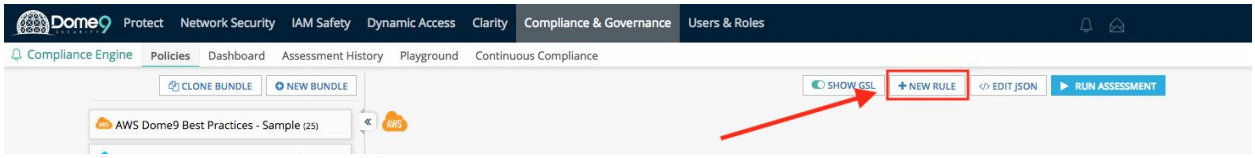
Dome9 allows for you to create your own custom rules. Here is how to access the GSL Rule Builder to create your own custom rule:

1. In the Dome9 dashboard, navigate to Compliance & Governance and select 'Compliance Engine'
2. 

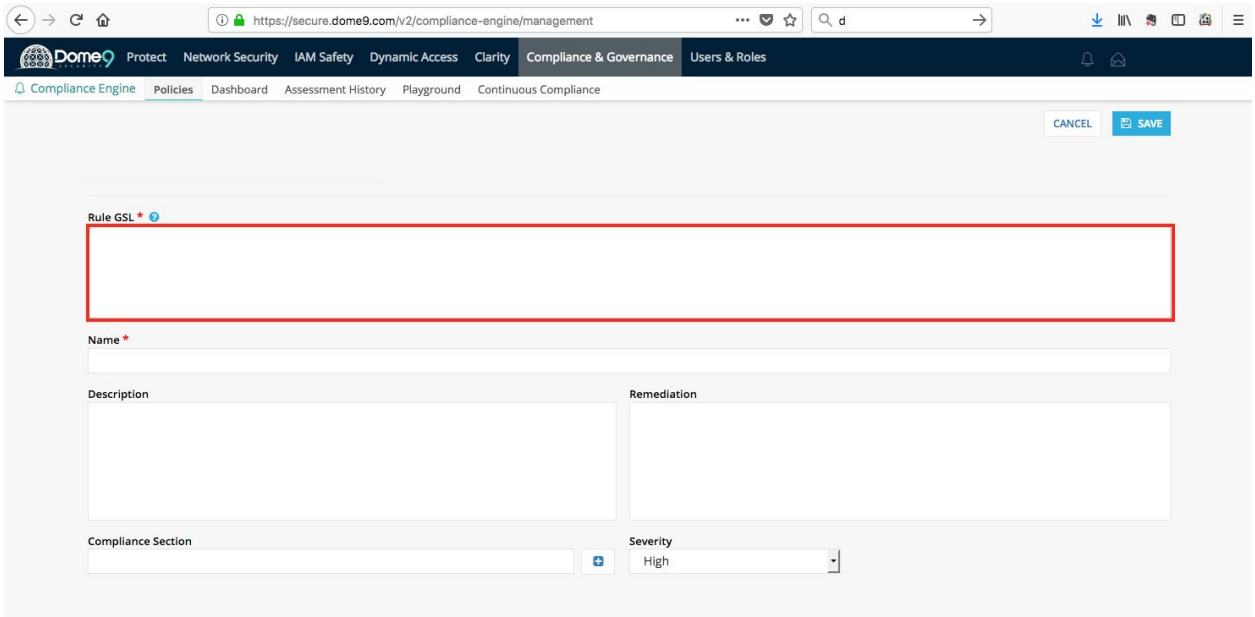
3. You must create a your own bundle if you'd like to create your own custom GSL rules. You can clone an existing bundle or create a new one. Let’s clone the existing Dome9 Best Practices bundle

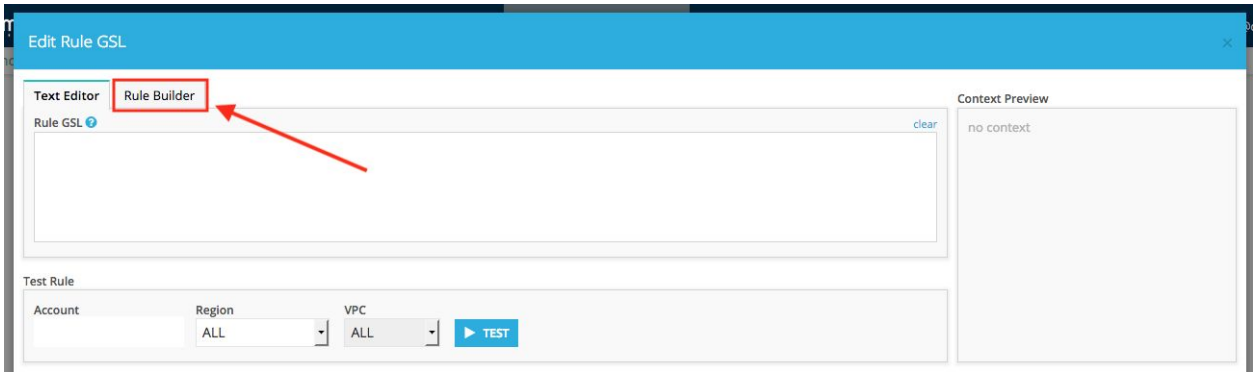
4. 

5. Now you can create custom rules for your newly created bundle. To create a new rule, select 'New Rule'

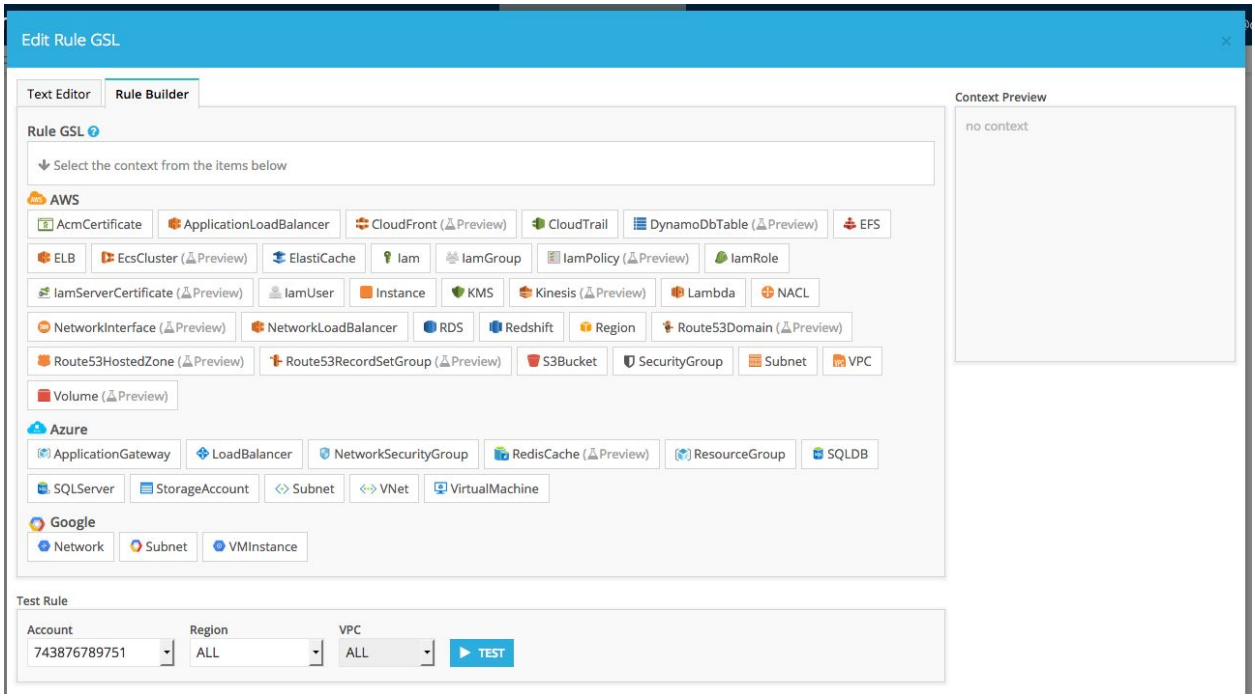
6. 

7. To begin creating your new rule, click in the box that says 'Rule GSL'

8. 

9. Dome9 offers multiple ways for you to create your rules. You can use the Text Editor to create your custom rule, or you can use the Dome9 Rule Builder. To use the Rule Builder, select the tab that says 'Rule Builder'
10. 

11. Here is where you can access the Rule Builder to build out your custom GSL rules



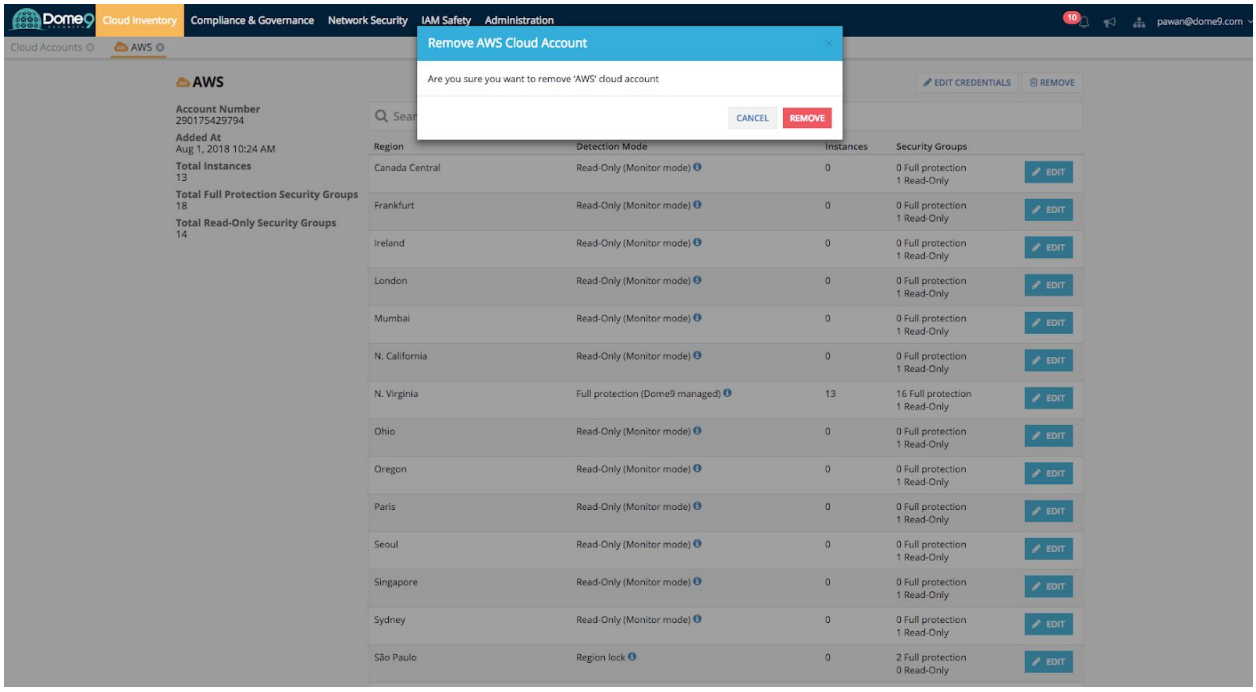
Now as part of this exercise, write your custom rule that highlights tagged instances with key value as “PCI”

Once you are done, run the bundle and check your report in the findings view.

Exercise Complete! You have now successfully written custom rules for unique governance policies.

Offboarding

Go to Cloud Inventory, cloud accounts, and remove the existing AWS account from your Dome9 free Trial



Hope you enjoyed this lab! We hope to see you again soon!